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European Commission

Study on Regulatory Incentives for the Deployment of Very High Capacity Networks in the Context of the Revision of the Commission's Access Recommendations

Final report

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STUDY ON REGULATORY INCENTIVES FOR THE DEPLOYMENT OF VERY HIGH CAPACITY NETWORKS IN THE CONTEXT OF THE REVISION OF THE COMMISSION'S ACCESS RECOMMENDATIONS

Final report

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ABSTRACT

The overall objective of this study is to support the Commission in assessing the need to revise its current guidance to National Regulatory Authorities (NRAs) regarding regulatory incentives for deploying Very High Capacity Networks (VHCN). Current guidance is primarily provided in the Next Generation Access (NGA) and the Non-discrimination and Costing Methodologies (NDCM) Recommendations. The results of this study can serve as an evidence base for the development of a new recommendation.

The study employed a mixed-methods approach, based on desk research, surveys of EU NRAs and network operators, interviews, case studies in 10 Member States, and full-day workshops with NRAs and with other stakeholders.

The study focuses on six key areas. The analysis of the approach towards pricing flexibility and price regulation shows that the costing methodology advocated in the NDCM Recommendation is widely supported by stakeholders. Cost orientation is imposed by many NRAs for access to one or more NGA wholesale products. However the use of the pricing flexibility, though still limited, is growing. There is substantial variation in the implementation of non-discrimination obligations, but very few NRAs perceive causal links between non-discrimination and incentives to invest in very high capacity network deployment. The scope of physical infrastructure access obligations imposed on operators with significant market power (SMP) varies across the EU, but the guidance on transparency and pricing seems to be followed by nearly all NRAs. Operators use a mix of cooperative arrangements and commercial agreements for wholesale broadband access. Most of these arrangements and agreements have been taken into account during the market reviews. The number of NRAs that differentiate remedies geographically is limited so far. Although the use of geographic differentiation varies greatly among NRAs, it is likely to be used increasingly for 'fine tuning' remedies. The NGA Recommendation brought consistency in the overall approach to migration from copper to fibre, but not in the details of its implementation.

Our results suggest that many aspects of the current Access Recommendations remain fit for purpose, but that further refinement is needed. The study led to recommendations on a number of issues, including but not limited to: the use of pricing flexibility overall; the "copper anchor"; the Economic Replicability Test (ERT); volume discounts and long term pricing; flexibility and measures to protect facilities-based competition; the price band; pricing of SMP civil engineering infrastructure; calculation of the next generation access / VHCN risk premium; choosing between Equivalence of Input (EoI) and Equivalence of Output (EoO); the Technical Replicability Test (TRT); dealing with information asymmetry; effective access to legacy ducts; improving the quality of databases and ordering processes; aligning the successor recommendation with the Broadband Cost Reduction Directive (BCRD); conditions warranting an out-of-cycle review of the SMP obligations; NRA engagement in forming cooperative arrangements; geographically differentiated market definition versus differentiated remedies; the recommended notice period for migration to fibre; possible departure from the principle of cost-orientation for legacy services in the context of migration to fibre-based networks; and the degree to which NRAs should oversee the migration process.

RESUME

Cette étude a pour objectif principal d'appuyer la Commission dans son évaluation de l'opportunité de réviser les orientations qu'elle a adressées dans le passé aux autorités réglementaires nationales (ARN) en ce qui concerne les incitations réglementaires au déploiement de réseaux à très haut débit (VHCN). Ces orientations figurent principalement dans les Recommandations sur l'accès réglementé aux réseaux de nouvelle génération (NGA) et las recommandations sur des obligations de non-discrimination et des méthodes de calcul des coûts (NDCM). Les résultats de cette étude pourront servir de fondement factuel pour l'élaboration d'une future recommandation, appelée à remplacer lesdites recommandations. L'approche méthodologique utilisée pour l'étude est mixtes : elle combine des recherches documentaires, des enquêtes auprès des ARN et des opérateurs de réseau de l'UE, des entretiens, des études de cas dans 10 États membres et des ateliers d'une journée complète avec les ARN et les autres parties prenantes.

L'étude porte sur six domaines phares. L'analyse des approches de flexibilité et de régulation tarifaire montre que la méthode de calcul des coûts préconisée dans la recommandation NDCM est largement acceptée par les parties prenantes. L'orientation vers lees coûts est imposée par de nombreuses ARN pour l'accès à un ou plusieurs produits d'accès de gros NGA. Toutefois, l'utilisation de la flexibilité tarifaire, bien qu'elle soit encore limitée, est en augmentation. La mise en œuvre des obligations en matière de non-discrimination varie considérablement, mais très peu d'ARN perçoivent des liens de causalité entre l'imposition d'obligations de non-discrimination et les incitations à investir dans le déploiement de réseaux à très haut débit. La portée des obligations en matière d'accès aux infrastructures physiques imposées aux opérateurs puissants sur le marché (PSM) varie d'un État membre à l'autre, mais les orientations de la Commission en matière de transparence et de tarification semblent être suivies par presque toutes les ARN. Les opérateurs utilisent une combinaison d'accords de coopération et de contrats commerciaux pour l'accès en gros à haut débit. La plupart de ces accords et contrats ont été pris en compte par les ARN lors de leurs analyses de marché. Le nombre d'ARN qui différencient géographiquement les mesures correctrices imposées est jusqu'à présent limité. Alors qu'aujourd'hui l'utilisation de la différenciation géographique varie considérablement d'une ARN à l'autre, une telle différentiation est susceptible d'être utilisée de plus en plus pour 'affiner' des mesures correctrices. Enfin, il appert que la recommandation NGA a favorisé une plus grande cohérence dans la régulation parles ARNs de la migration de la paire cuivre vers la fibre, bien que les détails de mise en œuvre continuent de diverger.

Nos résultats suggèrent que de nombreuses orientations des recommandations actuelles en matière d'accès restent adaptées aux objectifs du Code des communications électroniques européen (CCEE), mais qu'il est dans certain cas nécessaire de les mettre à jour. L'étude contient à cet égard des propositions sur un certain nombre de questions, y compris, mais sans s'y limiter, les suivantes: l'utilisation de la flexibilité tarifaire et ses conditions; le produit de référence pour le réseau en cuivre; l'essais de reproductibilité économique (ERE); les remises sur quantité et les accords de tarification de l'accès à long terme; la flexibilité et les mesures nécessaires afin de protéger la concurrence fondée sur les infrastructures; la fourchette de tarifs; la tarification de l'accès aux infrastructures de génie civil des opérateurs PSM; le calcul de la prime de risque incluse dans le tarif d'accès de gros aux réseaux de nouvelle génération/VHCN; le choix entre l'imposition de l'équivalence des intrants (EoI) ou de l'équivalence des extrants (EoO); l'essai de reproductibilité technique (ERT); le traitement de l'asymétrie de l'information; l'accès effectif aux fourreaux existants; l'amélioration de la qualité des bases de données et des processus de commande; la prise en compte par la future recommandation de la directive sur la réduction du coût du déploiement de réseaux de communications électroniques à haut débit (BCRD); les conditions justifiant un examen hors révision quinquennale des mesures correctrices relatives à la PSM; l'implication des ARN dans la mise en place d'accords de

coopération; le définition du marchés différenciés géographiquement par rapport à la différentiation géographique de mesures correctrices; le délai d'information préalable recommandé en cas de migration vers la fibre optique; l'abandon éventuel du principe de l'orientation vers les coûts de l'accès à la paire de cuivre dans le contexte de la migration vers les réseaux fibre optique; et la mesure dans laquelle les ARN devraient superviser le processus de migration.

TABLE OF CONTENTS

LIST OF FIGURES 10
LIST OF TABLES 11
LIST OF FINDINGS 13
LIST OF RECOMMENDATIONS 17
ABBREVIATIONS 23
PART I: INTRODUCTION AND DEVELOPMENTS IN BROADBAND DEPLOYMENT 25
1. Introduction 25
2. Broadband deployment, economic incentives and EU policy 31
a. The problem has evolved since the Access Recommendations were enacted 31
b. From NGA to VHC and new enhanced networks 32
c. Broadband in EU Member States 38
d. Solving the challenge of high-speed broadband deployment 43
e. Different media and regulation 45
f. Geographic aspects 47
g. A review of key economic literature regarding broadband deployment in the EU 48
h. Evolution of the EU broadband policy 54
PART II: RETROSPECTIVE ANALYSIS 57
3. The 2010 NGA Recommendation 57
a. Context 57
b. Main remedies recommended 58
4. The 2013 NDCM Recommendation 61
a. Context 61
b. Main recommended approaches 62
5. Implementation of the recommended approach towards price regulation 67
a. Summary of findings 67
b. Introduction 70
c. Guidance on cost orientation of wholesale access 72
d. Guidance on the price band 87
e. Guidance on the application of an NGA specific risk premium 90
f. Guidance on the criteria put forward for the assessment of long-term access pricing and volume discounts 101
g. Guidance on the implementation of an ERT 104
h. Guidance on the *copper anchor* 119
i. Guidance on other circumstances in which pricing remedies are not appropriate 123
j. Guidance on pricing remedies other than cost orientation 126
6. The recommended non-discrimination obligations 136
a. Summary of findings 136
b. Introduction 136
c. Guidance relating to EoI and EoO obligations 138
d. Guidance relating to the technical replicability test (TRT) 152
e. Guidance on monitoring of non-discrimination obligations 160
f. Guidance relating to SLAs 165
7. Regulation of civil engineering infrastructure and relations between asymmetric SMP regulation and symmetric access 172

a. Summary of findings 172
b. Introduction 173
c. Guidance on the design of the SMP remedy 175
d. Guidance on the centralisation of information on available civil engineering 190
e. Usage of symmetric access obligations or negotiated access under the BCRD as alternative 195
8. Cooperative or sharing arrangements between operators aiming to foster the deployment of new fixed networks 201
a. Summary of findings 201
b. Introduction 201
c. Overview of cooperative or sharing arrangements already concluded or planned to be concluded 203
9. Geographic dimension of regulation, in particular regarding the geographic segmentation of remedies 221
a. Summary of findings 221
b. Introduction 221
c. Application of geographic segmentation of remedies as opposed to sub-national geographic markets 223
10. Regulatory incentives to foster migration from copper to fibre 234
a. Summary of findings 234
b. Introduction 234
c. Initial follow up by NRAs 237
d. Commission's comments letters 238
e. The current situation 239
f. Different evolution stages of network development across the EU explain most of the divergence found 241
g. The prior notice period in the absence of a commercial agreement 243
h. Alternative products of at least comparable quality providing access to the upgraded network infrastructure 246
i. Regulatory incentives to facilitate migration from copper to VHCN 249
PART III: FORWARD LOOKING ANALYSIS 257
11. A suggested way forward 257
a. The scope of each provision of the successor Recommendation 258
b. Price regulation and pricing flexibility 260
c. Non-discrimination obligations 299
d. Access to Civil Engineering Infrastructure 314
e. Cooperative arrangements and other structural arrangements 323
f. Geographic differentiation 326
g. Migration from legacy infrastructure 329
ANNEX 1: LIST OF REFERENCES 336
ANNEX 2: SUMMARY OF NRA WORKSHOP 346
ANNEX 3: SUMMARY OF STAKEHOLDER WORKSHOP 349

LIST OF FIGURES

Figure 1. NGA Coverage in EU Member States in 2019. 34

Figure 2. Ultra-fast broadband (connections of 100 Mbps or higher) coverage in EU Member States in 2019 35

Figure 3. Gigabit (connections of 1 Gbps or higher) coverage in EU Member States in 2019 36

Figure 4. Overall fixed VHCN coverage in EU Member States in 2019 38

Figure 5. DOCSIS 3.0 and DOCSIS 3.1 coverage in EU Member States in 2019 39

Figure 6. VDSL and VDSL 2 Vectoring coverage in EU Member States in 2019 39

Figure 7. FTTP coverage in EU Member States in 2019. 40

Figure 8. Households with FTTH/B coverage in Europe in 2019. 41

Figure 9. Rural and overall NGA Coverage in EU Member States in 2019 42

Figure 10. Share of households with broadband access in Europe in 2019-2020. 43

Figure 11. Evolution of the EU regulatory framework for electronic communications with respect to broadband (not including termination), 2002-2021 55

Figure 12. The relationship between fixed penetration and FTTP coverage 76

Figure 13. Monthly LLU prices in selected European countries 88

Figure 14. NRAs applying a retail ex ante MST as a complement to price control versus those applying ERT to enable pricing flexibility (comparison of 2019 to 2020). 105

Figure 15. Regulation for FTTH products 112

Figure 16. Wholesale MST in France 113

Figure 17. Distribution of (active) fixed broadband lines by transmission speed (2015-2019) 130

Figure 18. Single information point tasks, set out under BCRD, assigned to NRAs in the EU 192

Figure 19. Take-up of bundles in the Spanish broadband market. 266

Figure 20. The legacy (copper-based) WACC and the NGA/VHCN (fibre-based) WACC plus risk premium (if any). 283

Figure 21. Frequency of update of the WACC 291

LIST OF TABLES

Table 1. Structure of the report 29
Table 2. NRA regulation of wholesale access products 68
Table 3. Overview of price control remedies 71
Table 4. NRAs applying cost orientation and/or ERT 74
Table 5. Use of LRIC, LR(A)IC and FDC in Member States 78
Table 6. Monthly ULL chargers in selected countries 79
Table 7. Use of guidance of the Recommendation 85
Table 8. Monthly fees and other key parameters in largest current (and former) EU Member States 88
Table 9. Pricing remedies and/or ERT and NGA specific risk premium applied 92
Table 10. The lack of consistency was illustrated by the following overview of approaches by NRAs 98
Table 11. Listed factors of uncertainty identified by NRAs as being relevant in their respective national market 100
Table 12. SEO market shares of selected countries 111
Table 13. Approaches to ERT monitoring 115
Table 14. Use of MST as a complement to cost orientation 119
Table 15. Additional margins by speed category for bitstream over cable 128
Table 16. Additional margins by speed category for VULA FTTH and bitstream over FTTH 129
Table 17. Non-discrimination obligations 141
Table 18. Elements of guidance in the current Recommendations deemed useful by NRAs when designing their EoI regime 148
Table 19. Approaches to implementing the TRT 155
Table 20. Best practices related to KPIs 156
Table 21. Elements of the regulated wholesale services that are covered by KPIs aiming at monitoring a non-discrimination obligation 158
Table 22. Who monitors, ex-post, the compliance of the SMP operator with technical replicability tests and/or key performance indicators? 162
Table 23. Best practices relating to SLAs and SLGs 167
Table 24. Type of physical infrastructure to which access was imposed in the market analysis in the EU Member States 177
Table 25. Overview of adherence to key guidance NGA Recommendation in a sample of Member States relating to the topics of effective access, pricing and transparency 179
Table 26. Overview of availability of a single database on PI. 192
Table 27. A selection of notable co-investment or access agreements to which the SMP operator is party 203
Table 28. A selection of co-investment agreements between alternative operators and third parties 205
Table 29. A selection of commercial agreements on access to wholesale active services 207
Table 30. Co-investment projects in EU MS 218

Table 31. Geographic segmentation of remedies 224

Table 32. Migration practices by selected Member States 239

Table 33. Overview of the notice periods and associated wholesale obligations in 10 EU Member States. 243

LIST OF FINDINGS

Finding 1. A limited number of NRAs made use of the pricing flexibility proposed by the NDCM Recommendation. 74

Finding 2. The costing methodology put forward in the NDCM Recommendation is widely supported across various stakeholders and countries. However, Recital 41 NDCM Rec refers to modelling the hypothetical efficient NGA network in the 2013 context referring to DAE. In defining the appropriate technology/level of performance "depending on the access technology and network topology that best fit national circumstances", NRAs do not yet pay much attention either to the VHCN notion or the 2030 policy targets (just as the NDCM). In that regard, the reference to FTTC does not appear very future proof. At the same time, the remainder of the approach advocated in Point 37 remains to be fit for purpose. 81

Finding 3. The recommended price band has ensured the stability of the monthly wholesale rates for ULL. However, one notes a growing divergence between the regulated ULL maximum rates set across the EU. It is not clear whether this evolution reflects only national differences or is due to the application of the costing methodology used. 90

Finding 4. Six of the ten NRAs imposing cost orientation on VULA FTTH access and/or fibre unbundling do not (or no longer) apply NGA specific risk premia. This raises the question as to why. A closely related question is the impact of such NGA specific risk premia on wholesale access prices. 93

Finding 5. The few NRAs applying risk premia follow the guidance of the NGA Recommendation. Some explicitly do the computation themselves, while others use benchmarks. 94

Finding 6. Only a few NRAs report volume discounts being applied by the SMP operator on the price of regulated wholesale access products. No NRA reports specific evidence of a link between volume discounts and investments in VHCN. 102

Finding 7. A significant number of NRAs report the use of long-term pricing agreements in their respective Member States. Some say that these long-term commitments have supported NGA deployment. 103

Finding 8. Where NRAs apply flexibility, they tend to follow the guidance provided and consider that the guidance provided in the NDCM Recommendation will likely continue to be adequate to deal with future technological and market evolutions. 106

Finding 9. NRAs applying the recommended pricing flexibility or those that applied a margin squeeze test instead of cost orientation, consider the approach to have contributed to promoting efficient investment in NGA/VHC networks, leading to an increase in NGA/VHC networks and better quality of service for end-users. 107

Finding 10. NRA approaches regarding the transparency of the process of designing the ERT/MST vary and transparency is alleged to be unsatisfactory by some operators. Transparency should address a number of key factors imbedded in the methodology, such as verification of forecast data accuracy, measures in case of failure, etc. 115

Finding 11. The process through which the effectiveness of the ERT is monitored varies strongly and is in some Member States allegedly ineffective. Moreover, the timing of the execution of the tests and of its follow up also diverge substantially. 117

Finding 12. The *copper anchor* continues to be relevant in many Member States. However, given the diverging market evolution in the various Member States, different 'anchor products' may be appropriate across the EU in the future. 122

Finding 13. Only a few NRAs that have designated an operator as having SMP on the market for wholesale local access have decided to waive pricing obligations, other than in the scenario of ERT, effective non-discrimination remedies, and retail price constraints as envisioned in the NDCM. .. 126

Finding 14. Only a few NRAs have imposed 'fair and reasonable' pricing obligations on SMP operators for wholesale broadband access products. The meaning attached to the term by each of them is different. BCRD uses a similar terminology for access to civil engineering and in-house cabling. However, national implementation reveals substantial differences of interpretation. 131

Finding 15. The Dutch NRA's experiment with a rate of return regulation was not emulated by other EU NRAs. However, the UK NRA's 'fair and reasonable' concept relies on the same regulatory philosophy. 135

Finding 16. Historically, EoI was perceived by some as a way to ensure strict non-discrimination without losing the benefit of vertical integration. It can in any case be considered a more proportionate approach than the imposition of functional separation, which is a last resort remedy. At the same time, where functional or structural separation is in place, certain non-discrimination requirements may no longer be warranted as suggested by the Czech NRA's approach. 145

Finding 17. When deciding on whether to impose EoI or EoO for specific access products, NRAs seldom proceed to a quantitative cost/benefit analysis, but rather rely on a qualitative estimation of the need to ensure 'stricter' non-discrimination for the wholesale access products at stake. 146

Finding 18. Notwithstanding the best practices listed in the Broadband Common Position (BoR (18) 24), substantial variation between the non-discrimination obligations imposed by NRAs remains. 148

Finding 19. Very few NRAs perceive causal links between strict non-discrimination and incentives to invest in VHCN deployment. No NRA acknowledges that such obligations may decrease access providers' incentives to invest in VHCN deployment. 148

Finding 20. Several comments acknowledge that any requirement to set up EoI will have a cost. However, access seekers did not express an inclination to pay for or share the costs of the implementation of EoI either in the online survey or during interviews. 151

Finding 21. Calls from operators to move from EoO to EoI often concern (potential) information sharing between wholesale and retail arms of the SMP operator. Beyond that specific issue, these calls seem to reflect problems related to the enforcement or the functioning of EoO rather than to the current guidance. Similar monitoring and enforcement problems are in some cases raised even when EoI is imposed. 152

Finding 22. TRTs, or at least KPIs, that ensure non-discriminatory replicability are available throughout the EU. However, comments received suggest that there is some room for improvement. 158

Finding 23. The manner in which KPIs are monitored varies substantially across the EU. Several comments by access seekers relate to alleged weaknesses in monitoring and enforcement. In some Member States, there appears to be a lack of transparency as to how NRA monitor KPIs, and what happens if they do not adhere to the rules. 165

Finding 24. Comments received sometimes go beyond the non-discrimination issue. Operators seemed concerned about QoS issues, stressing that KPIs set by the NRAs are sometimes not ambitious enough. 168

Finding 25. SLAs and SLGs on the provision of wholesale broadband access products are provided by SMP operators across the EU. However, access seekers' comments suggest that in some cases the billing procedure and the level of the SLG's payments foreseen would not be sufficiently dissuasive to ensure that the SMP operator complies with its delivery obligations, despite Point 29 NDCM Recommendation. 171

Finding 26. The scope of the physical infrastructure access obligations imposed on SMP operators varies across the EU. 179

Finding 27. The guidance on transparency (availability of a reference offer) and pricing (cost orientation) seems to be followed by nearly all NRAs. However, there is more variation as regards the guidance on the principle of equivalence as set out in Annex II NGA of the Recommendation. 180

Finding 28. Two NRAs regulate duct access in market 4/2014. This raises the question of the scope of the access that can be imposed in market 1/2020: only in the local loop and for network deployment, or also for dedicated end-to-end connections, i.e. whether NRAs should impose two parallel, distinct access to CEI obligations. 181

Finding 29. Several NRAs do not require the SMP operator, when deploying newly-built civil engineering, to design it so as to allow several operators to deploy their fibre lines as advocated by Point 15 of the Recommendation. However, these NRAs often have reasons not to do so based on their specific national situations. 182

Finding 30. Pricing is mentioned as a (potential) obstacle to the usage of existing civil engineering. However, it is not clear whether the alleged problem is confined to the countries in which access to civil engineering is mandated under the national law transposing the BCRD or whether the guidance of the NDCM Recommendation on the cost orientation of the access was not duly followed..... 185

Finding 31. The lack of enforceable QoS and costly ancillary obligations are mentioned as obstacles to the usage of existing civil engineering. 186

Finding 32. Proper design and enforcement of the access obligations seem to be crucial for the effectiveness of the access remedy. 187

Finding 33. Generally, NRAs do not differentiate between the pricing of newly-built civil engineering and legacy civil engineering 188

Finding 34. NRAs have different views on whether SMP operators retain sufficient incentives to invest in new civil engineering infrastructures when SMP access obligations are imposed. 188

Finding 35. The usefulness of the information made available by SMP operators is an issue in some Member States. The availability of online systems containing up-to-date information on duct location and availability with measures to ensure the accuracy of such data is a key requisite. 195

Finding 36. Most NRAs consider that in the large majority of cases, the BCRD alone, as it stands today, is not sufficient to ensure effective access to relevant civil engineering infrastructures for access seekers. Access seekers share that view. 200

Finding 37. According to some stakeholders, negotiated symmetric access, as under the BCRD, may provider stronger investment incentives, at least under specific circumstances. 200

Finding 38. To date, most co-investment initiatives in the EU have involved operators that are not designated as having SMP. As a result, while the number of co-investment schemes is growing, their overall impact on VHCN rollout in the EU remains somewhat limited. 207

Finding 39. For the deployment of FTTH, operators use a mix of cooperative arrangements and commercial agreements for wholesale broadband access (entailing in some cases the grant of IRUs). The latter affect the competitive dynamic more rapidly. Most of the agreements have been taken into account during the market reviews. However, the threshold applied by some NRAs to determine whether to reduce regulatory obligations in the geographical coverage of the arrangements seems to be the same as for the definition of distinct geographical markets. 212

Finding 40. At this stage, NRAs are very reluctant to determine *ex ante* conditions that would trigger a relief in regulatory obligations in areas affected by cooperation arrangements. Instead, they stress (in an overwhelming majority) the need for a review of remedies on a case-by-case basis. 213

Finding 41. Generally, NRAs want to set the bar for the initiation of non-routine market reviews relatively high. However, there seems to be some consensus on the criteria that cooperative arrangements should fulfil to justify such non-routine reviews. 216

Finding 42. Operators say that they entered into cooperative arrangement for economic benefits, rather than for hypothetical regulatory relief. However, economic literature provides very little empirical evidence of the impact of co-investment agreements on ultra-fast broadband deployment. 218

Finding 43. There is evidence that the absence of regulatory obligations leads to cooperative arrangements. Conversely, according to some operators, NRAs could foster such agreements also where regulated access is imposed. 220

Finding 44. The number of NRAs that differentiate remedies geographically is limited so far. Scope of the differentiation and approaches differ among them substantially. 224

Finding 45. NRAs overwhelmingly support the use of similar criteria for the geographic differentiation of remedies and the definition of distinct sub-national markets. 227

Finding 46. Some NRAs consider that beyond the criteria used for geographic market delineation, more case-specific criteria should be used to better reflect differences in the competitive dynamics within the market in which an operator has been designated as having SMP. 228

Finding 47. While a majority of NRAs advocate using similar criteria for the geographic segmentation of remedies to those used for the definition of subnational markets, the NRAs' currently segmenting

remedies do not do this based on a prospective analysis, but on the effectively materialized triggering criteria. 230

Finding 48. Stakeholders advocate an assessment of cost and benefits before implementing a geographic segmentation of remedies because the latter is likely to increase administrative costs and might reduce predictability for access seekers. 233

Finding 49. The NGA Recommendation brought about uniformity in the overall approach to migration, but not in the details of its implementation. Variations may result from differences in the state of evolution of the networks from the regulated SMP operators in their respective Member States. 240

Finding 50. Many NRAs say that they are not aware of the SMP operators' plans to decommission, partially or totally, the copper network over the next 5-10 years. This may suggest that in many Member States decommissioning is still not a topical issue. However, we observe increasing attention to the issue of migration and the copper switch off. 241

Finding 51. The 5 year default notice period set in Point 39 NGA Recommendation no longer seem to correspond with the periods set by most NRAs. Several stakeholders consider that the notice period should be reconsidered. 246

Finding 52. There is little support for NRAs setting mandatory deadlines for a (partial) switch-off from legacy networks to foster migration to newly built fibre networks. 250

Finding 53. Views are divided on whether departing from the principle of cost orientation to set access prices to legacy networks would be susceptible to hasten migration to fibre networks. In any case, pricing alone is not the just means to achieve an efficient fibre migration. 254

Finding 54. Several comments suggest the need for a clear monitoring system to ensure that the migration process is non-discriminatory, as there are concerns that SMP operators could use a copper switch-off to gain competitive advantage. 256

LIST OF RECOMMENDATIONS

Recommendation 1. We recommend that the successor recommendation require effective non-discrimination, rather than requiring equivalence of input (EoI) as a prerequisite in all cases. EoI would be a sufficient condition (but not a necessary condition) for recognising a non-discrimination regime as being effective, and thus meeting the non-discrimination criteria necessary to grant pricing flexibility. The successor recommendation should set forth a succinct list of suggested KPIs based on NRA experience that can be presumed, as part of an overall effective implementation of non discrimination by the NRA, to provide non-discrimination sufficiently effective to meet the non discrimination criteria necessary to grant pricing flexibility. 263

Recommendation 2. The reference to the "copper anchor" should be updated to provide constructive guidance and criteria as to how a suitable anchor product should be identified. The ideal anchor product would be (1) an entry level product that is used, or amenable to being used, by alternative operators to provide their own retail products and (2) with a price that is either price regulated or else constrained in such a way that regulation is not necessary. If a virtual fibre-based access product is chosen, its speed and quality should be defined and constrained. It is important, however, to bear in mind that an anchor product is not the only form of retail price constraint recognised by the EECC in the context of pricing flexibility. 264

Recommendation 3. Principles on which to choose ERT flagship products would appear to have merit. National circumstances would need to be taken into account, including the degree of market power of the SMP operator, and the prevalence and nature of bundled offerings. Factors that the NRA should take into account include (1) how the SMP operator packages its most popular offerings in practice (e.g. whether as individual connectivity offerings, versus, for instance, bundles that include unregulated elements such as content); and (2) whether selection of a portfolio as an ERT flagship would provide a strong SMP operator with too much scope to abusively price individual narrower offerings. 267

Recommendation 4. Identify best practices on how to conduct the ERT when a flagship product is a bundle that includes unregulated elements. The most promising approach in general appears to be to apportion the retail price to the different elements of the bundle, but it is not clear that this approach is best in all Member States or in all circumstances. Further exchange of best practice on these issues, especially in the context of some relevant BEREC workstream, might be helpful.... 268

Recommendation 5. The successor recommendation should clarify that information needed to allocate the price of a flagship retail bundle across regulated elements and any non-regulated elements of the retail bundle for purposes of the ERT constitutes "information, necessary for national regulatory authorities, other competent authorities and BEREC to ensure conformity with the provisions of …" the EECC, and thus falls within the scope of Art. 20(1) EECC. The SMP operator must respond to these information requests, even where they involve non-regulated services. 269

Recommendation 6. The successor recommendation should provide principles for determining the market share to be used in any scale adjustment to the scale of the SMP operator. The scale adjustment should reflect the overall level of competition for broadband and for VHCN in the Member State, taking into account (as appropriate) factors which for instance might include (1) the number of competitors that are likely to be viable at each level of the value chain, (2) the current HHI at each level of the value chain and its expected evolution over time, (3) the size of the largest competitors relative to that of the SMP operator, and (4) the size of the broadband and VHCN markets in the Member State (which might influence the number of competitors that can be economically viable). A scale adjustment will not necessarily be required in every Member State. 270

Recommendation 7. The handling of long term discounts and volume discounts in the ERT requires a case by case analysis. In most cases, long term discounts and volume discounts to wholesale prices should be ignored when conducting the ERT. Guidance should reflect the fact that in most cases, scale adjustments to the EEO/REO based on undiscounted wholesale prices will be the simplest and best way to ensure that the ERT is effective in protecting competition. If, however, the discount structure is imposed by the NRA as a price control measure, or if the market is such that most alternative operators achieve some level of wholesale discounts in practice, then it will typically be appropriate to reflect them in the ERT. 271

Recommendation 8. Permitting the NRA to initiate the ERT up to three months after the launch of the relevant retail product and completed within four months thereafter continues to be appropriate.

If the TRT is conducted in advance of the launch of the SMP operator's new retail offering, however, it will often be desirable that the ERT be conducted at the same time. 272

Recommendation 9. Transparency continues to be important for the conduct of the ERT. Point 56(a) and Annex II NDCM identify a number of aspects of the ERT that must be subject to public consultation in advance: (1) the relevant downstream costs taken into account; (2) the relevant cost standard; (3) the relevant regulated wholesale inputs concerned and the relevant reference prices; (4) the relevant retail products; and (5) the relevant time period for running the test. The successor recommendation should expand the list to include, where applicable: (6) how flagship products will be determined, (7) whether flagship products are intended to be individual versus portfolio products, and (8) what approach will be taken to any unregulated products that are part of the flagship bundle 273

Recommendation 10. In specific circumstances, an SMP operator might have the incentive to set (geographically differentiated) prices of wholesale access services at a low level that makes the success of facilities-based wholesale VHCN competitors unlikely in certain areas. This might possibly arise in Member States where facilities-based competition is emerging or is likely to emerge over a portion of the national territory (which the NRA will typically know based on Art. 22 EECC survey data). 278

Recommendation 11. A successor recommendation should no longer provide a price band for wholesale access products. 279

Recommendation 12. The guidance on costing methodology in Points 25 through 42 of the NDCM Recommendation continues to be relevant for new SMP CEI. This implies valuation based on the use of BU-LRIC modeling and current costs. 280

Recommendation 13. The guidance on costing methodology for reusable SMP CEIs that appears in the current Access Recommendations and in Recital 187 EECC continues to be broadly fit for purpose overall. NRAs typically use a BU-LRIC model to compute the topology and routing of the network, and thus the quantity of reusable civil engineering infrastructure, but not its valuation. The adjustments to the value in the regulatory accounting base that are called for in Recital 187 EECC to deal with (1) the average accumulated depreciation of SMP CEI, (2) the fraction of SMP CEI that is fully depreciated, and (3) the fraction of SMP CEI that is reusable, as well as (4) an adjustment based on a relevant price index continue to be appropriate and fully relevant for reusable SMP CEI. If it is impractical to use the regulatory accounting valuation, the current valuation can be used as a proxy, in which case the adjustments for depreciation are still required but not the application of a relevant price index. In this regard, we do not see a need for the successor recommendation to distinguish between reusable SMP CEI built for the legacy copper network versus reusable SMP CEI that was built for VHCN as regards costing and pricing methodology, as long as the CEI in question can be used for VHCN today. 282

Recommendation 14. In line with current guidance in the NGA Recommendation and elsewhere, and in the interest of clarity, any incremental risk premium associated with specific fibre-based deployment projects should continue to be separately tabulated from the legacy WACC. In computing the price of price-controlled wholesale access services, the risk premium should be added to the WACC. 284

Recommendation 15. The successor recommendation should emphasise that the purpose of the risk premium today is to promote VHCN deployments (including all forms that appear in the BEREC Guidelines) and to compensate the SMP operator for the extra risks that it incurs in deploying VHCN. 286

Recommendation 16. Instead of requiring review of the VHCN risk premium at regular intervals with the implication that the new VHCN risk premium immediately supersedes the old, a successor recommendation might acknowledge the permissibility of the use of a smoothing algorithm so as to reduce the risk to investors that the expectation of return on capital employed disappears too quickly. In the event that smoothing is not employed, then reviewing the risk premium every five years in line with the market review should be preferred in order to provide some limited smoothing effect. 294

Recommendation 17. The use of real options techniques in calculating the NGA/VHCN risk in order to quantify additional risk-based costs to which the SMP operator is subject, notably for relinquishing its implicit option to wait and see, may be appropriate in some circumstances. Real options are typically inappropriate however if the SMP operator is forced by competitive factors to deploy immediately, inasmuch as the option value of waiting in that case is negligible. If more experience

in the use of the technique is accumulated over time, it might be appropriate for NRAs that choose to do so (for instance, those that are less well staffed) to use the real option calculations of comparably situated NRAs as a benchmark and as an alternative to doing these complex calculations themselves. 297

Recommendation 18. The use of fair and reasonable pricing is well established in the EECC and in the corresponding practice of the NRAs; however, its meaning is heavily dependent on the nature of the regulated service. As regards SMP wholesale access services subject to price control obligations, the ability of fair and reasonable pricing to substitute for a concrete standard for price controls in cases where an objective quantitative standard is truly required is questionable. Fair and reasonable pricing may nonetheless have value in a limited number of cases where strict quantitative price controls are not required (i.e. some form of pricing flexibility has been granted), but where the NRA still needs to have the ability to intervene if prices are set at levels that appear to be inappropriate or excessive. 298

Recommendation 19. Equivalence of inputs (EoI) is in principle the surest way of achieving effective protection from discrimination; in practice, however, its advantages over EoO will vary considerably from one Member State to the next, and from one wholesale access product to the next. A well-crafted EoO regime, with good enforcement and suitable KPIs/SLAs/SLGs, can in many cases approach the effectiveness of an EoI regime. EoI provisions are largely self-enforcing, whereas EoO can be challenging to enforce in cases where the SMP operator does not itself consume the same wholesale access product that it offers to competitors. The successor recommendation should therefore continue to call for a case by case proportionality assessment of EoI versus EoO, in line with current practice. Both costs and benefits should be considered not only from the perspective of the SMP operator, but also from the perspectives of alternative operators and of the NRA. 302

Recommendation 20. In general, NRAs should duly justify their choices between EoO and EoI on a wholesale product by product basis, taking Member State characteristics and market characteristics into account. If however a single wholesale input is used in multiple wholesale products, then the decision should be made on an input by input basis. 302

Recommendation 21. The successor recommendation could encourage NRAs to consider enabling the SMP operator to offer comprehensive commitments in order to implement effective non-discrimination, subject to a consultation and approval process designed to seek consensus with alternative operators and overseen by the NRA. The potential advantages of such a multi-stakeholder process are obvious. 306

Recommendation 22. The frequency with which KPIs are updated (and SLAs and SLGs where appropriate) should be set by means of the same multi-stakeholder process described in Recommendation 21. A cycle shorter than the market review cycle is likely to be appropriate. ... 306

Recommendation 23. When designing or refining the non-discrimination framework, the NRA should consider utilising the same consensus-based multi stakeholder process described in Recommendation 21 to establish KPIs, SLAs and SLGs to ensure that the Quality of Service of wholesale products is in line with competitive market needs in the Member State. 307

Recommendation 24. It is important that the process of monitoring KPIs is fully transparent. The successor recommendation should make clear that the NRA "shall" make public on its website any decision to remedy non-compliance. 309

Recommendation 25. Penalties related to KPIs must be proportional, but should be large enough to be dissuasive. In Member States where it is feasible to do so, the NRA should encourage the SMP operator and the alternative operators to establish in advance a level of SLG penalties that are likewise proportional but dissuasive. In assessing whether the level of wholesale penalties is sufficiently dissuasive, the NRA should bear in mind that a breach of wholesale obligations on the part of the SMP operator may cause the alternative operator that uses the wholesale access product to be subject to indemnities imposed by the same NRA for problems at the retail level – the wholesale penalty should be large enough to cover the retail indemnity. 309

Recommendation 26. If the NRA identifies a pattern of repetitive breaches of non-discrimination obligations (as demonstrated for instance by means of monitoring of KPIs) on the part of the SMP operator, the NRA should consider imposing periodic penalty payments as referred to in Art. 29 EECC in order to motivate the SMP operator to refrain from repeating the breaches. Penalties that

progressively increase in response to a pattern of repeated infractions could be appropriate in some circumstances. 309

Recommendation 27. The successor recommendation could urge the NRA, for payment of penalties that are largely under its control (such as repeated discrimination as identified by KPIs), to strive to ensure that dissuasive payments are made without undue delay through a pre-established process for payment and billing. It could also require the NRA to report on the level of penalties that it has imposed and on the delay, where relevant, from complaint to payment of the penalty. The NRA should consider the promotion of alternative dispute resolution provisions (e.g. in the reference offer) that seek to accelerate the dispute resolution process. 311

Recommendation 28. We encourage Member States to monitor any delays in payment of penalties so as to ensure that their dissuasive effect is not lost. To the extent feasible, Member States should design administrative and/or judicial enforcement procedures related to the payment of penalties (for instance, SLGs) so as to avoid unreasonable delay. 311

Recommendation 29. The TRT should serve to ensure that alternative access seekers can technically replicate the retail offer of the SMP operator on the basis of the regulated wholesale input they receive. In the interest of proportionality, it need not be required for minimal changes to an existing retail offer of the SMP operator that prima facie do not imply a risk to technical replicability (such as for instance changes to price or to contract duration). Where a flagship retail product is a bundle that includes both regulated and unregulated elements, the TRT should be applied only to the regulated elements. 312

Recommendation 30. The TRT should continue to be implemented in advance, wherever feasible, of the SMP operator launching a new retail offer that depends on a new relevant wholesale input being available. If the TRT is conducted in advance of the launch of the SMP operator's new retail offering, it is desirable (but not required) that the ERT be conducted at the same time. 312

Recommendation 31. Commercial agreements between the SMP operator and alternative operators to offer additional wholesale access services with QoS beyond that covered by existing Reference Offers should not be prohibited. The SMP operator should be encouraged to meet reasonable requests for such services. 313

Recommendation 32. In crafting non-discrimination plans, NRAs should be sensitive to the need to ensure that the SMP operator does not use information about the deployment plans of alternative operators for its own competitive advantage. In particular, NRAs should ensure that the retail arm of a vertically integrated SMP operator is not informed in advance of network deployments and/or the evolution of competitors in cases where this knowledge might provide the SMP operator with a competitive advantage. We recommend that the successor recommendation oblige SMP operators (except for those where the risk of abuse of information is low, such as wholesale-only operators) to provide an annual report documenting its practices in this regard, any known allegations of violation, and any corrective actions that it has taken. Beyond this, NRAs must have both the authority and the responsibility to investigate any allegations that the SMP operator has improperly used information about the plans of competitors for its own competitive advantage, and to impose dissuasive penalties if and as appropriate. 314

Recommendation 33. The successor recommendation should urge NRAs to assess whether mandating SMP operators to provide access to all sections of their civil engineering that may be needed in order for alternative operators to deploy their fibre network between their ODFs and their end-users would be proportionate to address the market power of the SMP operator, taking into account the feasibility for alternative operators to use alternative civil engineering infrastructure such as ducts. Where relevant, NRAs should also identify different points of delivery at which the physical infrastructure could be accessed. Such an access obligation could where appropriate and proportionate also encompass ducts of the backhaul networks, and shelters susceptible to host operators' passive and active equipment, to the extent that such related facilities have enough capacity. Where the conditions are met, the NRA might find it appropriate to define a separate market for access to physical infrastructure as envisioned in the 2020 RRM rather than attempting to impose the access remedy under Art. 72/73 EECC. 316

Recommendation 34. In line with the principle of technological neutrality, under a successor recommendation, the SMP operator should not be allowed to refuse access solely because the access seeker intends to use the access to deploy VHCN based on technologies other than FTTH unless such access would objectively lead to exhaustion of available space for future fibre deployments on that specific route. The burden of proof should be on the SMP operator. 317

Recommendation 35. In Member States where there is history of unsatisfactory responses by the SMP operator (a) to reasonable requests for renovation, repair or bypass of SMP CEI, or (b) to reasonable requests request to expand the capacity of a duct, pole, or other similar element of CEI; and to the extent that it is deemed to be proportionate, the successor recommendation should encourage NRAs to require SMP operators (1) to establish procedures for the certification of qualified workers or subcontractors authorised to make such interventions; and (2) to define the procedure to be followed for such interventions. At a minimum, the SMP operator must be informed of all work undertaken in this way. Where work is undertaken on behalf of an alternative operator, the NRA will need to set rules to who pays for work, and who owns the resultant infrastructure (typically the SMP operator), in instances where (1) the SMP operator or (2) a contractor approved by the SMP operator makes improvements to the SMP operator's infrastructure at the request of an alternative operator. 319

Recommendation 36. NRAs should be vigilant against unreasonable SMP operator labour practices that require SMP staff to be present, and paid for, even where their presence is superfluous. 320

Recommendation 37. The provisions on the quality of databases and ordering processes that are already visible in Point (17) of the NGA Recommendation should be strengthened so as to substantially increase the likelihood that the database of SMP CEI is fully current and up to date. The expected updating of the BCRD might already address this; if not, the successor to the Access Recommendations should do so. The NRA should however consider the causes of any defects in the current database (taking into account the number of orders for SMP CEI currently placed, and the number that could be expected if the database were improved) in order to assess whether more effort invested would be proportionate and warranted. 321

Recommendation 38. A successor recommendation for the Access Recommendations should provide principles-based guidance as to which elements of the public database on SMP CEI should be publicly visible. 321

Recommendation 39. The successor recommendation should reinforce the importance of providing end-to-end ordering of CEI such as ducts where proportionate, as a complement to any point-to-point ordering processes that may already exist. Those Member States that currently have CEI ordering procedures that allow only point-to-point orders potentially waste time and effort, and consequently depress take-up of SMP CEI. The same legal and implementation considerations that were raised in Recommendation 37 are also relevant here. 322

Recommendation 40. A successor recommendation should reinforce the principle that CEI that is subject to an SMP access obligation should not simultaneously be subject to the national transposition of the BCRD or its successor. This is primarily a matter for the successor to the BCRD to consider, but those drafting the successor to the Access Recommendations should be cognizant of the issue. 322

Recommendation 41. Where a proposed cooperative arrangement is credibly expected to lead to a noteworthy change in competitive dynamics in line with Art. 3(4)(d) EECC, the NRA should consider whether regulatory changes are warranted outside of the normal market review period. In assessing the possible need for out-of-cycle changes, the NRA should also consider the importance of fostering regulatory predictability. Where an anticipated cooperative arrangement that is expected to lead to a noteworthy change in competitive dynamics is known at the time of a market review, the NRA should signal whether it considers an out-of-cycle adjustment likely, and how it intends to proceed to assess the arrangement. 325

Recommendation 42. In conducting an out-of-cycle review of remedies (whether in the context of a new cooperative agreement or an updating of geographically differentiated remedies), the NRA should take a consistent view in its assessment of the market and its imposition of remedies. There will be instances where changes in market dynamics are insufficient to support a finding that SMP is no longer present, but sufficient to justify differentiated remedies. NRAs may wish to offer prospective guidance as to how they expect to interpret anticipated changes in the competitive environment. 326

Recommendation 43. In the interest of promoting regulatory predictability, the NRA should proactively engage in a balanced way with stakeholders if a cooperative arrangement with large impact on competitive dynamics is anticipated. NRAs may wish to offer prospective guidance as to how they expect to interpret anticipated changes in the competitive environment. 326

Recommendation 44. The successor recommendation should summarise the circumstances under which differentiated market definition versus differentiated remedies should be preferred, with a specific focus on VHCN. 328

Recommendation 45. In the interest of fostering VHCN investment by means of predictability, NRAs should refrain from adjusting geographic differentiated remedies out-of-cycle unless the geographically differentiated changes in competitive dynamics are substantial. If a substantial shift is known at the time of a market review, the NRA should signal whether it considers an out-of-cycle adjustment likely, and how it intends to proceed. 328

Recommendation 46. A successor recommendation should envision a shorter notice period than five years, and should allow for more differentiated treatment to reflect areas where a no-longer needed location serves alternative operators who purchase ULL, VULA, or bitstream. A shorter notice period could be possible where suitable alternatives are promptly available, where the deployment is high in the area served by the MDF, and especially where the wholesale offerings that have been sold are centralised products such as bitstream rather than product that require local infrastructure such as ULL. We suggest that the default notice period be set to two years in light of Art. 105 EECC, which prevents most contracts concluded between consumers and providers of publicly available electronic communications services from imposing a commitment period longer than 24 months. 332

Recommendation 47. In revising the notice period that the SMP operator must give prior to de-commissioning legacy facilities, the successor recommendation should envision commercial closure of an MDF (i.e. not accepting new orders for legacy wholesale services) prior to point in time at which the MDF is closed for all existing SMP services. 333

Recommendation 48. There have been suggestions over the years that the SMP operator should be forced to shut down its copper network in order to accelerate migration to a fibre-based infrastructure. Even though the proposals are well-meaning, doing so would appear to be ill-advised. In particular, the SMP operator should be free to build or to decommission where it sees fit. Other than in the context of a migration from copper-based to fibre-based services, artificially raising or lowering the price of copper-based wholesale access services likewise seems inadvisable. The successor recommendation should, however, permit the NRA to deregulate (or allow for an increase of) the wholesale price of legacy copper services as a transitory measure until the copper switch off takes place and when sufficient safeguards against abuse are present, such as (1) commercial closure of the legacy network has already been firmly committed, (2) the SMP operator's VHCN network has already been rolled out, and (3) alternative operators have realistic prospects to offer services over the SMP operator's VHCN network. 334

Recommendation 49. The successor recommendation could encourage NRAs to engage in the migration process by proactively promoting a multi-stakeholder process that seeks to ensure that alternative operators are well aware of the plans of the SMP operator and that stakeholders have ample opportunity to find solutions to the challenges of the migration that are in line with overall societal welfare. As in other aspects of broadband policy, the potential advantages of such a multi-stakeholder process are obvious. 335

ABBREVIATIONS

ADSL	Asymmetric Digital Subscriber Line
ANO	Alternative Network Operator
ARPU	Average Revenue per User
BCRD	Broadband Cost Reduction Directive
BEREC	Body of European Regulators of Electronic Communications
BSA	Bitstream Access
BU LRIC+	Bottom-Up Long-Run Incremental Costs Plus
BU-LRAIC+	Bottom-Up Long-Run Average Incremental Costs Plus
BU-LRIC	Bottom-Up Long-Run Incremental Costs
CAPEX	Capital Expenditures
CAPM	Capital Asset Pricing Model
CEI	Civil Engineering Infrastructure
CFO	Co-Financing Only
DCF	Discount Cash Flow
DESI	Digital Economy and Society Index
DOCSIS 3.0	Data Over Cable Service Interface Specification 3.0
DOCSIS 3.1	Data Over Cable Service Interface Specification 3.1
DSL	Digital subscriber line
EDC	Embedded Direct Costs
EECC	European Electronic Communications Code
EEO	Equally Efficient Operator
EoI	Equivalence of Inputs
EoO	Equivalence of Output
ERG	European Regulators Group
ERT	The Economic Replicability Test
FDC	Fully Distributed Costs
FDC CCA	Fully Distributed Costs - Current Cost Accounting
FDC-HCA	Fully Distributed Costs - Historical Cost Accounting
FTTC	Fibre to the Cabinet
FTTH	Fibre to the Home
FTTB	Fibre to the Building
FTTN	Fibre to the Node
FTTP	Fibre to the Premises
FWA	Fixed Wireless Access
HDPE	High Density Polyethylene
HFC	Hybrid fibre-coaxial
IOB	Independent Oversight Board
IRR	Internal Rate of Return
JD	Joint Deployment
KPIs	Key Performance Indicators
L2 WAP	Layer 2 Wholesale Access Products
LEX	Local Exchanges
LLU	Local loop unbundling
LRIC	Long-Run Average Incremental Cost
LRIC+	Long-Run Average Incremental Cost plus
MDF	Main Distribution Frame
MEA	Modern Equivalent Asset
MS	Member State
MST	Margin Squeeze Test
NCA	National competition authority
NDCM	Non-discrimination and costing methodologies
NGA	Next Generation Access
NRA	National Regulatory Authority
ODF	Optical Distribution Frame
ODPR	Option to Delay Pricing Rule

OPEX	Operating Expenses
PST	Price Squeeze Test
QoS	Quality of Service
RAB	Regulatory Asset Basis
REO	Reasonably Efficient Operator
RFEC	Regulatory Framework for Electronic Communications
RO	Reference Offer
RUO	Reference unbundling offer
SD	Separate Deployment
SEO	Similarly Efficient Operator
SIP	Single Information Point
SLAs	Service Level Agreements
SLGs	Service Level Guarantees
SMP	Significant Market Power
SMPF	Shared Metallic Path Facility
TRT	Technical Replicability Test
UFB	Ultra-fast broadband
ULL	Unbundled local loop
VDSL	Very high-speed Digital Subscriber Line
VDSL2	Very high-speed Digital Subscriber Line 2
VHCN	Very High Capacity Network
VUA	Virtual Unbundled Access
VULA	Virtual Unbundled Local Access
WACC	Weighted Average Cost of Capital
WBA	Wholesale Broadband Access
WCA	Wholesale Central Access
W-CRM	Wholesale Customer Relationship Management System
WTP	Willingness to Pay

PART I: INTRODUCTION AND DEVELOPMENTS IN BROADBAND DEPLOYMENT

1. Introduction

Objectives and scope of the study

The **overall objective** of this study is to support the Commission in assessing the effects of Next Generation Access (NGA)[1] and the Non-discrimination and costing methodologies (NDCM)[2] Recommendations, as well as exploring the need to revise the guidance in the field of access regulation. The results of the study will provide an evidence base for the development of a new recommendation. The revision of Recommendations would, in the context of the implementation of the European Electronic Communications Code (EECC)[3], provide up-to-date for the promotion of the deployment of very high capacity networks (VHCN) through appropriate regulatory incentives.

The study explores, on the one hand, the implementation of the current Recommendations:

- whether and how they have been followed by EU National Regulatory Authorities (NRAs);
- what are the reasons for existing deviations;
- what was the EU value added;
- to what extent the implementation of Recommendations contributed to fostering competition and investment in VHCN.

On the other hand, the study explores what guidance to NRAs on the design of remedies would be appropriate for the purpose of achieving EECC objectives, taking into account the emergence of network competition and whether in particular, for the areas where no network competition can be expected in the short term, the current recommended approaches still fit. The study will list a number of policy options that could be taken up within the eventual recast of the 2010 and 2013 Recommendations. The conclusions of this assessment are summarised in the form of a number of key findings presented during workshops with NRAs and other stakeholders in April/June 2021.

Geographically, the study focuses on the EU with coverage of all 27 Member States and an in-depth analysis of 10 selected Member States via case studies. The scope of the study is also bounded in terms of regulated access products. As was the case under Point 5 of the NDCM Recommendation and Recital 3 of the NGA Recommendation, the study covers remedies that can be imposed on operators found to have significant market power (SMP) in:

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[1] European Commission (2010), *Recommendation on regulated access to Next Generation Access Networks*, 20 September 2010

[2] European Commission (2013), *Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment,* 11 September 2013

[3] Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code.

- the market for wholesale network infrastructure access (Market 3a in Recommendation 2014/710/EU and Market 1 in Recommendation 2020/337)
- the wholesale broadband access market (Market 3b in Recommendation 2014/710/EU and no longer listed in Recommendation 2020/337)
- any markets susceptible to ex ante regulation identified by NRAs during a market analysis which substitute them and cover the same network layers.[4]

The principles relating to the imposition of EoI of the NDCM Recommendation have now been enshrined in Article 70 EECC (in conjunction with recital 185 EECC). It would be good administrative practice if, as BEREC advocates in its response to the targeted consultation, a new Recommendation succeeding the NDCM Recommendation would state whether the guidance must also be followed by NRAs imposing non-discrimination obligations on SMP operators in the current Market 2 (RRM 2020). We do not consider that this question is relevant for the assessment of either reviewed Recommendation. However, when drafting the forward-looking proposals, we take this aspect into consideration when possibly relevant, but the data collection and analysis exercise mainly focused on the wholesale local and central access markets.

The background for the review of the Recommendations and the study

The 2002 EU Regulatory Framework[5] as amended in 2009 and the EECC require national regulatory authorities (NRAs) to define and analyse relevant markets susceptible to ex ante regulation, and to determine whether any operators have SMP[6] in these markets. If an NRA identifies an operator(s) as having SMP, it must impose appropriate remedies (see Box 1 below) on this operator to ensure sustainable competition on wholesale and related retail markets. The analysis of relevant markets and the assessment of dominance should be based on the principles of competition law. Moreover, the EECC (recital 29) states that SMP regulation should be withdrawn when competition law alone suffices to safeguard the competitive process[7].

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[4] "This includes, inter alia: (i) access to the civil engineering infrastructure; (ii) unbundled access to the copper and fibre loops; (iii) unbundled access to the copper sub-loop; (iv) non-physical or virtual network access; and (v) wholesale broadband access (bitstream services) over copper and fibre networks (comprising, among others, ADSL, ADSL2+, VDSL and Ethernet)." Point 5 NDCM Recommendation.

[5] Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009 amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, and 2002/20/EC on the authorisation of electronic communications networks and services, which is applicable since 21 December 2020, carries over the main requirements of the amended Directives, which it replaces.

[6] According to Article 14 of Directive 2002/21/EC ("Framework Directive") "an undertaking shall be deemed to have significant market power if, either individually or jointly with others, it enjoys a position equivalent to dominance, that is to say a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers".

7 Recital 29 EECC reads "This Directive aims to progressively reduce ex ante sector-specific rules as competition in the markets develops and, ultimately, to ensure that electronic communications are governed only by competition law."

Box 1. Regulatory toolbox

The regulatory toolbox, as amended by the EECC, includes the following remedies:

- mandating access to the SMP operator's network and associated facilities;
- mandating access to CEI as a self-standing remedy;
- non-discrimination obligations (i.e. the SMP operator must allow external service providers access to its networks on terms and conditions 'equivalent' to those applicable to the providers within its own undertaking);
- cost accounting obligations (i.e. requiring the SMP operator to use a specified cost accounting system, among others, to facilitate calculating controlled wholesale prices);
- price control obligations (i.e. the SMP operator must provide access seekers regulated wholesale products (particularly network access) at controlled prices (e.g. cost-oriented or linked to the SMP operator's retail prices));
- obligations in terms of transparency;
- in exceptional cases, mandated functional separation; and
- making commitments from SMP operators binding.

The framework leaves a margin of discretion to NRAs when designing their remedies. This discretion is needed to allow NRAs to take into account the specific circumstances of the national market. However, to ensure a certain level of harmonisation, the EECC gives the Commission a number of tools to foster consistency in the application of regulatory remedies across the EU:

- the internal market procedure (since 23 December 2020, the Article 32 and 33 procedure;[8])
- the issuance of guidance by the Commission (since 23 December 2020, Article 38 Recommendations).

Source: Visionary Analytics based on the provisions of the EECC (incl. Title II, Chapters I-V).

When the EECC became fully applicable on 21 December 2020, it introduced the promotion of connectivity, access to and take-up of VHCN as a new objective of the regulatory framework, alongside the promotion of competition, the development of the internal market and the interests of Union citizens. This additional objective requires reconsidering both the 2010 NGA Recommendation and the 2013 NDCM Recommendation to ensure that these rules remain applicable in a dynamic policy and market environment; and incentivise VHCN investments while also promoting competition. The market environment has also changed dramatically as a consequence of huge amounts of investments required to replace the copper local loop by fibre and the emergence of players other than the historic telecom incumbents that are deploying FTTH loops in certain geographic areas. Therefore, there is a need to reassess the two Access Recommendations.

[8] Until 21 December 2020 known as the Article 7 procedure because the procedure was set out in Article 7 of the Framework Directive.

Some provisions of the EECC overlap and sometimes slightly depart from the advocated approaches under the NGA Recommendation, notably the obligations on NRAs to ensure that the decommissioning or replacement process in the framework of migration includes a transparent timetable and conditions, including an appropriate notice period for transition, and establishes the availability of alternative products. However, the latter suggest strict equivalence between legacy and new products, including with respect to price, while the former simply require the products to be of at least comparable quality. In addition, the EECC does not define the length of the notice period. Another difference concerns access to CEI, which can now be imposed as a self-standing remedy – possibly as the only access remedies where it would be sufficient to address competition problems – and the fact that symmetric access can be imposed beyond the first concentration point. Thus, it should be acknowledged that the underlying principles of the EECC differ to an extent from those provided in the NGA Recommendation. The EECC has also enshrined approaches that were only promoted in the NDCM Recommendation until its adoption. This concerns in particular promoting price flexibility when the necessary conditions are met and highlighting that Equivalence of Input (EoI) is in principle the surest way of achieving effective protection from discrimination, where such an approach is proportionate. In parallel, the EECC foresees the possibility of 'fair and reasonable pricing' for wholesale-only operators, while the new VHCN elements subject to co-investment meeting the conditions of Article 76 cannot, in principle, be subject to any regulatory obligation.

Another reason to review the working of both Recommendations is that a decade after their adoption one can and should review whether the recommended approaches have been followed by the NRAs and thus whether the Recommendations led to higher regulatory consistency across the EU to help understand how they have actually been applied. Recommendations under Article 38 EECC aim to provide regulatory predictability to market players and foster consistency among approaches used by NRAs, thus allowing stable business planning. Ultimately, the objective of ex ante regulatory intervention is to create benefits for end-users by making retail markets competitive on a sustainable basis, allowing European citizens to access performant networks and enjoy choice and attractive prices (consumer benefit). The effect of the recommended approaches must primarily be assessed in relation to this ultimate objective.

Given the discussion above and in the context of the transition from the previous regulatory framework to the EECC, we consider that a recommended approach from either Recommendation may be inefficient when there are no indications of their effects in achieving the objectives or it loses relevance due to legislative changes (e.g. adoption of the EECC).

Data sources

The study is based on a mixed-method approach and relied on the following methodology:

- Desk research, which focused on:
  - a) EU and national legislation, including national market reviews and Article 7 documents;
  - b) Other studies and reports, especially those prepared by BEREC, as well as academic literature on the related topics;
  - c) Stakeholder responses to the Commission's targeted consultation.
- Surveys of NRAs (25 responses) and operators (18 responses) working in the EU-27.
- Interviews with stakeholder representatives (ETNO and ECTA).

- Case studies, which provided in-depth analysis of market and regulatory developments in 10 EU Member States: Belgium, Cyprus, Czechia, France, Germany, Ireland, Lithuania, Poland, Spain and Sweden. Each case study relied on extensive desk research and three to five interviews with representatives of NRAs and market players.
- Two full day workshops with stakeholders, which sought to assess preliminary findings and suggested ways forward.
    a) A workshop with NRA representatives was organised on 15 April 2021 and attracted over 110 participants from European NRAs;
    b) A workshop with stakeholders (market players, academics and experts in the field) was held on 9 June 2021 and had over 70 attendees.

The study team also thanks external experts Dr Alexandre de Streel, David Rogerson, Alain Maton, Nicolai van Gorp and Paul de Bijl for thought-provoking discussions, insights and comments on the drafts of the report.

Structure and contents of the report

The report is structured around three overarching questions:

- How has the economic and policy context evolved since the adoption of NGA and NDCM Recommendations and what are the likely future developments in the broadband market? These questions are discussed in Part I: Introduction and developments in broadband deployment (Chapters 1 and 2).
- How have the NGA and NDCM Recommendations been applied and what are their impacts? The evidence is presented in Part II: Retrospective analysis (Chapters 3-10). The assessment is structured around six topics:
    a) Price regulation;
    b) Non-discrimination obligations;
    c) Access to civil engineering infrastructure;
    d) Cooperative or sharing agreements;
    e) Geographic segmentation of remedies;
    f) Migration from copper to fibre.
- What should be the key strategic directions for the future, so that the successor Recommendation is more effective, efficient, and coherent in light of the objectives expressed in the EECC, in particular sustainable infrastructure-based competition, and more in line with the market evolution? The suggested ways forward are discussed in Part III: Forward-looking analysis (Chapter 11).

Table 1 below outlines the structure of the report.

Table 1. Structure of the report

Chapter	Focus
Part I: Introduction and developments in broadband deployment	
Chapter 1	Introduction defining the objectives and scope of the study, background for the review of Recommendations and the structure and contents of the report
Chapter 2	Broadband in the EU and economic background of the broadband regulation, including a general overview of EU policy developments

Part II: Retrospective analysis	
Chapter 3	Overview of the main provisions of the NGA Recommendation and their implementation
Chapter 4	Overview of the main provisions of the NDCM Recommendation and their implementation
Chapter 5	Assessment of the implementation of the recommended approach towards price regulation (incl. the possibility of including an NGA-specific risk premium)
Chapter 6	Assessment of the non-discrimination obligations (Equivalence of Input and Equivalence of Output)
Chapter 7	Assessment of the regulation of civil engineering infrastructure and relations between asymmetric SMP regulation and symmetric access
Chapter 8	Assessment of the principles that NRAs should follow in the assessment of cooperative or sharing arrangements between operators aiming to foster the deployment of new fixed networks
Chapter 9	Assessment of the geographic dimension of regulation, in particular regarding the geographic segmentation of remedies
Chapter 10	Assessment of the regulatory incentives to foster migration from copper to fibre
Part III: Forward-looking analysis	
Chapter 11	A suggested way forward
Annexes	List of references, summaries of NRA and stakeholder workshops

Source: Visionary Analytics.

2. Broadband deployment, economic incentives and EU policy

This chapter provides a concentrated introductory overview of the broadband situation in the EU, the economic logic of regulation and general EU policy developments before turning to a detailed discussion of the NGA and NDCM Recommendations in Chapters 3 and 4, respectively. Chapter 2 is intended to provide the context of the analysis, while in-depth issues are discussed in the chapters that follow. Nonetheless, the information here is important to understand the needs addressed by the study, the policy developments since the adoption of the NGA and NDCM Recommendations (e.g. Communications on the Gigabit Society and Digital Decade), the background of assessment of the Recommendations (Chapters 5-0) and the possible ways forward that are suggested (Chapter 11).

a. The problem has evolved since the Access Recommendations were enacted

The Commission requested this study in order "… to assist the Commission in evaluating the effects of the NGA and NDCM Recommendations in the market and regulatory context foreseeable in the medium-term and assessing the need to revise the guidance provided in the field of access regulation. The outcome would inform a potential initiative for a new recommendation, which would [together with other instruments such as the RRM and the BCRD] provide consolidated up-to-date guidance to promote the deployment of VHCN through appropriate regulatory incentives in line with the Code."

Our assessment of the effects to date, those foreseeable in the medium term, and the implications for revised guidance all need to be understood in conjunction with the ongoing evolution of:

- Overall EU policy goals as regards the digitalisation of the EU as a whole;
- The changes in focus embodied in the EECC itself in comparison to the previous RFEC; and
- Changes that are already visible in electronic communications markets in the EU Member States, including changes that are visible since 2018 when the EECC was enacted.

To begin with, EU policy over the past 20 years has reflected the strong desire to progressively increase the capability of EU communication networks as a crucial underlying element in strengthening the productivity, sustainability and global competitiveness of the EU (see Sections 2.b and 2.h). Communications networks are a key enabler that can contribute to broad spill-over effects into the broader society and economy. The shift in focus from the goals of the *Digital Agenda for Europe (DAE)*,[9] which seem quite modest by today's standards, to the *Gigabit Society*[10] represented a significant raising of the bar. In 2021, the Commission's *Digital Compass communication*[11] notes that "achieving gigabit connectivity by 2030 is key." It calls for all European households to be covered by a gigabit network by 2030 (versus 59% today), with all populated areas covered by 5G (versus 14% today). These strategy

[9] European Commission (2010), *A Digital Agenda for Europe*, COM(2010) 245.
[10] European Commission (2016), *Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society*, COM/2016/0587 final.
[11] European Commission (2021), *2030 Digital Compass: the European way for the Digital Decade*, COM(2021) 118 final.

pronouncements are backed by a number of concrete measures, including notably the Recovery and Resilience Fund (RRF),[12] which requires that 20% of the funding of up to EUR 672.5 billion (2018 prices) be applied to promoting digitalisation and addressing its consequences, and explicitly identifies various forms of VHCN and 5G as candidates for funding.

Secondly, promotion of "connectivity and access to, and take-up of, very high capacity networks, including fixed, mobile and wireless networks" became an explicit policy objective with the adoption of the EECC (Article 3), and with it, a shift to "efficient infrastructure-based competition" (see again Section 2.h). This was accompanied by a shift in focus to make greater use of access to passive civil engineering assets rather than active network services. The Access Recommendations already represented a step in that direction, but the EECC took the process further. Some of our suggestions in this chapter seek to take this process still further.

Thirdly, progressively more high-speed broadband has been deployed within the Member States (see Section 2.c). The Access Recommendations were enacted at a time when this process was still at an early stage. Moreover, the nature of high-speed broadband deployment and with it the nature of competition is changing – with the progressive increase in consumer demand and willingness to pay (WTP), facilities-based network operators who are willing and able to compete head to head at wholesale level with SMP operators have emerged in many Member States (for instance, in Italy and Ireland). In Spain, Portugal and France, the use of SMP CEI has played a crucial role in the emergence of facilities-based competition.

In parallel with this shift in emphasis in the EECC, the number of regulated markets (i.e. markets susceptible to ex ante regulation) has been progressively reduced from 18 to 2 in successive versions of the *Relevant Markets Recommendation (RRM)* as a response to improving competitive conditions in the Member States.

Our task here, based on our assessment of the performance of the current Access Recommendations to date and in light of the goals expressed in the EECC and more recent policy instrument such as the Digital Compass[13], is to identify possible ways in which a successor recommendation might be made more effective, efficient, coherent and more in line with EU added value than the current Recommendations. This is very much in line with spirit of the EU's long-standing core principle of Better Regulation: "Evaluate first!"

b. From NGA to VHC and new enhanced networks

The definitions of NGA and VHC networks are not as straightforward as could be initially expected because they cover more than just specific types of technologies. Technology neutrality also plays an important role, especially given the variation among Member States. This section discusses the NGA and VHCN concepts as they are understood in the EU documents, then turns the discussion towards how NGA and VHCN coverage varies across the EU. We look at them in two contexts:

- The Digital Agenda for Europe, due to its relevance at the time when Access Recommendations were adopted, and because the targets that were set for 2020 and the degree to which they have been achieved can be discussed.

[12] Regulation (EU) 2021/241 of the European Parliament and of the Council of 12 February2021 establishing the Recovery and Resilience Facility.
[13] *2030 Digital Compass: the European way for the Digital Decade*, COM(2021) 118 final.

- New developments in connectivity targets set out in the more recent documents, as they are highly relevant for the successor recommendation. Specifically, the new recommendation should take into account the developments in strategic direction that came through the Communication Connectivity for a Competitive Digital Single Market – Towards a European Gigabit Society (2016),[14] the Communication Shaping Europe's digital future (2020),[15] and the Communication Digital Compass: The European Way for the Digital Decade (2021)[16].

From NGA to gigabit

The policy since the adoption of the NGA Recommendation has evolved significantly to date with multiple instruments, including most recently the Digital Compass: The European Way for the Digital Decade (2021)[17], setting the most recent policy target that all European households must be covered by a gigabit network by 2030 (versus 59% as of 2020), and for all populated areas to be covered by 5G wireless services by 2030 (compared to 14% in 2021).[18]

The new recommendation must contribute to achieving these policy targets. The experience from the NGA and NDCM Recommendations helps us to understand the prospects for success of the successor recommendation. We therefore begin the discussion of the change in policy targets with the Access Recommendations moving on until the Digital Decade/Digital Compass Communication to show the changes that took place and that the new recommendation should consider.

The NGA Recommendation defines NGA networks as "wired access networks which consist wholly or in part of optical elements and which are capable of delivering broadband access services with enhanced characteristics (such as higher throughput) as compared to those provided over existing copper networks. In most cases, NGAs are the result of an upgrade of an existing copper or coaxial access network"[19]. Although the definition is technology-neutral, the Commission Staff Working Document accompanying the NGA Recommendation specifically speaks about NGA penetration in terms of FTTH/B, VDSL and EuroDOCSIS 3.0[20].

The definition of NGA networks as connections capable of delivering a service speed of at least 30 Mbps reflects the main objective of one of the key areas of the Digital Agenda for Europe, namely, to "increase European access to fast and ultra-fast internet. The 2020 target is internet speeds of 30 Mbps or above for all European citizens"[21]. By the end of June 2019, the objective was achieved by several Member States, but not all. For example, Lithuania and France reported NGA coverage lower than 70%, with France reporting the lowest coverage of

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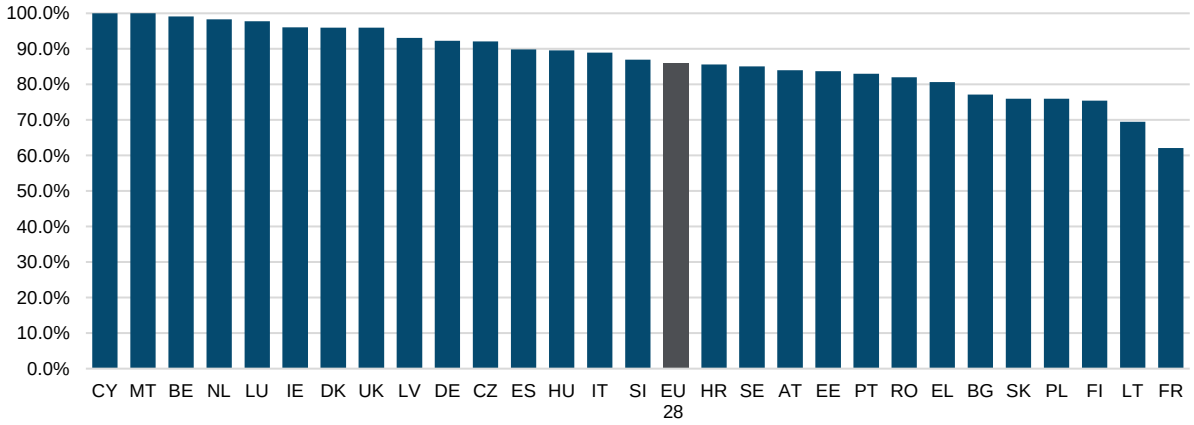
[14] *Connectivity for a Competitive Digital Single Market – Towards a European Gigabit Society*, COM/2016/0587 final, p. 2.
[15] *Shaping Europe's digital future*, COM/2020/67 final
[16] *2030 Digital Compass: The European Way for the Digital Decade*, COM/2021/118 final
[17] Ibid.
[18] Annex to *2030 Digital Compass: The European Way for the Digital Decade*, COM/2021/118 final, p. 2.
[19] *Recommendation on regulated access to Next Generation Access Networks*, 20 September 2010
[20] Commission Staff Working Document Accompanying document to the Draft Commission Recommendation on regulated access to Next Generation Access Networks (NGA) C(2010) 6223, p. 10
[21] Digital Agenda: Kroes to present Digital Agenda for Europe as at 31 May, EU Telecoms Council, MEMO/10/223, 28 May 2010, available at: https://ec.europa.eu/commission/presscorner/detail/en/MEMO_10_223

the study, with only 62.1% of households passed[22] (see Figure 1). On the whole, as of 2020, more than 86% of EU citizens enjoy access to NGAs with speeds of 30 Mbps and above[23].

Figure 1. NGA Coverage in EU Member States in 2019.



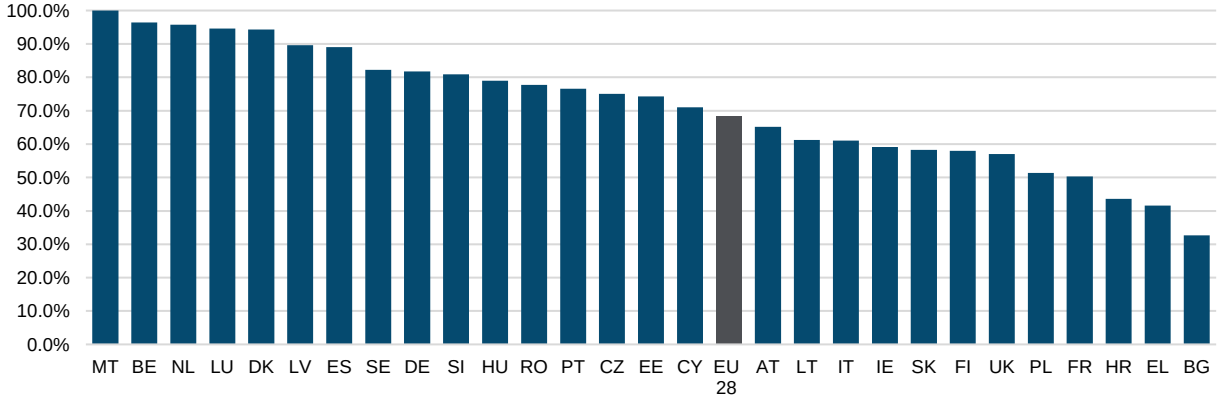
Source: IHS Markit, Point Topic (2020) Broadband Coverage in Europe 2019.
Note: NGA coverage includes VDSL, VDSL2 Vectoring, FTTP, DOCSIS 3.0, DOCSIS 3.1. The data reflects the situation in mid-2019 and significant changes could have appeared since then.

The second target of the Digital Agenda for Europe was that at least a half of European households should be subscribed to connections of 100 Mbps or above[24]. The Digital Economy and Society Index Report (DESI) "… assesses the availability as well as the take-up of basic, fast (Next Generation Access – NGA providing of at least 30 Mbps) and ultra-fast broadband (at least 100 Mbps)"[25]. Thus, the ultra-fast broadband corresponds to the mentioned second target of the Digital Agenda for Europe. The Communication Connectivity for a Competitive Digital Single Market – Towards a European Gigabit Society (2016) extended this target by setting the strategic objective for 2025, when all European households should be covered by at least a 100 Mbps connection.

There are substantial differences between the Member States regarding the availability of ultra-fast broadband (see Figure 2). The EU average is close to 70%, but the differences between the countries at the top and at the bottom of the ranking are quite significant. The 2019 data shows that Malta is the only Member State to have achieved the 100% ultra-fast broadband coverage. It is followed by Belgium, the Netherlands, Luxembourg and Denmark with ultra-fast broadband coverage above 90%. On the other hand, Croatia, Greece, and Bulgaria had coverage below 50%.

[22] IHS Markit, Point Topic (2020) Broadband Coverage in Europe 2019, final report, SMART 2019/0020, p. 10, available at : https://ec.europa.eu/digital-single-market/en/news/broadband-coverage-europe-2019
[23] Digital Economy and Society Index (DESI) 2020. Available at: https://ec.europa.eu/digital-single-market/en/news/digital-economy-and-society-index-desi-2020
[24] Digital Agenda: Kroes to present Digital Agenda for Europe as at 31 May, EU Telecoms Council, MEMO/10/223, 28 May 2010, available at: https://ec.europa.eu/commission/presscorner/detail/en/MEMO_10_223
[25] Digital Economy and Society Index (DESI) 2020. Available at: https://ec.europa.eu/digital-single-market/en/news/digital-economy-and-society-index-desi-2020

Figure 2. Ultra-fast broadband (connections of 100 Mbps or higher) coverage in EU Member States in 2019



Source: IHS Markit, Point Topic (2020) Broadband Coverage in Europe 2019.
Note: the data reflects the situation in mid-2019 and significant changes could have appeared since then.

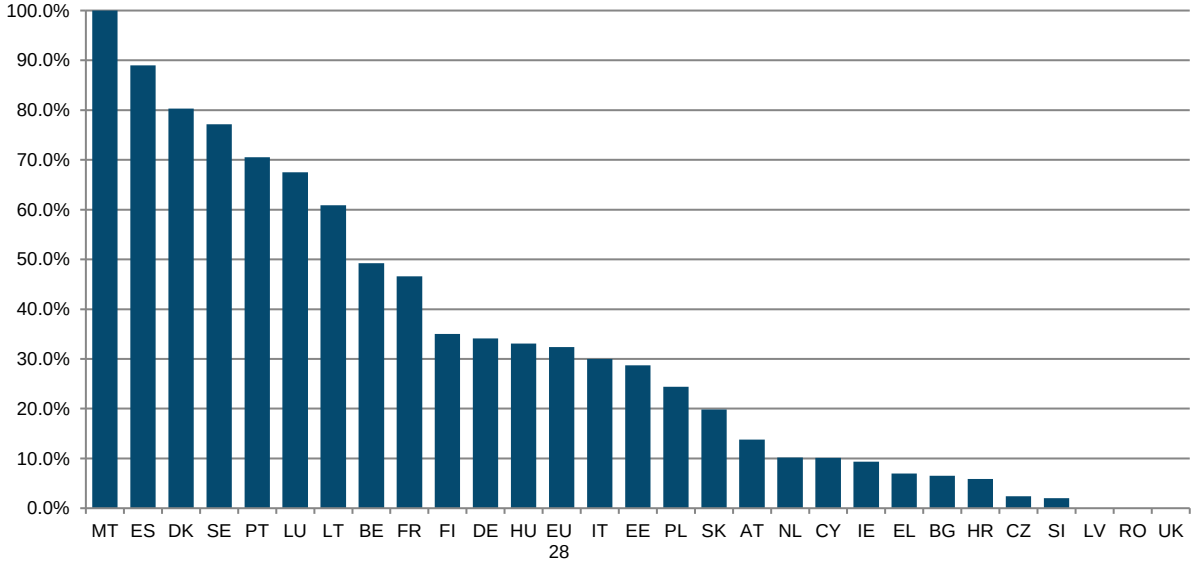
More recent EU policy developments with connectivity targets also focused on gigabit speeds:

- *Connectivity for a Competitive Digital Single Market – Towards a European Gigabit Society (2016),* in addition to 100 Mbps coverage of all European households sets the strategic objective for 2025, when gigabit connectivity should be provided "for all main socioeconomic drivers such as schools, transport hubs and main providers of public services[26] as well as digitally intensive enterprises;"[27]
- *Shaping Europe's digital future (2020)* discusses technology works for people relying on the EU 2025 Connectivity targets set out in the Gigabit Society Communication and the key actions in this field (such as accelerating investments, cybersecurity, the Digital Education Action Plan, etc.);[28]
- *Digital Compass: The European Way for the Digital Decade (2021)* sets the level of ambition that all EU households be covered by a gigabit network by 2030[29].

The new recommendation will have to take into account these developments and contribute to achieving the expected targets. The current situation in terms of the Digital Decade target is shown in Figure 3 below. Only Malta has already reached the 100% target, while Latvia and Romania lagged behind with no gigabit coverage at all by mid-2019. The EU average was 32.4%, less than a third of the 2030 target. Thus, it is important that new policy measures and guidance facilitate rapid transition.

[26] Covering, e.g. primary and secondary schools, train stations, ports and airports, local authority buildings, universities, research centres, doctors' surgeries, hospitals and stadiums.
[27] *Connectivity for a Competitive Digital Single Market – Towards a European Gigabit Society*, COM/2016/0587 final
[28] *Shaping Europe's digital future*, COM/2020/67 final
[29] *2030 Digital Compass: The European Way for the Digital Decade*, COM/2021/118 final

Figure 3. Gigabit (connections of 1 Gbps or higher) coverage in EU Member States in 2019



Source: IHS Markit, Point Topic (2020) Broadband Coverage in Europe 2019.
Note: the data reflects the situation in mid-2019 and significant changes could have appeared since then.

However, the new recommendation must account for the targets established in more recent policy instruments in order to make sure that the expected gigabit speeds are delivered. We must therefore consider the definition of VHCN in the EECC, as elaborated by BEREC, when discussing the most appropriate remedies to cover these new requirements. The new recommendation should also keep an eye on the still more ambitious goals of the Digital Compass.[30]

Very high capacity networks (VHCN)

While the VHCN concept covers different technologies, it is not fully technology-neutral[31], as its starting point refers to specific technologies/architectures (namely, fibre to the building or to the antenna) and performance criteria are defined based on that starting point. Thus, VHCN can also be seen in terms of criteria in addition to connection speed, as shown further in this section. EECC sets out that NRAs "shall take into account the need to promote competition and long-term end-user interests related to the deployment and take-up of next-generation networks, and in particular of VHCN"[32]. As per the EECC, VHCN are electronic communications networks:

- either consisting "wholly of optical fibre elements at least up to the distribution point at the serving location";[33]

[30] *2030 Digital Compass: The European Way for the Digital Decade*, COM/2021/118 final.
[31] It could also be noted that while technology neutrality is an important principle, it is not a policy end in and of itself. Article 3.4 notes that "national regulatory and other competent authorities shall […], inter alia […] apply Union law in a technologically neutral fashion, to the extent that this is consistent with the achievement of the objectives […]"
[32] Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code, Article 74.
[33] Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code, Article 2.

- or "capable of delivering, under usual peak-time conditions, similar network performance in terms of available downlink and uplink bandwidth, resilience, error-related parameters, and latency and its variation"[34].

These definitions mean that in addition to the wholly optical fibre networks (FTTH/FTTP architectures), fixed VHCN may include other NGA architectures that meet the performance criteria.

The EECC entrusts BEREC with the task of providing further guidance "on the criteria that a network is to fulfil in order to be considered a very high capacity network, in particular in terms of down- and uplink bandwidth, resilience, error-related parameters, and latency and its variation,"[35] with the guidelines adopted on 1 October 2020[36]. The guidelines consider a fixed network[37] to be a VHCN if it satisfies either of the following criteria:

- it is a fixed-line connection with fibre rollout at least up to the multi-dwelling building (FTTB); OR
- it is capable of delivering services to end-users under usual peak-time conditions at specific quality of service levels (QoS) including:
    a) Downlink data rate ≥ 1 000 Mbps;
    b) Uplink data rate ≥ 200 Mbps;
    c) IP packet error ratio (Y.1540) ≤ 0.05%;
    d) IP packet loss ratio (Y.1540) ≤ 0.0025%;
    e) Round-trip IP packet delay (RFC 2681) ≤ 10 ms;
    f) IP packet delay variation (RFC 3393) ≤ 2 ms;
    g) IP service availability (Y.1540) ≥ 99.9% per year.

These QoS criteria are technology-neutral. They could apply for instance to NGA architectures that combine, on the one hand, copper with DSL technology or coax with DOCSIS 3.1 and, on the other, optical fibre. However, in order to compute the VHCN coverage in the case of the second condition listed above, only those areas should be included where networks are capable of meeting thresholds listed above in peak-time.

DESI used a proxy for VHCN when estimating VHCN coverage. It includes the combined footprint of FTTP and DOCSIS 3.1[38]. This approach deviates in particular from the EECC definition in order to enable easier data management and improved comparability. It is more straightforward to use for measuring the indicator.

Following the proxy used by DESI for VHCN (FTTP and DOCSIS 3.1), there is substantial variation among the Member States in terms of the availability of VHCN (see Figure 4). While

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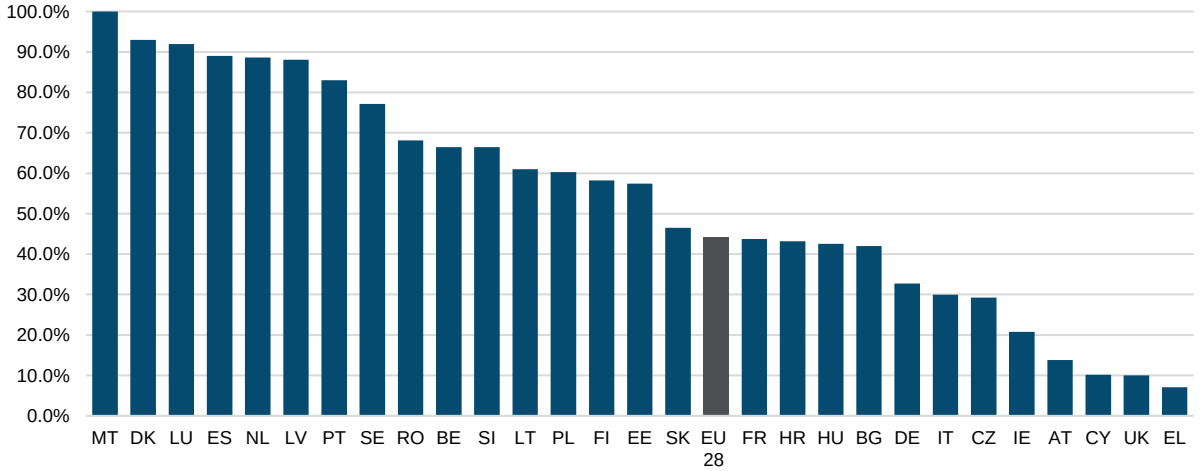
[34] Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code, Article 2.
[35] Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code, Article 82.
[36] BEREC (2020), *BEREC Guidelines on Very High Capacity Networks*. BoR (20) 165. Available at: https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/9439-berec-guidelines-on-very-high-capacity-n_0.pdf
[37] Given the scope of the study, we do not further discuss the criteria for wireless networks.
[38] Webpage 'Digital Economy and Society Index Report 2020 – Connectivity', available at: https://ec.europa.eu/digital-single-market/en/connectivity

the EU average remains at 44%[39], the differences between the countries at the top and bottom of the ranking are quite significant. As of 2020, Malta is the only EU Member State that has achieved 100% coverage of VHCN (through FTTP & Cable DOCSIS 3.0). It is followed by Denmark with 93% and Luxembourg with 92% coverage, respectively. On the other side of the spectrum is Greece, where only 7% of households have FTTP or cable coverage[40].

Figure 4. Overall fixed VHCN coverage in EU Member States in 2019



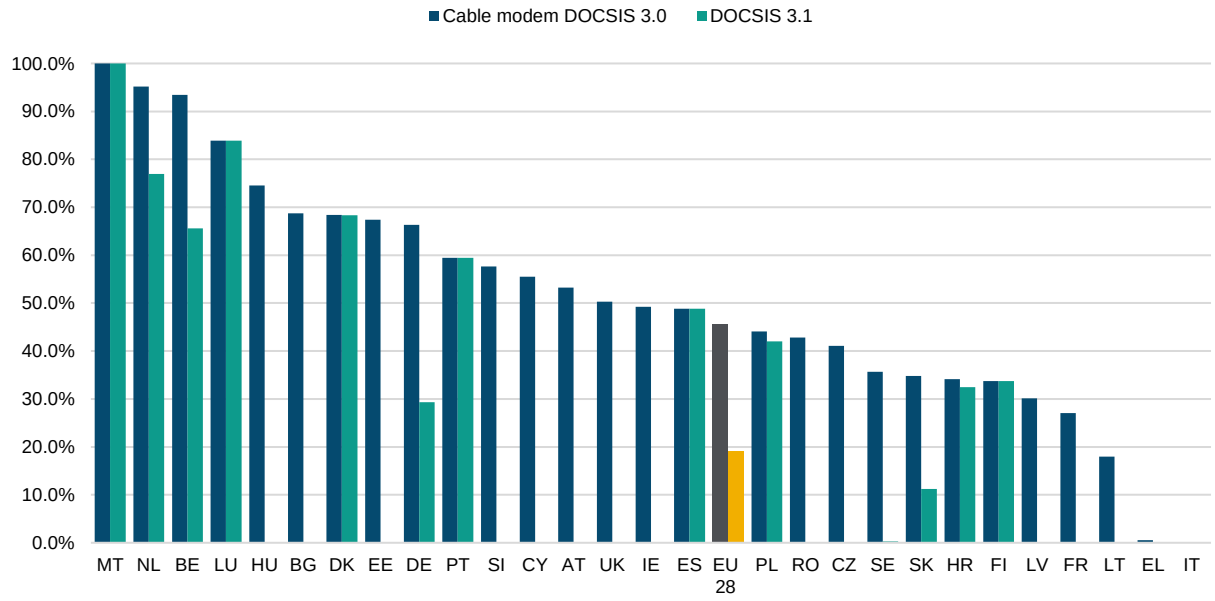
Source: IHS Markit, Point Topic (2020) Broadband Coverage in Europe 2019.
Note: VHCN coverage includes FTTP and DOCSIS 3.1 coverage. The data reflects the situation in mid-2019 and significant changes could have appeared since then.

c. Broadband in EU Member States

In terms of coverage by specific technologies, Member States vary greatly. For example, while the EU average for DOCSIS 3.0 and DOCSIS 3.1 is 45.5% and 19.2% respectively, Malta has achieved full coverage of its population with these technologies. On the other hand, many Member States do not utilise the DOCSIS 3.1 technology at all, and Italy and Greece have virtually no coverage of either DOCSIS 3.0 or DOCSIS 3.1. The situation is comparable in the case of VDSL and VDSL 2 Vectoring adoption, where the EU average stands at 59.2% and 28.2% respectively. Cyprus, Belgium and Ireland have the greatest coverage of VDSL technology, providing almost universal access to the population, while the Czech Republic, Austria and Germany are the leaders in VDSL 2 Vectoring availability above 60%[41]. Meanwhile, Portugal has no VDSL technologies at all. The tables below illustrate the aforementioned points regarding the adoption of various DOCSIS and VDSL technologies.

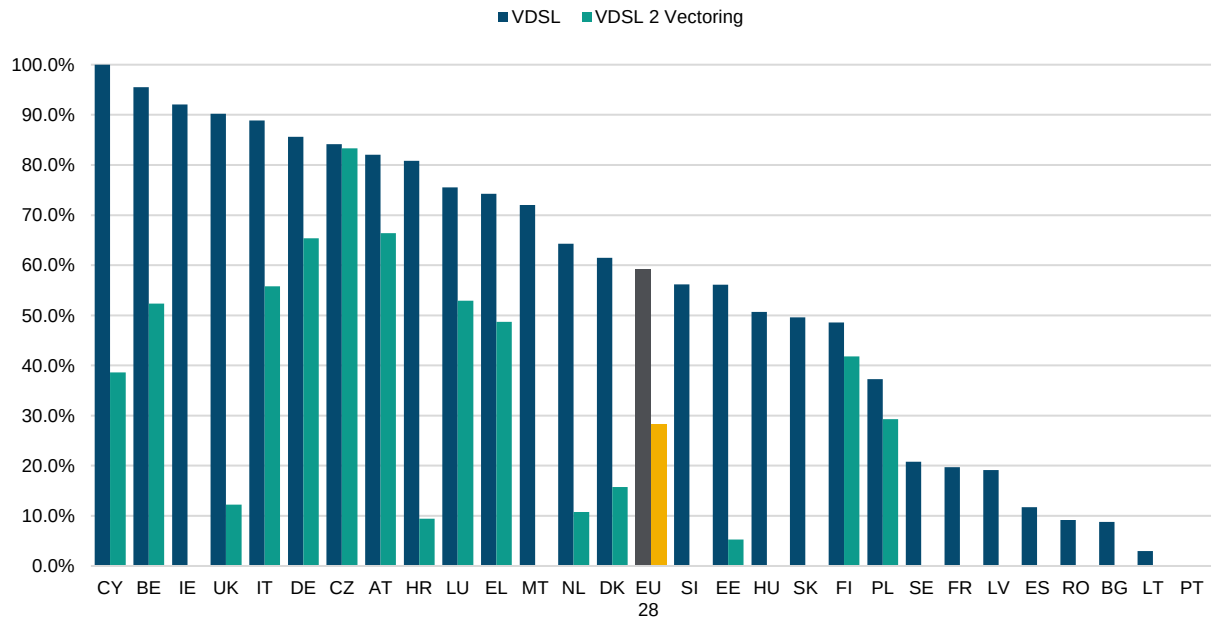
[39] It should be noted that the EU-27 average is higher than 44% as of 2020, since DESI calculations also include the United Kingdom (with a low 10% average) despite it no longer being an EU Member State.
[40] Digital Economy and Society Index (DESI) 2020.
[41] Ibid.

Figure 5. DOCSIS 3.0 and DOCSIS 3.1 coverage in EU Member States in 2019



Source: IHS Markit, Point Topic (2020) Broadband Coverage in Europe 2019.
Note: the data reflects the situation in mid-2019 and significant changes could have appeared since then.

Figure 6. VDSL and VDSL 2 Vectoring coverage in EU Member States in 2019

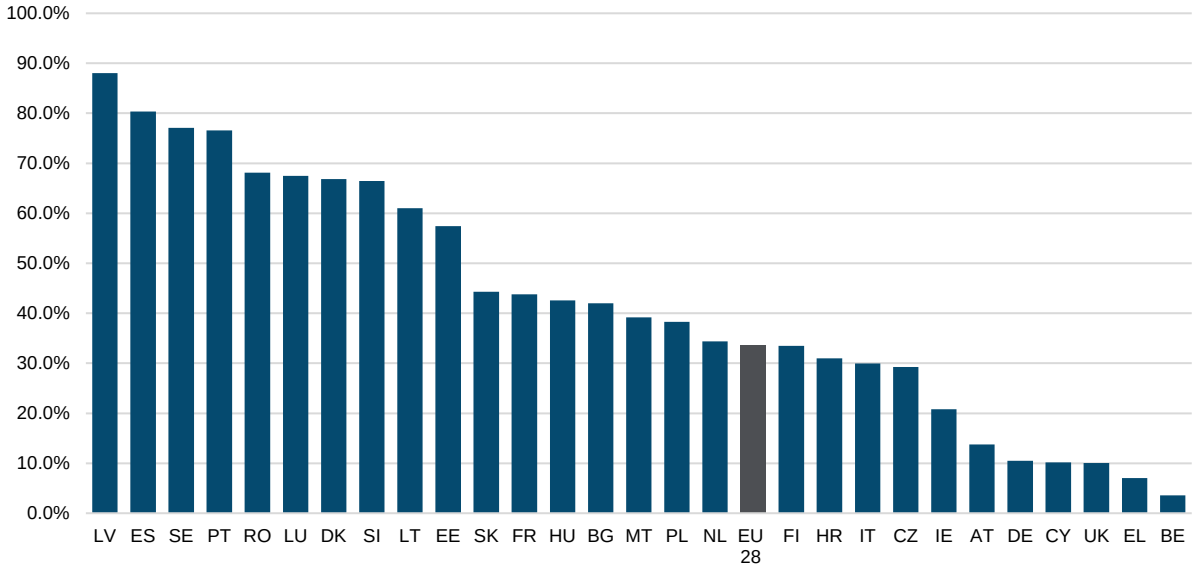


Source: IHS Markit, Point Topic (2020) Broadband Coverage in Europe 2019.
Note: the data reflects the situation in mid-2019 and significant changes could have appeared since then.

The adoption of FTTP technology also varies among the Member States. On average, just around one third of EU households have access to an FTTP connection. In this respect, the leading Member States are Latvia (88.1%), Spain (80.4%), Sweden (77.1%) and Portugal

(76.6%), while FTTP coverage in Belgium and Greece is below the 10% threshold[42]. Figure 7 below illustrates the stark contrast among Member States as of 2019.

Figure 7. FTTP coverage in EU Member States in 2019.



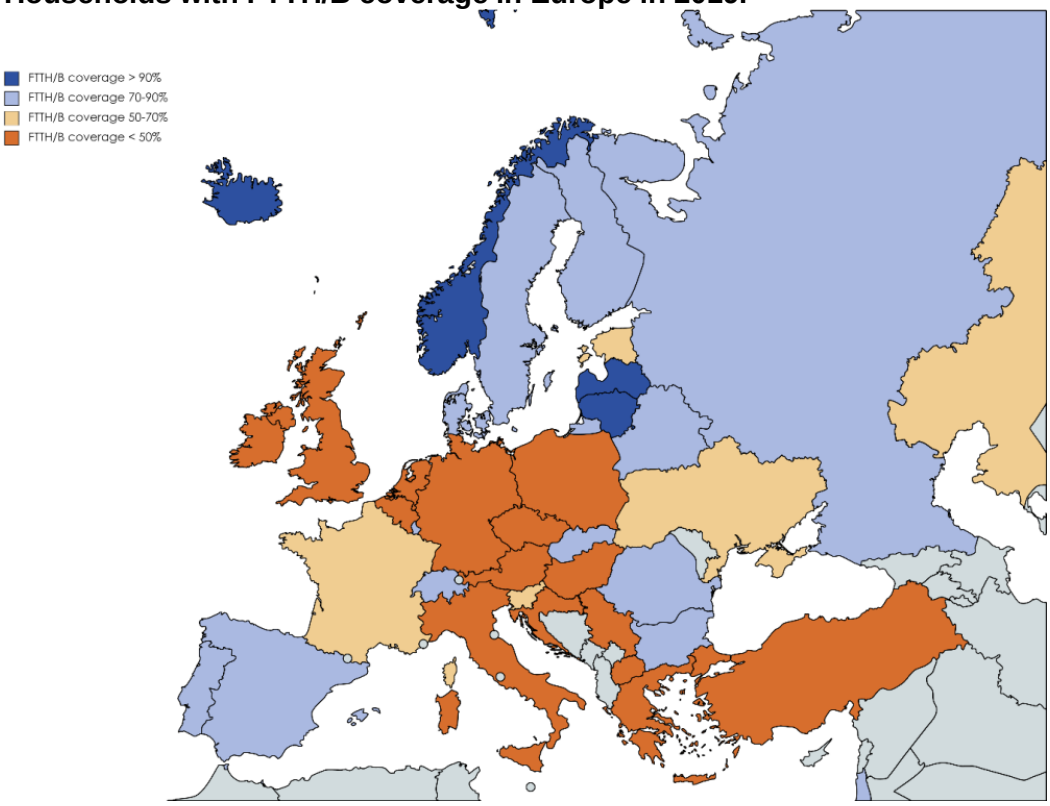
Source: IHS Markit, Point Topic (2020) Broadband Coverage in Europe 2019. Note: the data reflects the situation in mid-2019 and significant changes could have appeared since then.

The situation described by the FTTH Council resembles the data provided in the Broadband Coverage in Europe (2019) study, but with some differences. Lithuania and Latvia are the top EU Member States in terms of technological adoption (94% and 95.6% of households are covered respectively). Still, most other Member States do not provide the majority of their households with access to this technology. Just 10% of German and 30.6% of Italian households have homes equipped with FTTH/B technology[43]. This variation is very clear even among the countries that are typically bulked together for other purposes (Central and Eastern European, Mediterranean, or EU6 countries), which is clearly visible on the map below.

While there is variation in the data, this might also come from different definitions. IHS Markit and Point Topic define FTTP coverage to be when "a household […] can be connected now to a fibre service without requiring the construction of new fibre infrastructure and is available to be connected within reasonable time and cost limits."[44] Meanwhile, the FTTH Council defines coverage as "homes passed/households"[45].

[42] Ibid.
[43] FTTH Council Europe (2020), *Markets as at September 2019*
[44] IHS Markit, Point Topic (2020*), Broadband Coverage in Europe 2019*, p. 193.
[45] FTTH Council (2020), *Markets as at September 2019*.

Figure 8. Households with FTTH/B coverage in Europe in 2019.



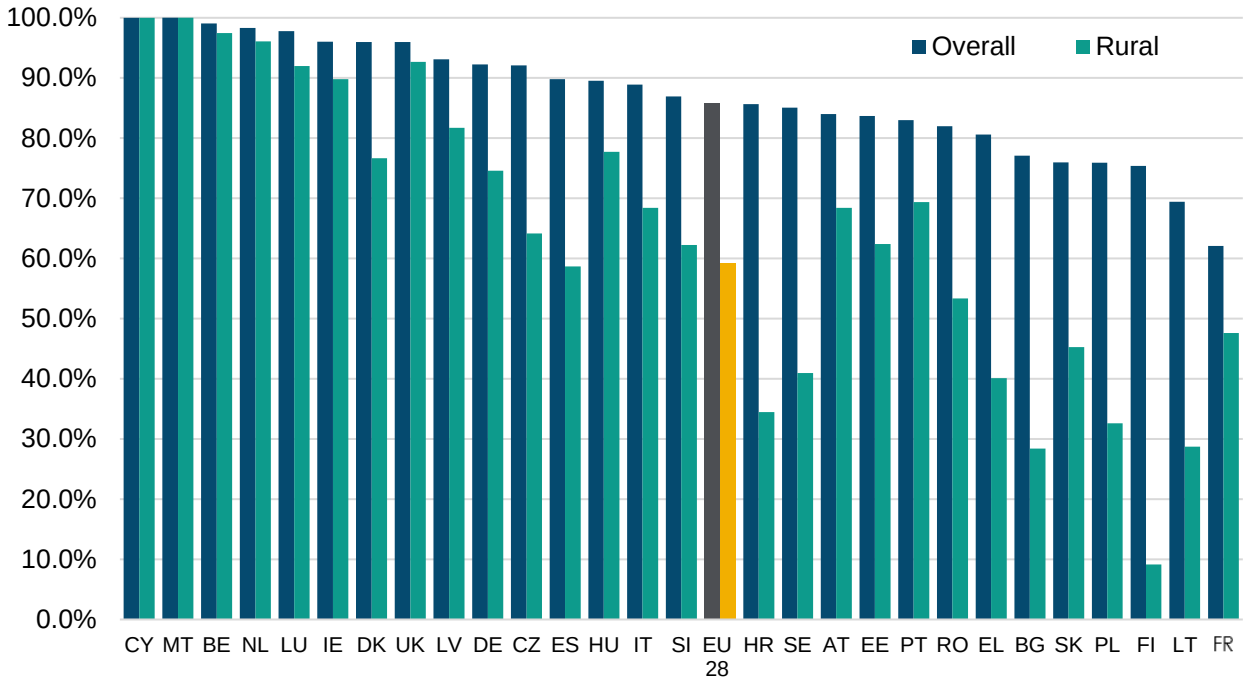
Source: FTTH Council (2020) Markets at September 2019.

As shown, EU Member States vary not only in terms of the general coverage of NGA or VHC networks, but also in technologies used to provide broadband services and their regional coverage. Nonetheless, one of the most important dimensions when discussing the NGA or VHCN rollout is availability in rural and hard-to-reach areas. The problems of the "new" digital divide and poor connectivity could negatively affect the further development of the Digital Single Market. An analysis of ICT market trends indicates that the provision of many products, services and applications in the Digital Single Market will only be sustainable where optical fibre networks are deployed up to a fixed or wireless access point close to the end-user[46]. The Commission pointed out in 2016 that rural NGA coverage has been increasing slowly in several countries such as Germany, France, Italy, Austria and Finland, thus increasing the risk of a growing urban and rural digital divide[47].

Figure 9 illustrates the variation in NGA coverage in urban and rural areas in Member States in 2019. While certain smaller Member States tend to have good coverage, other countries still face the challenge of providing services to rural areas. The numbers are even smaller for VHCN rollout in rural areas, thus raising questions on how it could be improved and how guidance provided in the Access Recommendations could encourage deployment in such areas.

[46] *Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society*, COM/2016/0587 final.
[47] Ibid.

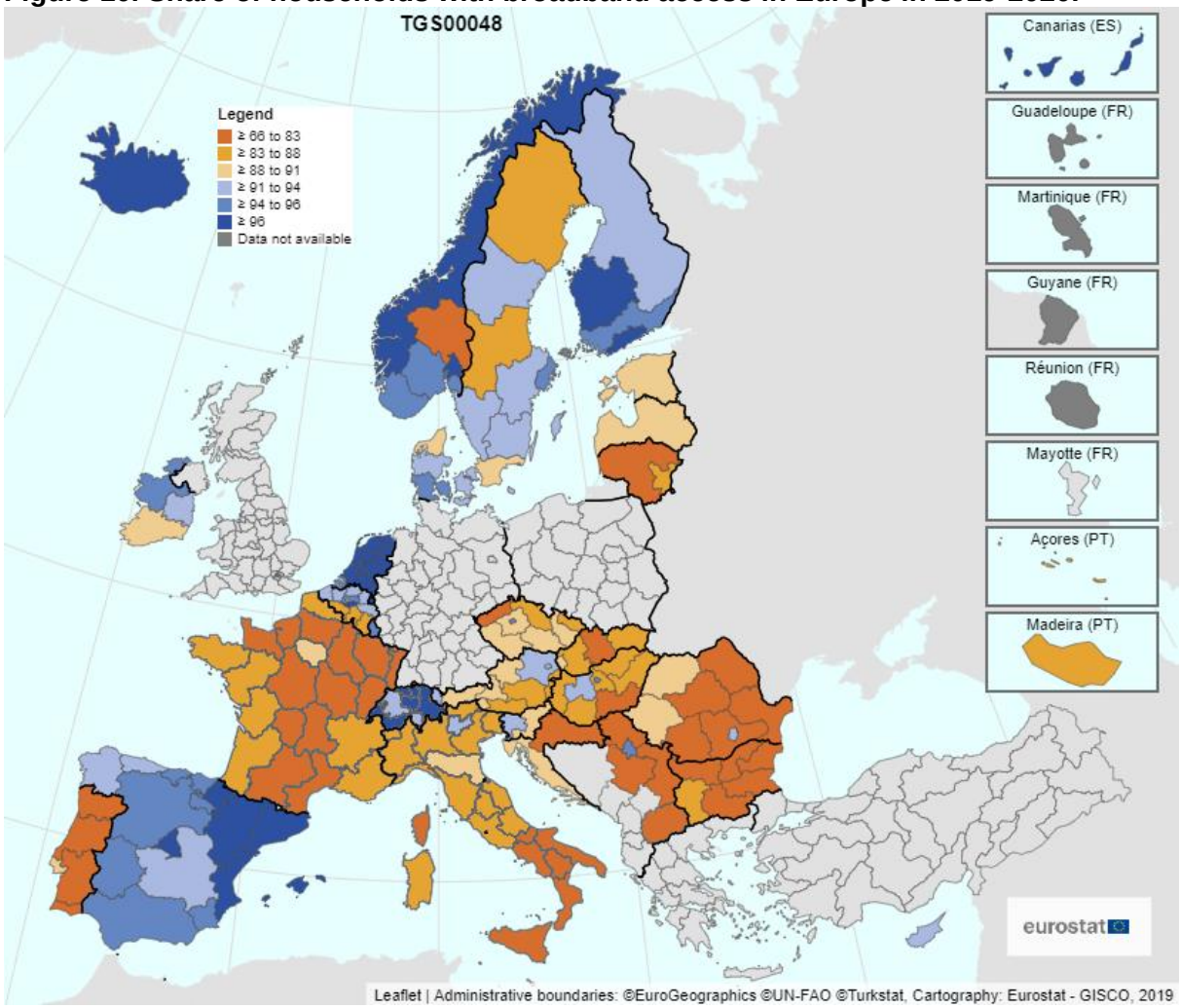
Figure 9. Rural and overall NGA Coverage in EU Member States in 2019



Source: IHS Markit, Point Topic (2020) Broadband Coverage in Europe 2019.
Note: the data reflects the situation in mid-2019 and significant changes could have appeared since then.

While the urban-rural division is very important, when considering broadband coverage and accessibility from the perspective of regulatory incentives for deployment, there is also regional variation within the Member States (which can also be affected by non-uniform population distribution in a country with certain regions being more urban than others). While in certain Member States the distribution is quite uniform, it is not so in others. The variation in broadband coverage at the NUTS2 region level is illustrated in Figure 10 below.

Figure 10. Share of households with broadband access in Europe in 2019-2020.



Source: Based on Eurostat data, indicator TGS00048. Note: data for FR, IT, CH and MK are taken for 2019, as data for 2020 was not available for these countries. Data for the remaining countries reflects the situation in 2020.

The general variation of VHCN coverage, differences in technologies and penetration of rural areas suggest that there may be economic challenges to uniform high-speed broadband, as discussed further in the text.

d. Solving the challenge of high-speed broadband deployment

The variation in broadband deployment among and, especially, within Member States illustrates the fundamental challenge in achieving coverage of the full national territory with VHCN, or more generally with broadband of high quality, which is that there are very few countries worldwide where commercial incentives alone would suffice to motivate network operators to make sufficient investments throughout. Without one form or another of public policy intervention, network operators would tend to deploy to the most profitable parts of the country, and would leave the rest with broadband of poorer quality.

Costs tend to be higher in low-density rural areas, and lower in high-density urban areas, because the average length of each line (and therefore the unit cost of deploying it) tends to

be less when the density of customers is high[48]. In most countries in the world, the willingness to pay (WTP) on the part of consumers is not as great as the unit cost of covering the lowest density areas with VHCN. This implies that the country as a whole would not be covered if matters were left solely to market mechanisms[49].

Public policy measures are called for in order to unlock the relevant societal benefits. Any possible solutions are subject to the EU principle of proportionality, which is to say that they must be targeted to the problem, and no more intrusive than necessary. The range of public policy measures that can be employed are thus a direct consequence of the fact that revenues will tend not to cover costs (including the cost of capital) **for the most expensive portions of the national territory**. With that being said, the main options to correct the mismatch of costs and returns are:

- **Driving down** the cost (and risk) of deployment;
- **Adjusting regulation to allow higher revenue for network operators** (with a primary focus on SMP operators for the purpose of this study);
- **Providing public subsidies** so as to make the business case at least marginally profitable, leading "to the rollout of a new infrastructure which would not have been there otherwise, thus delivering additional capacity and speed"[50] in the high cost portions of the national territory.

Introduction of clear **guidance** via policy means may also provide a clear and predictable framework for investments, making it easier for the operators to plan their activities and estimate costs and return on investment more accurately. Current European broadband policy is in fact using all of these tools, but not all of them are relevant to this study.

Numerous measures in the EECC and other EU policy instruments **seek to drive down broadband deployment costs.** The Broadband Cost Reduction Directive (BCRD) is primarily concerned with exactly this. Although the Article 72 EECC SMP Civil Engineering Infrastructure (CEI) provisions are mainly about promoting competition, they can also play a role in cost reduction. Article 57 EECC provisions to facilitate small cell deployment are not specifically relevant to this report, but they are in the same direction.

The pricing flexibility that is a central feature of the NDCM Recommendation seeks to solve the incentives problem by **providing additional flexibility to the SMP operator**, while avoiding significant retail price increases because flexibility is granted only when a demonstrable retail price constraint is in place. Pricing flexibility helps the SMP operator in many ways. It would provide the SMP operator more opportunities to ensure cost recovery (including cost of capital) by adapting prices to demand (e.g. penetration pricing in the beginning, higher prices when demand picks up, etc.)

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[48] See Attila Mitcsenkov *et al*. (2013), Geometric versus Geographic Models for the Estimation of an FTTH Deployment, March 2013, *Telecommunication Systems* 54(2):113-127 and FTTH Council (2012), *Creating a bright future, the Cost of Meeting Europe's Network Needs*, July 2012.

[49] "Due to economics of density, the deployment of broadband networks is generally more profitable where potential demand is higher and concentrated, i.e. in densely populated areas. Because of high fixed costs of investment, unit costs increase significantly as population densities drop. Therefore, when deployed on commercial terms, broadband networks tend to profitably cover only part of the population. (…) Where the market does not provide sufficient broadband coverage or the access conditions are not adequate, State aid may therefore help to remedy such market failure", communication from the commission, EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks (2013/C 25/01), point 38.

[50] State Aid Broadband guidelines, point 50.

The long evolutionary arc of regulation of electronic communications over the past decade has sought to achieve results along these lines in different ways at different times, but they are variations on a theme. For each of these approaches (typically implemented through targeted deregulation), solutions had to be found so as to ensure (1) that the deregulated SMP firm would not practice anti-competitive discrimination, and in particular that it would not favour its own downstream activities over those of competitors; and (2) that it would not charge excessive prices, however defined. In the case of separation, for instance, the first of these problems was solved because there was no longer an integrated downstream retail operation that might be favoured.

Returning to the NDCM Recommendation, it sought to provide more flexibility to SMP operators while also limiting the risk of retail price increase by (1) ensuring non-discrimination by means of mechanisms such as Equivalence of Input (EoI), and (2) preventing excessive pricing primarily by means of the Economic Replicability Test (ERT), which is a form of the ex ante Margin Squeeze Test (MST).

The EECC represents a further development. The wholesale-only provisions, for instance, solve the problem of preventing the SMP network operator from favouring its retail operations by recognising the existence of various models and prescribing the relevant regulatory adjustments.

It is important to remember that this study deals only with a number of specific tools that entail regulation of electronic communications, but they need to be understood as part of a constellation of measures. There are other tools that could be employed to increase the deployment and use of networks (e.g. stimulating demand (avoiding impediments to demand) by means of education, demand aggregation, or subsidies to certain classes of consumers are all relevant here) so as to increase their incentives to build out VHCN. These measures fall within the broader policy realm rather than only regulation, and are out of scope for the current study. There is nonetheless an obvious need for joined up policy.

Many aspects, including the setting of objectives, constitute industrial policy. Subsidies are subject to state aid rules and thus fall under competition policy. Training for the public is largely an educational competence.

Finally, the misalignment of incentives can be addressed by means of **providing public subsidies**. State aid rules must be understood as playing a complementary role to the regulatory tools covered in this report, but they are outside of the scope of what we will cover here.

e. Different media and regulation

This study is not just about FTTP/FTTH. For our purposes, it is important to understand the evolution of broadband as a whole, because different forms of broadband can have the potential to substitute for one another in varying degrees, even though they are typically imperfect substitutes at best. The degree to which two broadband services substitute for one another is an empirical question that is highly dependent on the specific characteristics of the products and markets involved.

Variation in technology cannot be ignored. Indeed, the EECC itself recognises this explicitly in Article 3(4)(c), which calls on NRAs to “apply Union law in a **technologically neutral fashion** [emphasis added]” However, the same article goes on to state that this should be applicable “to the extent that this is consistent with the achievement of the [other objectives identified in

Article 3 EECC]". Thus, while technological neutrality is important, it should not hinder the implementation of the EECC objectives.

Aside from this, market developments of these alternative media are important in understanding the competitive landscape, and how they interact with the regulatory elements of the EECC and Recommendations.

Cable has played a substantial role in the deployment of high-speed broadband in the EU (and is, for comparison, the majority broadband provider in the US and Canada). Cable coverage and adoption in the EU are, however, quite diverse, with essentially full coverage in the Netherlands, Belgium and Malta, but none at all in Italy or Greece (see Section 2.b). Experience in the EU suggests that where cable competes effectively, it can serve as a catalyst for competition, providing benefits for all; conversely, Member States such as Italy, where cable is totally absent, seem to have experienced slow growth of FTTH.

Most remedies were originally designed for copper telecoms networks. They have subsequently been modernised (partly through these Recommendations) in recognition of VDSL, vectoring, FTTP/FTTH, and to a limited extent cable/HFC.

Much of EU regulation and the literature pay insufficient attention to cable. In North America, however, cable is the majority broadband provider. In the EU, cable likewise represents a substantial fraction of NGA and (with the shift to DOCSIS 3.1) has the potential to represent a significant fraction of VHCN, even if not all DOCSIS 3.1 and cable can be considered VHCN. In 2012, in the era when the Recommendations were enacted, cable networks using DOCSIS 3.0 accounted for 74% of NGA coverage and 57% of NGA subscriptions.[51] In 2019, cable provided 29% of NGA fixed broadband subscriptions, and represented 19% of fixed broadband subscriptions, even though cable passed only 46% of all EU homes (and the cable footprint is not growing significantly).[52]

Despite the fact that cable was the majority provider of NGA in the EU at the time, the 2010 Digital Agenda for Europe[53] contains only a single reference to cable as a legacy technology. Cable is barely mentioned in the NGA Recommendation. In the review of the economics literature in Section 2.f, only three papers[54] out of some 17 pay significant attention to cable.

One can debate whether the regulatory "benign neglect" of cable in the past was a defect. In many of the Member States, cable has functioned as a competitive catalyst for competition, not as an SMP operator (see Section 2.f). Coverage varies enormously across the Member States – cable has essentially full coverage in the Netherlands, Belgium and Malta and plays a substantial role in urban areas in some eastern Member States such as Hungary, but is altogether absent in Italy and Greece.

Historically, there was little regulation of cable in the EU for various reasons: (1) it is often included in market analysis in terms of effects on competition, but rarely included in the

[51] European Commission (2013), *Broadband lines in the EU: situation as at 1 July 2012*; Communications Committee Working Document.
[52] Digital Economy and Society Index (DESI) 2020: Thematic chapters.
[53] COM(2010)245 final.
[54] Namely Wolfgang Briglauer, Carlo Cambini, Michał Grajek (2018), "Speeding up the internet: Regulation and investment in the European fiber optic infrastructure", *Telecommunications Policy;*; Nardotto, M., Valletti, T., & Verboven, F. (2015). "Unbundling the incumbent: Evidence from UK broadband", *Journal of the European Economic Association*, 13(2); and Calzada, García-Mariñoso, Ribé, Rubio, and Suárez (2018).

definition of the relevant market[55]; (2) efforts to impose remedies on cable have sometimes been blocked by the courts because they rely on proving joint dominance with telecoms; (3) cable tends to have much less coverage than the historic telecoms incumbent in most Member States, with the exception of BE, NL and MT; and (4) conventional remedies such as ULL cannot be directly employed with cable; however, alternatives such as Point-to-Point Protocol over Ethernet (PPPoE) can be used in practice. Today, some Member States (and EEA members and accession countries) apply remedies in some markets to cable.[56]

f. Geographic aspects

As noted above, both the RFEC and EECC implicitly recognise that national markets differ from one another. There are also substantial differences within the Member States, which are now explicitly recognised in the EECC. Specifically, Article 67(3) EECC says: "National regulatory authorities shall, taking the utmost account of the Recommendation and SMP guidelines, define relevant markets appropriate to national circumstances, in particular relevant geographic markets within their territory by taking into account, inter alia, the degree of infrastructure competition in those areas, in accordance with the principles of competition law."

The discussion on the geographical aspects of regulation is also addressed in the Recommendation on the Relevant Markets and the Guidelines on market analysis and the assessment of significant market power under the EU regulatory framework for electronic communications networks and services. The Recommendation on the Relevant Markets notes that NRAs "should define a basic geographic unit as a starting point for assessing competitive conditions" and the unit should be of an appropriate size and able to reflect network structure (Rec. 37). Accordingly, NRAs should define the scope of the markets by aggregating units with a similar competitive situation (Rec. 38). Point 3 of the Recommendation stresses that "the assessment of competitive conditions should be forward-looking and should be based, inter alia, on the number and characteristics of competing networks, distribution of and trends in market shares, prices and behavioural patterns." Furthermore, differentiation of both markets and remedies is possible. As noted in the Explanatory Note to the Recommendation on the Relevant Markets, "segmentation of remedies may be used to address less significant or less stable variations in competitive conditions, including by adjusting remedies periodically or punctually, without thereby undermining regulatory predictability."

Supply side differences among and within the Member States that are relevant to this analysis include (1) the degree of coverage by telecommunications networks, which were historically copper-based; (2) the degree of coverage by cable television infrastructure capable of supporting high-speed broadband, (3) the length of copper sub-loops in telecommunications networks, (4) the degree of population dispersion, (5) suitability of passive infrastructure (especially ducts and poles) for deployment of VHCN, and (6) possible challenging topography (such as mountains or islands).

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[55] E.g. Luxembourg (case LU/2019/2137-2138), However, some NRAs found that cable networks exercised a pricing constraint in Market 3b. E.g. in France (Cases FR/2020/2277-2278-2279-2280) and in Hungary, in the latter because there was a commercial wholesale offer for broadband access based on cable (see Case HU/2011/1190-1191).

[56] BEREC (2020), *BEREC Report: Regulatory Accounting in Practice 2020*, BoR (20) 210. The report states that three NRAs regulate cable; the corresponding table shows Belgium, Denmark, Hungary, as well as Liechtenstein, North Macedonia, Norway, and Serbia.

Also relevant but mostly not covered in this report are differences in demand side aspects such as consumer WTP for services, ability to pay (e.g. GDP per capita), and the degree to which residents of the Member State are at home with digital technology.

Conditions may be fairly uniform in some Member States, while they can differ greatly across the national territory in others. Whether this is best addressed (when necessary) through differentiation in market analysis versus through differentiated remedies is taken up in Chapter 11.

g. A review of key economic literature regarding broadband deployment in the EU

Before going into the assessment of the Access Recommendations and especially proposing the way forward, it is necessary to provide an economic background covering the relevant issues. The economic literature on deployment, adoption and use of broadband is extensive. In this section, we provide brief summaries of only a few of the contributions that are most relevant to this study. For a comprehensive survey of recent literature, see Abrardi and Cambini (2019).[57] Our review in this section draws on their work and benefits greatly from it.

There is no real debate among experts today as to the value of the economic and societal welfare benefits that flow from widespread availability of broadband. In a concise literature survey, Cambini (2018)[58] identifies numerous credible results, such as:

- Röller and Waverman (2001)[59] estimate that an increase of 10% in the broadband penetration rate leads on average to an increase of 2.8% of GDP growth (21 OECD countries).
- Koutroumpis (2009)[60] estimated that the average impact of broadband infrastructure on GDP was 0.63% (for 15 countries in the European Union, in the period 2002–2007).
- Czernich et al. (2011)[61] estimated that a 10% increase in the broadband penetration rate could be expected to result in a 1-1.5% increase in annual GDP per capita.

We concur however with the observation in Abrardi and Cambini (2019)[62] that there are "few studies that explicitly account for speed, and the incremental economic benefits of (ultra-)fast fibre technologies, and whether these benefits justify the deployment costs is still under debate."

The CGE analysis that appears in Annex V of the Impact Assessment that accompanied the legislative proposal for the EECC[63] is rarely cited in the academic literature, but it is worthy of consideration. It seeks to quantify the impact that an "accelerated fibre" or a "full fibre" scenario would have on EU GDP in comparison with the business as usual "status quo" scenario, and

[57] Laura Abrardia and Carlo Cambini (2019), "Ultra-fast broadband investment and adoption: A survey", *Telecommunications Policy*.
[58] Carlo Cambini (2018), "Broadband and regulation – How can better research help?"
[59] Röller, L. and L. Waverman (2001), "Telecommunications Infrastructure and Economic Development: A Simultaneous Approach", *American Economic Review*, Vol. 91/4, pp. 909-923.
[60] Koutroumpis, P. (2009), "The economic impact of broadband on growth: A simultaneous approach", *Telecommunications Policy*, Vol. 33/9, pp. 471-485.
[61] Czernich, N. et al. (2011), "Broadband Infrastructure and Economic Growth", *The Economic Journal*, Vol. 121/552, pp. 505-532.
[62] Op. cit.
[63] European Commission (2016), "Impact Assessment accompanying the proposal for [the EECC]", SWD(2016) 303 final/2.

finds a GDP gain of up to 0.95% for the "full fibre" scenario in 2025. This would represent a very substantial benefit, particularly when one considers that it is annual rather than a one-time gain. At the same time, one must not forget that the investment needed to reach that point is substantial – the European Investment Bank estimated in 2018 that achievement of European Gigabit Society goals in 2025 would cost some EUR 384 billion by 2025 under the most likely assumptions (versus EUR 192 billion for a modest deployment, or EUR 428 billion for a still more ambitious deployment).[64] For comparison, consider that EUR 384 billion corresponds to 2.8% of EU-27 2019 GDP of some EUR13.9 trillion, suggesting that the break-even point will be reached in just a few years.

Martin Cave's 2006 paper on the "ladder of investment"[65] represents a key contribution that has been important in the historic evolution of EU regulatory policy. In it, he argued persuasively that "the objective of one-way access regulation should be to generate sustainable infrastructure-based competition where feasible, and that the twin objectives of promoting competition and promoting investment and innovation can be achieved by providing access opportunities for competitors which are appropriately calibrated over time. These are designed to encourage competitors to 'climb the ladder' of infrastructure investment, by installing progressively less replicable assets." The goal was, however, to "restrict mandatory access to a limited period" after which it would no longer be necessary. The shift that had already taken place from simple resale to bitstream access seemed to support the ladder of investment theory. And indeed, many of the Member States observed a shift from bitstream access to LLU. If the rungs of the ladder were appropriately placed, the argument in Cave (2006) was that the shift from bitstream to ULL, and from ULL to full facilities-based deployment, should be feasible based on incentives for network operators.[66]

The ladder of investment is explicitly recognised as a guiding principle in BEREC Common Positions on remedies (for instance the 2012 Common Position on remedies for bitstream access BoR (12) 128). In particular, the principle that infrastructure competition should be encouraged at the deepest feasible level of the network continues play a strong role.

Subsequent developments have necessitated a reassessment of the ladder of investment. Numerous experts came to question whether the last step (to facilities-based deployment of fibre by competitors) was taking place, or whether it was even feasible, at least where no usable CEI is available and in less dense areas. For many years, there were concerns that the last rung of the latter was placed too high – only in recent years has facilities-based competition (other than cable) seriously taken hold in Member States such as Spain, Portugal, France, Ireland and Italy, typically due to good availability of civil engineering infrastructure and/or cooperative arrangements.

By 2014, Cave himself was acknowledging the problem clearly.[67] With the ladder, is "the process … expected to culminate in complete independence from the incumbent's assets and

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[64] European Investment Bank (2018), "A study on the deployment costs of the EU strategy on Connectivity for a European Gigabit Society". These figures presumably correspond to the EU-28, not the current EU-27.

[65] Martin Cave (2006), "Encouraging infrastructure competition via the ladder of investment", *Telecommunications Policy.*

[66] See Ilsa Godlovitch, Christian Hocepied et al. (2020), *Future electronic communications product and service markets subject to ex-ante regulation: Recommendation on relevant markets: Final Report*; and European Commission (2020), *Explanatory Note Accompanying the document Commission Recommendation on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code*.

[67] Martin Cave (2014), The ladder of investment in Europe in retrospect and prospect", *Telecommunications Policy.*

full end-to-end competition?" "It seems unrealistic or even irrational to expect that, outside certain densely populated urban areas, the wireline local loop will be fully replicated, especially if that expectation extends to the complete set of local loop unbundlers, which in some exchanges might number as many as a dozen." With that in mind, Cave (2014) goes on to compare the approaches considered or taken in the 2010 and 2013 Recommendations, and to consider whether access to civil engineering infrastructure is more promising than bitstream access as a future policy. This represents a significant departure from his initial conceptualisation of the ladder of investment in 2006.

Among classic regulatory approaches, there has been a long-standing debate as to whether regulatory goals are better promoted by setting the price of unbundled copper loops low versus high. Seven or eight years ago, there were concerns that the LRIC price for copper loops would increase because of (1) a declining customer base for copper-based network services, thus fewer customers among whom to spread the already sunk costs,[68] and (2) increasing global prices for metallic copper, which under a Modern Equivalent Asset (MEA) approach would imply once again a higher LRIC price. Some worried that this would harm competitive entry. One could also argue on policy grounds that the wholesale price of LLU for copper loops should be lower than pure cost orientation would suggest in order to motivate SMP operators to upgrade their networks to fibre (if they can also expect that there will be no intrusive fibre regulation, and that they will be permitted to switch-off their copper networks freely). However, it would also reduce incentives for alternative operators to invest in fibre. Moreover, by lowering the cost and thus the price of copper-based broadband, it might increase the price difference between copper-based and fibre-based services, thus reducing the incentive for consumers to switch to fibre-based services.

The balance of opinion in the literature has generally shifted in the opposite direction; however, it must be said that at least four distinct economic effects have been identified, and they do not all push in the same direction. Bourreau, Cambini and Dogan (2012) identified three distinct effects associated with higher prices for wholesale legacy network access that can influence operators' incentives to invest in NGA networks. Briglauer, Cambini and Grajek (2018) identified a fourth effect, corresponding to the fourth bullet in the list that follows.[69]

- **Replacement effect:** Entrants can be motivated to accelerate their investment in the new higher quality infrastructure when the legacy access charge is high. This is because the higher wholesale price flows through into higher retail prices, thus reducing the price difference between lower quality and higher quality services at a retail level and increasing the relative attractiveness of the higher quality services.
- **Wholesale revenue effect:** Whenever an SMP operator invests in an unregulated higher quality network, they risk cannibalising their wholesale revenues from the lower quality legacy network.
- **Retail-level migration effect:** A lower wholesale access price to the legacy network implies lower retail prices for the services that rely on the legacy network. In order to encourage customers to switch from the legacy network to the higher quality network, the operator making the upgrade may have to make additional investments in order to further differentiate their high-quality services from lower quality legacy services that have now become less expensive.

[68] See for instance Karl-Heinz Neumann and Ingo Vogelsang (2013), "How to price the unbundled local loop in the transition from copper to fiber access networks?", *Telecommunications Policy.*
[69] Wolfgang Briglauer, Carlo Cambini, Michał Grajek (2018), "Speeding up the internet: Regulation and investment in the European fiber optic infrastructure", *Telecommunications Policy*.

- **Reduced competition effect:** Assuming that entrants are at a cost disadvantage relative to the SMP operator, and if there are two facilities-based network providers (e.g. an SMP telecoms operator and a typically unregulated cable operator), then a higher regulated wholesale access price for the lower quality legacy network of the SMP operator tends to result in higher retail prices for legacy-network-based services, and reduces the competitiveness of entrants. This implies a higher opportunity cost of investing in a fibre network for the non-SMP provider of a facilities-based network. Hence, an increase in the wholesale access price raises the profitability of both facilities-based networks because of a reduced competitive constraint from entrants.

Briglauer, Cambini and Grajek (2018)[70] go on to claim that regardless of whether an incumbent dominates broadband investment or not, the incumbent's incentives to invest depend on the relative strength of the retail-migration and the wholesale revenue effects. When the retail-migration effect dominates, the impact of higher access prices on investment is expected to be positive. Conversely, when the wholesale revenue effect dominates, the impact of higher access prices on investment is expected to be negative.

Related work by the same authors deals with incentives for consumers to switch from a lower quality legacy network to a higher quality fibre-based network. Briglauer and Cambini (2018) find that an increase in the regulated unbundling price for the legacy network of some 10% increases investment in fibre-based networks in the range of between 2.9% and 6.4%, and increases fibre-based adoption in the range of 0.7%–1%. That the increase in coverage (presumably somewhat proportionate to investment) is greater than the increase in adoption reflects a consumer response to increased prices. The same paper finds very little response to access pricing for legacy networks in the newer EU Member States in the east, probably because their legacy copper-based broadband tends to be much less developed than that in western European Member States. This is one of many indications that "one size fits all" broadband policies are unlikely to be appropriate in the EU.

A number of papers express some scepticism as to the impact of regulation in general, and cost-based pricing in particular, on deployment of high-speed fibre-based networks in the EU. Briglauer, Ecker, and Gugler (2013)[71] find that service-based competition decreases deployment of high-speed broadband, while infrastructure-based competition can either promote or discourage deployment in an "inverted U-shaped" relationship (which is strongly reminiscent of the relationship between innovation and competition that appears in Aghion et al. (2002)).[72]

This notion of the "inverted U-shaped relationship" also appears in Fourie and de Bijl (2018).[73] They found that the relationship between service-based DSL competition and fibre penetration follows an inverted U-shaped curve: when the competition in the DSL sector is either severe or weak, there is a low degree of fiber penetration; conversely, a moderate degree of

[70] Ibid.
[71] Wolfgang Briglauer, Georg Ecker, and Klaus Gugler (2013), "The impact of infrastructure and service-based competition on the deployment of next generation access networks: Recent evidence from the European Member States", *Information Economics and Policy*, Volume 25, Issue 3, September 2013, pp. 142-153.
[72] Aghion, Philippe; Bloom, Nicholas; Blundell, Richard; Griffith, Rachel; Howitt, Peter (2002) "Competition and innovation: An inverted u relationship", IFS Working Papers, No. 02/04, Institute for Fiscal Studies (IFS), London, http://dx.doi.org/10.1920/wp.ifs.2002.0204.
[73] Fourie, Helanya, de Bijl, Paul W.J. (2018). "Race to the top: Does competition in the DSL market matter for fibre penetration?" Telecommunications Policy, vol. 42,778-793, https://doi.org/10.1016/j.telpol.2017.11.003

competition may positively influence fiber penetration. "The scale of these effects however varies with the openness of the DSL market: operators' incentives to invest in fiber appear to be more sensitive to changes in DSL competition if there is extensive [LLU]."

On the other hand, Calzada, García-Mariñoso, Ribé, Rubio, and Suárez (2018) [74] found a strong positive relationship between LLU competition and fibre deployment by the SMP incumbent. Conversely, they found that bitstream competition had a negative effect on fibre investment, presumably because bitstream poses only a limited retail threat to the SMP operator, while the wholesale replacement effect plays a larger role than with LLU. Unsurprisingly, they found the SMP operator was more likely to invest in cities where cable was present. Interestingly, they found that market size and population density had a positive effect on deployment, while the level of unemployment and the percentage of elderly population had a negative impact.

Nardotto, Valletti, and Verboven (2015)[75] found that LLU in the UK had a positive effect on broadband penetration in the early years, but not in more recent years. On the positive side, they found that unbundling had a positive impact on the quality of the broadband service offered. They also found that competition from cable operators had a positive impact on both the penetration and speed of broadband offered by other network operators.

A number of papers explore different risk-sharing and co-investment mechanisms. Inderst and Peitz (2012),[76] for instance, analysed cost-sharing agreements between an SMP operator and an entrant. They found that long-term contracting in advance reduces duplication of investment, and may increase coverage; however, this comes at the risk of reduced competition.

Cambini and Silvestri (2012, 2013)[77] likewise find that risk-sharing can lead to greater welfare than partial regulation (i.e. regulation only of the legacy, not of the high-quality network irrespective of the presence of SMP) or full regulation (of both the legacy and the new fibre-based high-quality network), especially where demand uncertainty is high.

The Bourreau, Cambini, Hörnig and Vogelsang paper (2019)[78] is a particularly useful work that integrates many different aspects of the theory. We have found it to be valuable reference for this study. The authors model a national territory with diverse average cost of deployment in different regions; diverse willingness to pay (WTP) among individuals; no direct subsidy; and no special measures to reduce deployment costs. A clear initial observation is that, in terms of maximising coverage, a monopolist cannot be beaten; however, the drawbacks are clear, including (1) high retail prices, thus limited consumer surplus; (2) low consumer demand as a result of the high prices (due to the price elasticity of demand); (3) little incentive to innovate; and (4) a lack of consumer choice. Conventional cost controls can never reach as high a level of total deployment because profits would be dissipated.

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[74] Joan Calzada, Begoña García-Mariñoso, Jordi Ribé, Rafael Rubio and David Suárez (2018) "Fiber deployment in Spain". Journal of Regulatory Economics, vol. 53, issue 3, No 2, 256-274, https://link.springer.com/article/10.1007/s11149-018-9357-y

[75] Nardotto, M., Valletti, T., & Verboven, F. (2015). "Unbundling the incumbent: Evidence from UK broadband", *Journal of the European Economic Association*, 13(2), 330–362.

[76] Inderst, R., & Peitz, M. (2012). "Market asymmetries and investments in next generation access networks". *Review of Network Economics*, 11, 1–27.

[77] Cambini, C., & Silvestri, V. (2012). "Technology investment and alternative regulatory regimes with demand uncertainty". *Information Economics and Policy*, 24, 212–230.

[78] Marc Bourreau, Carlo Cambini, Steffen Hoernig, and Ingo Vogelsang (2019) "Fiber Investment and Access under Uncertainty: Long-Term Contracts, Risk Premia, and Access Options", *Journal of Regulatory Economics*.

They go on to provide a detailed assessment of the use of risk premiums to achieve greater deployment than would be possible under a purely competitive system with no public policy intervention. It is worth noting that most of their analysis would apply equally well to any regulatory system that offers pricing flexibility. In EU regulatory practice, the rationale for the NGA risk premium is to compensate the SMP operator for NGA-specific risks (the presence of which is debated these days). Their quantitative results would in fact hold for any premium, whether based on risk or not, but our interest here is in understanding the quantitative implications of the risk premium.[79] An interesting corollary of their thinking is that, if this is the real reason for a risk premium, then it is somewhat superfluous where the high-speed fibre-based network has already been built out (except as a matter of regulatory commitment and credibility).

Reasoning from this thought model, they find that risk premiums can indeed expand the fraction of the national territory that the SMP operator will be motivated to cover with high-quality broadband. The fraction covered can never be as great as that which a monopolist would choose, but the gain is achieved without permitting monopoly pricing and its attendant drawbacks. Specifically, they find in comparison with the ideal monopolist that "additional margins on top of the cost-based access charge can restore coverage incentives even in the most costly areas. This comes at the price, though, of increasing the entrant's marginal cost, reducing ex post entry and consumer surplus in the newly covered areas."

They go on to analyse co-investment arrangements, as well as long-term contracts. For co-investment (dealt with as *access arrangements* in the paper), they find that they "do not distort ex post market outcomes. The incumbent's coverage increases strongly, though, but not all the way to monopoly coverage."

A few papers touch on geographic market differentiation and geographic differentiation of remedies. The survey paper by Abrardi and Cambini (2019)[80] notes succinctly that "competition among high-speed broadband networks is likely to emerge only in specific regions of a country, mostly in dense metropolitan areas, while in the rest of the country infrastructure competition will probably not materialise. Large swathes of the country will most likely be left with only one high-speed network, while urban areas might be covered by two or more. From a regulatory point of view, this calls for a transition from country-wide uniform measures to a more locally tailored regulation, with different ex ante access rules across areas depending on the degree of infrastructure competition."

The previously noted Bourreau et al. (2019) paper provides complementary insights about the need for a geographically differentiated approach. Note that even though the discussion here is in terms of risk premiums, many of the same considerations would apply to pricing flexibility in general. "[D]ifferent access schemes are optimal depending on the type of area to be covered: Access options are preferable to risk premiums where they are feasible, i.e. where the sum of profits without an extra access margin exceeds investment cost, because they do not distort ex post market outcomes. More outlying areas can only be covered using risk premiums, which carry a cost in terms of achievable total surplus. To make this more intuitive,

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[79] They express it as follows: "As a first extension to standard access charges we consider the imposition of an additional margin just set high enough to make the incumbent invest in uncovered areas. This can be understood as a risk premium that compensates the incumbent partially for the risk it is subjected to ex post by the uncertain entry decision. We find that this margin can be set at a level that both makes the incumbent invest and safeguards some (though less) entry."

[80] Laura Abrardia and Carlo Cambini (2019), "Ultra-fast broadband investment and adoption: A survey", *Telecommunications Policy*.

consider various types of countries that differ in their geography. In relatively flat countries, such as Belgium and the Netherlands, our results show that access options are the preferable solution to coverage issues. On the other hand, in countries where deployment costs increase steeply outside of urban areas (mountainous countries such as Italy and Switzerland), access options are not feasible (investment costs cannot be covered without adding an extra margin to the access price) and risk premiums need to be used instead. In other countries that have both types of areas, such as France and Spain, the adoption of a mix of instruments is called for."

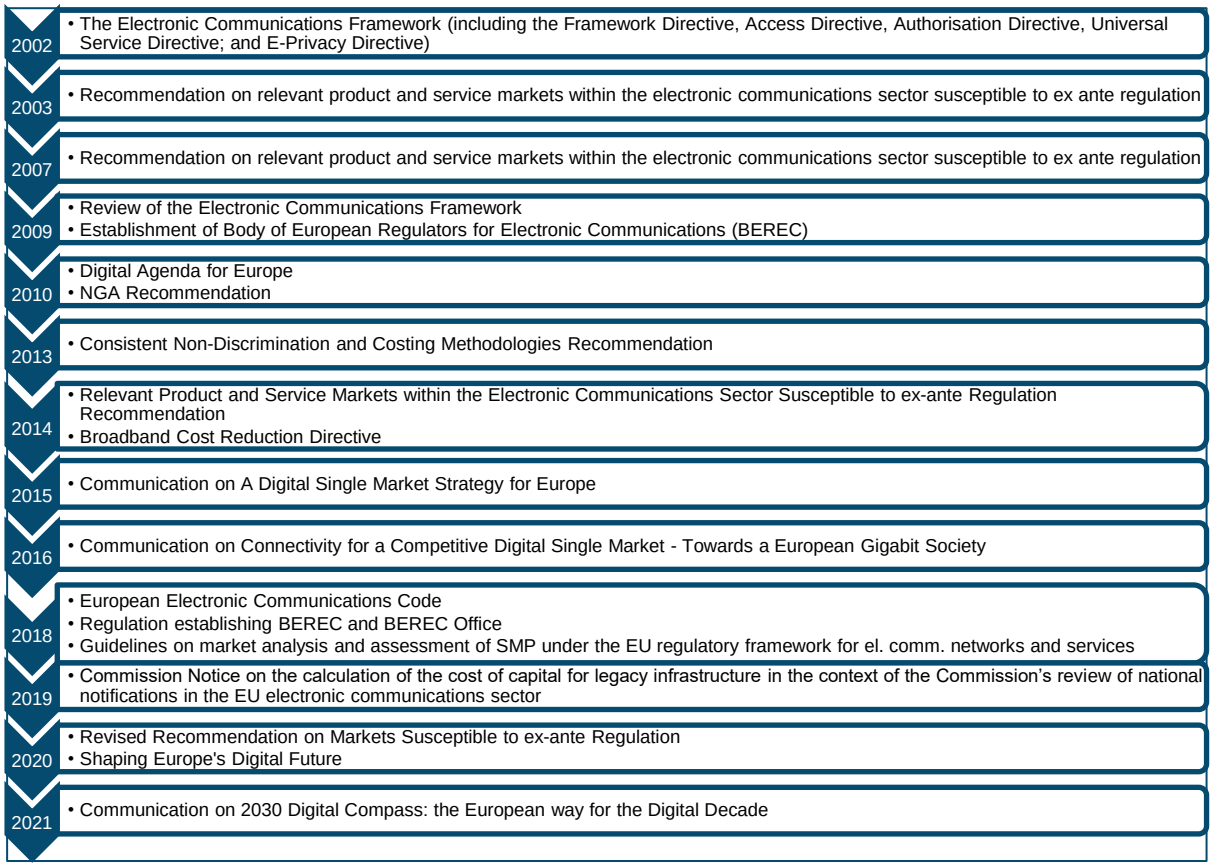
h. Evolution of the EU broadband policy

The challenges in the broadband market and the need for policy intervention via regulation that have been discussed throughout this chapter have been taken into account by European policy makers. Over the last decade, EU electronic communications policy has largely focused on delivering greater competition, lower prices and more choices for businesses and consumers[81]. The Commission acknowledged that the "widespread availability of affordable and secure broadband communications networks is a key condition for realising the growth and job-creation potential of the European Union – an objective that lies at the heart of the renewed Lisbon strategy"[82]. The importance of ensuring high-quality connectivity came to the forefront only later, as one of the key principles in the Europe 2020 strategy through the Digital Agenda for Europe document in 2010. The Gigabit Society (2016) is especially important, since it sets new goals for fast networks in Europe for 2025, further expanded with goals until 2030 in the European Way for the Digital Decade (2021). Changes in policy also mean updated targets, replacing the ones that were relevant when the NGA and NDCM Recommendations were introduced. The current target is for gigabit coverage to all European households by 2030. It is an important development for the new recommendation. However, it is important to briefly review the overall EU policy evolution. Figure 11 illustrates the key milestones in the gradual evolution of EU policy in this area.

[81] *Connectivity for a Competitive Digital Single Market – Towards a European Gigabit Society*, COM(2016) 587 final,14 September 2016, p. 23. available at: http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=17183

[82] Report on the outcome of the Review of the EU regulatory framework for electronic communications networks and services in accordance with Directive 2002/21/EC and Summary of the 2007 Reform Proposals, COM(2007) 696 final, Brussels, 13 November 2007, available at: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0696:FIN:EN:PDF

Figure 11. Evolution of the EU regulatory framework for electronic communications with respect to broadband (not including termination), 2002-2021



Source: Own elaboration.

The 2010 NGA Recommendation sought to coordinate diverging approaches of the NRAs when dealing with the dilemma between extending access-based competition to fibre infrastructure elements newly deployed by the incumbent operators, and providing incentives to the deployment of such networks. However, the NGA Recommendation clearly balances in favour of the former goal and seeks primarily to avoid incumbent investment in fibre networks that might reduce the level of competition and consumer choice. Chapter 3 provides a more detailed overview of the NGA Recommendation.

The NDCM Recommendation of 2013 fine-tuned the approach set out in the NGA Recommendation by promoting stricter application of the non-discrimination rules (technical replicability, EoI) while ensuring stable wholesale copper access prices and expanding the circumstances which should lead to the (non)imposition of regulated wholesale access prices for NGA services. The cost modelling parts recognised that the balance between the regulated wholesale access prices for copper LLU and for fibre unbundling was a crucial element in the speed with which incumbents would phase out legacy infrastructure. The NDCM Recommendation is discussed in detail in Chapter 4.

Both Recommendations followed a parallel road to the Digital Agenda for Europe, which was part of the Europe 2020 strategy, setting, among other objectives, the goal of providing NGA (30 Mbps or more) for all by 2020. The progress towards these goals is discussed in Section 2.a.

In light of further market and technology development, new goals have been proposed. They are especially relevant for the new recommendation, as it will need to contribute to achieving the aims. In 2016, the European Council called for very high capacity fixed and wireless broadband connectivity across Europe, and set the gigabit targets for 2025 (in the Gigabit Society Communication). Accordingly, it was declared that gigabit connectivity should be provided "for all main socioeconomic drivers such as schools, transport hubs and main providers of public services[83] as well as digitally intensive enterprises" and at least a 100 Mbps connection should be provided to all European households by 2025. The goals were further updated in the Digital Decade Communication in 2021, the connectivity target in the latter document being that all EU households are covered by a gigabit network by 2030. Therefore, the new recommendation must provide guidance facilitating the intended market evolution.

Adoption of the EECC and Digital Decade Communication has implications for further applicability of the NGA and NDCM Recommendations, as outlined in Chapter 1, leading to the need to review the application, effects and future-orientation of these Recommendations. The strengthened focus and new connectivity targets need to be taken into account in parallel to the market and technology development to ensure that the policy mix helps achieve the set targets. The NGA and NDCM Recommendations are discussed in detail in Chapters 3 and 4 respectively, before assessing their implementation to date and suggesting ways forward.

[83] Covering, e.g. primary and secondary schools, train stations, ports and airports, local authority buildings, universities, research centres, doctors' surgeries, hospitals and stadiums.

PART II: RETROSPECTIVE ANALYSIS

3. The 2010 NGA Recommendation

The main purpose of the NGA Recommendation (Point 3) is "to foster the development of the single market by enhancing legal certainty and promoting investment, competition and innovation in the market for broadband services, in particular in the transition to next-generation access networks (NGAs)." It contains guidance on:

- remedies that can be imposed (for instance, for access to civil engineering infrastructure, access to the unbundled fibre loop, or wholesale bitstream access);
- general principles that should apply to the pricing of these remedies.

a. Context

In the 2010s, the Commission used its powers to intervene in market regulation after noting that NRAs were "developing regulatory responses to the challenges raised by the transition from copper to fibre-based networks".[84] In particular, this concerned remedies that they imposed in two wholesale broadband markets:

- the market for passive network access, including unbundled access to the copper local loop infrastructure (Market 4 of Recommendation 2007/879/EC on relevant markets) and virtual unbundled local access (with high optic-fibre content);
- the market for active network access, in particular bitstream access to the existing wholesale product (Market 5 of Recommendation 2007/879/EC on relevant markets).

The Commission anticipated significant changes in demand and supply "at both the wholesale and retail level following the deployment of NGA networks"[85] and sought to prevent inappropriate divergence of regulatory approaches, while allowing NRAs to properly account for national circumstances.

A major concern was that the EU was lagging behind in terms of fibre deployment. The Commission noted that in terms of fibre deployment global competitors, including Japan, South Korea and the United States, were achieving better results. Incumbent operators in the EU claimed that the regulation applicable to fibre investments for these global competitors was less intrusive and that they had no interest in investing in fibre in the EU as long as they were obliged to provide regulated cost-oriented access to competitors. Indeed, access obligations limit the ability of investors to reap the benefits of their investment because access seekers can use the investment without bearing any related risk. Thus, for a number of years, the SMP operators asked for regulatory forbearance to ensure a business case for their investment in fibre. The Commission however rejected 'regulatory holidays' as a means to deal with the so-called investment 'hold up' risk. Instead, the NGA Recommendation is strongly oriented towards access-based competition and asks NRAs to extend cost-orientation remedies to new fibre elements.

[84] NGA Recommendation, recital 3.
[85] Idem, recital 5.

Box 2. Policy before the NGA Recommendation

A good illustration of the preventive steps taken by the Commission is the "fast tracked" infringement procedures against Germany, when it considered whether to grant Deutsche Telekom "regulatory holidays" back in 2007, with EU Telecom Commissioner Reding arguing that "the granting of regulatory holidays to incumbent operators is an attempt to stifle competition in a crucial sector of the economy, and in violation of the EU telecom rules in place since 2002"[86]. Such a preventive approach was subsequently endorsed by the EU Court of Justice in 2009[87]. However, while the Commission won the case, it was not on the question whether 'regulatory holidays' were against EU law, but on the scope of the exclusive powers to be granted by Member States to independent NRAs. Before exempting a 'new market' from regulation, the relevant NRA should follow the referred procedures which give it the discretionary power to define and analyse a market and consequently, a legislator cannot grant regulatory holidays. In 2009, the Spanish NRA granted such a regulatory holiday to the SMP operator (for broadband speeds above 30 Mbps) and the Commission could not block the remedy, despite the serious doubts expressed on 13 November 2008 in case ES/2008/805 (Wholesale broadband access market). This context is important to understand the approach advocated by the NGA Recommendation. As the analysis by Alexiadis and Cave states, "the prospect of an incremental unravelling of ex ante regulation as a result of the deployment of NGA networks no longer appears to be a realistic policy possibility. If anything, the role of ex ante regulation will become even more intrusive in an NGA environment"[88].

Source: Visionary Analytics based on the sources in the footnotes.

The context[89] that surrounded the NGA Recommendation at the time of its adoption explains why only three years later the Commission complemented the 2010 guidance with advocating pricing flexibility for NGA access in the presence of a retail price constraint when strict non-discrimination obligations are imposed.

b. Main remedies recommended

The essence of the NGA Recommendation is that where ex ante price regulation is applied, access prices should be cost-oriented. This approach should also apply to access to new fibre elements, but with several specificities:

- When setting regulated access tariffs, NRAs should factor in **a risk premium** incorporated in the regulated weighted average cost of capital (WACC). As the NGA Recommendation states, "NRAs should, where justified, include over the pay-back period of the investment a supplement reflecting the risk of the investment in the WACC

[86] IP/07/237, Commission launches "fast track" infringement proceedings against Germany for "regulatory holidays" for Deutsche Telekom, 26 February 2007. Available at: https://ec.europa.eu/commission/presscorner/detail/en/IP_07_237

[87] Judgment of the Court (Fourth Chamber) of 3 December 2009, Federal Republic of Germany v Commission,(Case 424/07).

[88] Alexiadis, P. & Cave, M. (2010) The European NGA Recommendation: the Banal, the Controversial and the Inconclusive, *Intermedia,* 38 (4) p. 47. Available at: https://www.cerre.eu/sites/cerre/files/Intermedia_Vol_38_No4_2010_MC_PA_NGA.pdf

[89] "The goal of harmonisation has clearly lost out. On a philosophical note, perhaps that was always the destiny of this document, given the multiple network topologies that account for the "NGA" world and the varied patterns of State and private investment in fibre-based networks" Alexiadis and Cave (2010) p. 49.

calculation currently performed for setting the price of access to the unbundled copper loop"[90].

- NRAs should consider additional mechanisms **to share the investment risk** between investors and access seekers and to foster market penetration such as long-term access pricing or volume discounts for large numbers of lines[91].

The Recommendation adds that to "foster predictability, NRAs should properly specify in advance the methodology they will follow to identify the imputation test, the parameters to be used and the remedial mechanisms in case of established margin squeeze"[92]. Moreover, according to the Recommendation, to maintain effective competition between operators not benefiting from the same economies of scale and scope and having different unit network costs, a '**reasonably efficient competitor test**' will normally be more appropriate than the 'equally efficient competitor' test used under the Competition law.

In parallel, the NGA Recommendation asks NRAs to take into consideration co-investment in FTTH. NRAs should examine, in the course of their market analysis, whether, in light of the level of infrastructure competition resulting from the co-investment, identifying an operator with SMP is warranted in terms of the **geographic area** covered by the co-investment. In this context, NRAs should also examine whether the co-investors install sufficient duct capacity for third parties to use and grant cost-oriented access for such capacity[93].

When competitive conditions diverge between different areas in a geographically defined market, but those differences are not sufficient to justify defining a sub-national geographic market, NRAs have the flexibility to impose differentiated remedies and access products.[94] According to BEREC, Belgium, France, Denmark, Spain and Italy impose differentiated remedies on SMP operators in Markets 3a, 3b or both.[95]

Points 13-17 of the NGA Recommendation contain recommendations concerning **access to civil engineering infrastructure** and to the terminating segment, in particular to the in-house wiring, of the SMP operator. NRAs are invited to:

- seek information from SMP operators on whether and where ducts and other local loop facilities are available for the purpose of deploying NGA networks;
- ensure that the SMP operator provides access under the same conditions to its own downstream arm and to third-party access seekers.

Annex II of the Recommendation sets out in detail what constitutes the principle of equivalence.

This being said, the Recommendation did not deal exhaustively with the civil engineering and in-building wiring bottlenecks, because it could legally only recommend measures that can be taken following an SMP finding in Markets 4/2007 and 5/2007. Mandatory access to civil engineering from utilities other than electronic communications network operators is not

[90] NGA Recommendation, Annex I, point 6
[91] Idem, Recital 24; point 25 and Annex I, point8.
[92] Idem, Recital 26.
[93] Idem, Point 28.
[94] NGA Recommendation, point 9.
[95] BoR (20) 210, Figure 63, p. 68.

covered. This 'gap' was addressed in 2014 by the Broadband Cost Reduction Directive (BCRD).

Finally, the NGA Recommendation seeks to ensure that all NRAs put in place a transparent framework for the **migration from copper to fibre-based networks**. NRAs should ensure that the systems and procedures put in place by the SMP operator, including operating support systems, are designed to facilitate the switching from alternatives to NGA-based access products[96]. Migration measures should be limited to a five-year time horizon. A shorter time period is nonetheless possible when:

- there is an agreement on an appropriate migration path between the SMP operator and operators using regulated access; or
- fully equivalent access is provided at the point of interconnection.

In parallel, NRAs must ensure that SMP operators design support systems to facilitate the switching of competitors to NGA-based virtual products.

In effect, the NGA Recommendation is strongly focused on the promotion of access-based competition, especially by promoting price control with a cost orientation adjusted for investment risk. One of the challenges that the NGA Recommendation responded to was the diverging approaches used by NRAs when dealing with the dilemma between extending access-based competition to fibre infrastructure elements newly deployed by the incumbent operators, and providing incentives to the deployment of such networks. The document clearly weighs in favour of the former goal.

[96] NGA Recommendation, Point 40.

4. The 2013 NDCM Recommendation

The NDCM Recommendation was adopted in 2013 and aimed to:

- fine-tune the approach set out in the NGA Recommendation by promoting stricter application of the non-discrimination rules (e.g. technical replicability, EoI) while ensuring stable wholesale copper access prices;
- expand the circumstances which should lead to the (non-)imposition of regulated wholesale access prices for NGA services.

a. Context

In 2013, the NDCM Recommendation slightly modified the recommended approach by providing an alternative to the cost-orientation pricing remedy. According to the Recommendation, NRAs should introduce pricing flexibility when they enforce strict non-discrimination remedies and in the presence of competitive constraints described in the Recommendation.

The Commission adopted the recommendation "on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment"[97] following its finding that "the approach of NRAs when imposing on SMP operators access price-setting as well as non-discrimination obligations [revealed] (…) significant variations which were not always justified by differences in national circumstances, despite (…) publication of the NGA Recommendation by the Commission"[98]. For example, "existing provisions of the NGA Recommendation foresee the setting of a risk premium for access prices to the fibre network in order to duly reward the access provider for the risk incurred. However, it appears that it has not been extensively applied so far by the NRAs"[99].

The NDCM Recommendation recognised that the balance between the regulated wholesale access prices for copper LLU and for fibre unbundling was a crucial element in defining the speed with which incumbents would phase out legacy infrastructure. The price of copper as a metal was increasing at the time, which implied possibly higher LRIC costs. There were also calls for a lower LRIC copper cost in order to accelerate the deployment of fibre.

The Commission eventually chose "regulatory transparency and predictability and the need to ensure stability without significant fluctuations when setting cost-oriented access prices, both when developing the costing methodology (…) (the 'recommended costing methodology') and when implementing it once it is finalised" (Point 38). The recommended approach was meant to "lead to stable copper access prices and a Union average monthly rental access price for the full unbundled copper local loop within a band between EUR 8 and EUR 10 (net of all taxes) expressed in 2012 prices (the price band)" (Point 41). A 2020 study by BEREC finds that at least 15 NRAs applied NCDM paragraphs 30-37 (on BU LRIC+ cost orientation) (against only 7 NRAs in 2016), while 5 NRAs made use of the transitional regime established

[97] European Commission (2013), *Commission Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment*, 2013/466/EU
[98] Impact Assessment accompanying the Recommendation on consistent non-discrimination obligations and September costing methodologies, SWD(2013) 329 final, p. 11.
[99] Idem, p. 41.

by NCDM paragraph 40, allowing them to continue applying other cost methodologies if leading to similar outcomes[100].

In the context of stabilised access prices to copper generation access, the pricing flexibility for fibre-based wholesale access was an attempt to increase the profitability of deploying the alternative without wrecking the competitive structure.

b. Main recommended approaches

The NDCM Recommendation first outlines the scenarios in which established competitive safeguards should lead to NRAs deviating from the general principle of imposing cost-oriented wholesale NGA access on SMP operators as expressed in the NGA Recommendation and in which **cost-oriented wholesale access to NGA broadband may not be necessary and can be lifted**. Box 3 lists the conditions under which the price regulation is not needed

Box 3. Conditions under which cost-oriented wholesale access to NGA Broadband may not be necessary

- The SMP operator is subject to strict non-discrimination obligations, in particular through Equivalence of Input (EoI) requirements.
- Alternative operators can replicate NGA offers from SMP operators economically and technically.
- Adequate costing methodology is applied to legacy copper prices and civil works.
- NGA network pricing is subject to a demonstrable retail price constraint either through regulated access to the legacy network where it is subject to cost orientation in accordance with the recommended costing methodology ('copper anchor') or by retail offers provided based on an alternative network.

Source: NDCM Recommendation.

Where NRAs impose **price control obligations** on an SMP operator, according to the NDCM Recommendation:

- NRAs must use the 'bottom-up long-run incremental costs plus' costing methodology (BU LRIC+). This applies to both copper and NGA networks (point 30). This methodology accounts for (point 31) the variable costs (incl. investments) of a hypothetical efficient operator in building a modern efficient NGA network and a supplement for common costs.
- The 'modelled' NGA network should not necessarily consist wholly of 'optical elements' (optical fibre) and it should be hosted in existing civil engineering assets while all other civil engineering assets will have to be newly constructed.

The NDCM Recommendation asked the NRAs to implement **the BU LRIC+ methodology** by no later than the end of 2016 (Point 39). Alternatively, NRAs may continue applying other costing methodologies as long as these methodologies (Point 40):

[100] BEREC (2020). BoR (20) 210, p. 43.

- were used at the time when the NDCM Recommendation was adopted;
- meet the objectives of BU LRIC+ (particularly the creation of incentives for investment in NGA networks);
- reflect the shift from a copper to an NGA network if the cost methodology is not modelling an NGA network;
- take into account that certain civil engineering assets will probably not be replicated; and
- guarantee stable, transparent and foreseeable copper network access prices.

The NDCM Recommendation anticipates that the implementation of the recommended methodology would lead to an average monthly rental **access price for the copper local loop** of EUR 8-EUR 10 (price band) expressed in 2012 prices (Point 41). For this reason, only the NRAs of Member States, where the access prices for the full unbundled copper local loop fall outside the price band (e.g. Poland: EUR 5.34/month, Finland: EUR 14.37/month)[101] should recalculate the access prices on the basis of BU LRIC+ "as soon as possible" to ensure implementation by the end of 2016.

One of the main objectives of the NDCM Recommendation is indeed that the regulated monthly copper ULL rental prices would remain within the recommended price band. The wholesale access prices of legacy infrastructure could otherwise be strongly affected by volume effects and make future pricing unpredictable. Such volume effects result from decreasing demand in copper wholesale access and lead to higher unit costs (i.e. the same cost base of copper must be distributed between fewer lines). Therefore, the shift to NGA products might lead to higher copper prices. Accordingly, the NDCM Recommendation asks NRAs to ensure that their costing model includes both copper and fibre lines. Otherwise, just moving traffic volume to other infrastructures would inflate unit costs[102]. If the copper access price is consistent, the copper anchor without a direct wholesale price obligation can be introduced.

At the same time, the NDCM Recommendation considers that the monthly wholesale prices for unbundled copper loops regulated with 'copper anchor' will provide a competitive constraint, making a wholesale access price obligation for NGA networks no longer warranted[103]. Box 4 below spells out the assumptions behind the use of a *copper anchor*.

[101] Full LLU Monthly Rental charge in October 2011 according to the Digital Agenda Scoreboard 2012.
[102] BoR (19) 240, p. 44
[103] Commission SWD of 11 September 2013 accompanying the Recommendation on consistent non-discrimination obligations and September costing methodologies, SWD(2013)330 final, p. 4.

Box 4. Assumptions of the *copper anchor* application

The application of the *copper anchor* is based on three assumptions:

1. For the time being, copper and NGA-based networks remain in the same product market. The functionalities of access over one (copper) or the other (NGA) are sufficiently close for end-users to remain on the legacy copper product if prices of the new access product become too high. This means that users focus on the premium of the NGA price (compared to copper) rather than on the absolute price.
2. The prices of the copper retail products that constitute such a price reference reflect the cost-oriented copper access prices.[104]
3. The cost-orientation obligation applied to the legacy copper access product of SMP operators is determined on the basis of the current costs of modern equivalent access and can act as a strong constraint on NGA pricing if properly imposed.

Source: Visionary Analytics.

In the case of a copper-fibre overlay, the demand for wholesale fibre network access in the absence of regulation on NGN will be influenced by the relative price of the copper network. This effect is due to the interplay between the 'wholesale revenue effect' for the SMP operator and the 'business migration effect' for access seekers[105].

Meanwhile, a *copper anchor* without direct cost orientation for NGA networks allows network operators and access seekers to share some of the risks by differentiating wholesale access charges according to the level of the access seeker's commitment. The examples could include:

- making access prices contingent on capacity reservations (rather than usage) is a particular way of balancing the risk between the investor and access seekers;[106]
- an Option to Delay Pricing Rule (ODPR) which "sets the access price (in each period) equal to the difference between the optimal regulated monopoly retail price and the incumbent's retail costs." Under ODPR, the incumbent earns either the minimum payoff required to induce investment in the first period, or the (lower) minimum payoff required to induce investment in the second period.[107]

At the same time, "abridgement of regulatory obligations seems to be a rather simple and effective means to foster investments," though such an approach "may involve some loss of static efficiency (and possibly also dynamic efficiency) in comparison to cost-oriented regulation. Departure from cost-based pricing may lead to higher prices for consumers, and therefore should be undertaken only when necessary to induce investments that are to the benefit of consumers and would otherwise not take place"[108]. However, when drafting the 2013 NDCM Recommendation, the Commission omitted to include specific guidance on these alternative (not purely cost-based) approaches to regulation, such as a threat of regulation, or

[104] Impact Assessment accompanying the Recommendation on consistent non-discrimination obligations and September costing methodologies, SWD(2013) 329 final, p. 45.
[105] Costing methodologies and incentives to invest in fibre, CRA (2012) p. 58.
[106] Idem p. 41
[107] Idem p. 42
[108] Idem p. 45

regulatory abridgement ('regulatory holidays'), without excluding their use by NRAs where the circumstances justify it[109].

A third objective of the NDCM Recommendation is to **harmonise non-discrimination obligations** imposed by NRAs on SMP operators (Points 6(g) and (h)). The general principle is that NRAs should impose Equivalence of Inputs (EoI), meaning that the SMP operator must provide network access to external and internal service providers on 'the same' terms and conditions and using 'the same' systems and processes. Where EoI is used, price controls may not be needed (see the discussion below). The SMP operator may itself commit to following the EoI approach voluntarily. In the absence of a voluntary commitment, the NRA should assess "whether it would be proportionate to require SMP operators to provide relevant wholesale inputs on an EoI basis" (Point 7). The decisive factor in this regard is whether the competition benefits of EoI outweigh the compliance costs[110] or not. When carrying out this proportionality assessment, the NRA must take into account the fact that (Point 7) compliance costs are often lower for NGA networks than for existing copper networks. Where EoI is disproportionate, NRAs should opt for Equivalence of Output ('EoO') (Point 9). EoO means that the SMP operator must allow external and internal service providers to have network access on 'comparable' terms and conditions but can use different systems and processes to ensure this.

The baseline expectation is that access seekers have network access to the extent that they can **'technically replicate'** the operator's new retail product (i.e. they can offer retail products in a comparable form). Therefore, where EoI has not yet been fully implemented (Point 11), the NRA or the SMP operator must test the technical replicability demonstrating that the retail price exceeds the network access tariff to the extent sufficient to ensure that its common costs and downstream costs are covered. Regarding the test:

- Where the NRA conducts the test, it must require the SMP operator to provide details on the new retail products 'with sufficient notice' prior to their launch.
- Where the operator itself conducts the test, the NRA should 'validate' the test results (Points 14 to 16).

In case the test fails, the NRA must oblige the SMP operator (Points 17 and 18) to amend the network access product in a way that ensures its technical replicability and, in the meantime, cease or delay the provision of the retail product pending compliance with the requirement of technical replicability.

Where the SMP operator is subject to a non-discrimination obligation consistent with EoI or, alternatively, obligations relating to technical replicability of retail products if EoI has not been fully implemented, and its retail products fulfil the economic replicability test, the NDCM Recommendation asks NRAs to remove the stringent NGA cost-orientation obligations if the following requirements are also met (Points 48 and 49):

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[109] "The conditions set out in points 48-57 should not be seen as the only circumstances under which NRAs can decide not to impose regulated access prices for NGA wholesale inputs. Depending on the demonstration of effective equivalence of access and on competitive conditions, in particular effective infrastructure-based competition, there may be additional scenarios where the imposition of regulated wholesale access prices is not warranted under the Regulatory Framework" (point 58).

[110] Point 7 refers to 'compliance costs' which refer to the costs of the SMP operator. However, this does not mean that under the NDCM Recommendation, NRAs should disregard the costs borne by access seekers (who may often have to adapt their own processes in case the SMP operator changes its internal processes) when performing their proportionality assessment.

- in the case of active NGA access products, a competitor must be provided with sufficient upstream and regulated passive (or similarly functioning active) access products, or alternative infrastructures must be available, creating a demonstrable retail price constraint;
- in the case of passive NGA access products, the SMP operator offers copper access at cost-oriented, controlled prices (the above-mentioned price anchor), or there are alternative infrastructures that exercise a "demonstrable retail price constraint."

The NDCM Recommendation also acknowledges that price control for NGA wholesale products may not be warranted in other situations. In particular, NRAs can also remove price controls on NGA access products where there is '**effective equivalence' of access and 'effective infrastructure-based competition'** (Point 58).

The NRA can at any time reintroduce them or impose penalties if the SMP operator fails to fully implement an agreed EoI (Point 54). Along with the removal of price controls, the NRA should (Point 55):

- monitor the investment and competitive environment for NGA networks and
- obtain information from network operators about their NGA rollout plans.

The NDCM Recommendation considers that the two-pronged approach above (i.e. stricter application of non-discrimination and costing methodology) will ensure that:

- on the one hand, those seeking access to NGA access products under the flexibility regime have equal access to the incumbent operators' networks through tougher non-discrimination rules;
- on the other hand, investment incentives for NGA are in place (i.e. pricing flexibility for NGA wholesale access).

The ability of NRAs to remove price controls increases the scope for stimulating demand for fast broadband services by way of a dynamic pricing policy.

Finally, the NRA should differentiate its regulatory practice within geographical markets and remove price controls in areas where said conditions have been fulfilled ("regional regulation") (Point 50). This can be done by:

- defining sub-national geographic markets or
- imposing differentiated remedies and access products where it cannot be concluded that the different competition conditions would justify the definition of sub-national geographic markets.

5. Implementation of the recommended approach towards price regulation

a. Summary of findings

The NGA Recommendation contemplates remedies that NRAs should adopt to address the risk that incumbents would seek to monopolise new broadband services provided over legacy infrastructure (including civil enginieering infrastructure) and thereby limit consumer choice. Adopted three years later, the NDCM Recommendation seeks to bring about a consistent application of pricing and non-discrimination remedies by NRAs that find SMP in Markets 1/2020 and 3b/2014, while at the same time incentivising NGA deployment by SMP operators.

NRAs mandate a series of wholesale access products to preclude the concerned SMP operators from using their market power in these markets and refusing to deal with access seekers. The mandated access products are:

a) Local loop unbundling service on copper network (ULL)

b) Sub-loop unbundling on copper network (SLU)

c) Shared access service on copper network

d) Fibre local loop unbundling (fiber LLU). FTTH can be deployed according to different types of architecture (Ethernet Point-to-Point (P2P), Gigabit Passive Optical Network (GPON) over P2P, GPON over Point-to-multipoint (P2MP) and Wavelength Division Multiplexing PON), of which some are technically more difficult to unbundle.

e) Virtual Unbundled Local Access (VULA) on Fibre to the Cabinet Network (VULA (FTTC[111]))

f) VULA on Fiber to the Home Network (VULA (FTTH))

g) Dark fibre in access network, i.e. an ancillary service mandated on the SMP operator consisting of the provision of a dark fibre, often as an alternative access to ducts in the absence of space (e.g. for backhaul to reach street cabinets in the case of sub-loop unbundling).

h) Duct access on access network

i) Bitstream service at central access on legacy infrastructure (copper from the central office)

j) Bitstream service at central access on FTTC and FWA infrastructure

k) Bitstream service at central access on (FTTH) infrastructure

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[111] Fibre-to-the-cabinet (FTTC): An access network structure in which the optical fibre extends from the exchange to the cabinet. The street cabinet is usually located only a few hundred metres from the subscriber's premises. The remaining part of the access network from the cabinet to the customer is usually copper wire but could use another technology, such as wireless." Source: www.ofcom.org.uk/__data/assets/pdf_file/0013/63220/nga_glossary.pdf

Mandated access to the terminating segment (i.e. to the wiring and cables and associated facilities inside of buildings or up to the first concentration or distribution point) is advocated in Point 18 NGA Recommendation. However, in line with the definition of Art. 61(3) EECC, such access could in principle be imposed as a symmetric remedy.

The products listed from d) to h) and j) and k) are NGA/ VHCN access products. Table 2 shows which NRAs mandate SMP operators to provide these wholesale access products and whether they impose a non-discrimination obligation and price controls on top of the access obligation.

Table 2. NRA regulation of wholesale access products

	Fibre LLU	VULA (FTTC)	VULA (FTTH)	Dark fibre	Duct access	Bitstream FTTC -FWA	Bitstream (FTTH)
Access mandated	CZ, DE, DK, EE, FI, HR, HU, LT, LV, LU, MT, PL, SE, SI, SK	AT, VE, CY, CZ, DE, EL, FI, HR, HU, IE, IT, LT, LV, SI, SK	AT, BE, CY, CZ, EL, ES, FI, HR, HU, IE, IT, IS, LT, LU, LV, MT, SI, SK	CZ, DE, DK, FR, HR, HU, IE, IT, LT, LU, LV, PL	BE, DE, EE, ES, FR, HR, HU, IE, IT, LT, LV, PL, PT, SI, SK	BE, CY, CZ, DE, EE, EL, FI, HR, HU, IE, IT, LT, LU, LV, PL, SK	BE, CZ, DK, EE, ES, FI, HR, HU, IE, IT, LT, LU, LV, PL, SK
Non-discrimination mandated	CZ, DE, DK, EE, FI, HR, HU, LT, LU, LV, MT, PL, SE, SI, SK	AT, BE, CY, CZ, DE, EL, FI, HR, HU, IE, IT, LT, LV, SI, SK	AT, BE, CY, CZ, EL, ES, FI, HR, HU, IE, IT, LT, LU, LV, MT, SI, SK	CZ, DE, DK, FR, HR, HU, IE, IT, LT, LU, LV, PL	BE, DE, EE, ES, FR, HR, HU, IE, IT, LT, LV, PL, PT, SI, SK	BE, CY, CZ, DE, EE, EL, FI, HR, HU, IE, IT, LT, LU, LV, PL, SK	BE, CZ, DK, EE, ES, FI, HR, HU, IE, IT, LT, LU, LV, PL, SK
Price control	CZ, DE, DK, EE, FI, HR, HU, LT, LU, LV, MT, PL, SI	AT, BE, CY, NCZ, DE, EL, FI, HR, HU, IE, IT, LT, LV, SI	AT, BE, CY, CZ, EL, ES, FI, HR, HU, IE, IT, LT, LU, LV, MT, SI	CZ, DE, DK, FR, HR, HYU, IE, IT, LT, LU, LV, PL	BE, DE, EE, ES, FR, HR, HU, IE, IT, LT, LV, PL, PT, SI, SK	BE, CY, DE, EE, EL, HR, HU, IE, IT, LT, LU, LV, PL	BE, DK, EE, ES, HR, HU, IE, IT, LT, LU, LV, PL

Source: BEREC RA 2020 Survey, Figure 61, p. 67

The advocated costing methodology set out in the NDCM Recommendation in case NRAs should impose price controls is widely supported by stakeholders, despite some of them suggesting a possible need for improvement and on the frequency of review of the parameters of the cost models used.

Many NRAs do not (or no longer) apply NGA specific risk premia, while the few NRAs applying risk premia follow the guidance of the NGA recommendations. Some explicitly do the computation themselves, while others use benchmarks.

Moreover, the recommended price band has ensured the stability of the monthly wholesale rates for ULL across the EU. However, we have noted a growing divergence between the regulated maximum rates for LLU set across the EU. These divergencies reflect national differences, but also result from differences in the application of the costing methodologies used.

The use of long-term pricing agreements and volume discounts varies. Only a few NRAs report volume discounts being applied by the SMP operator on the price of regulated wholesale access products and no NRA reports specific evidence of a link between volume discounts and investments in VHCN. On the other hand, a significant number of NRAs report the use of long- term pricing agreements in their respective Member States with some agreeing that these discounts support VHCN deployment.

At the time of the adoption of the NGA Recommendation, imposing pricing remedies was seen as generally the most appropriate way to deal with a finding of SMP, entailing market power to fix tariffs. The NDCM Recommendation, however, advocated a more nuanced approach: in certain circumstances, pricing flexibility should be viewed as the default option. Currently, cost orientation continues to be imposed by many NRAs for access to one or more NGA wholesale products, however the use of the pricing flexibility proposed by the NDCM Recommendation, though still limited to date, is taking up. The NRAs concerned tend to follow the guidance provided and believe that the guidance provided in the NDCM Recommendation will likely continue to be adequate to deal with the future technological and market evolution. NRAs applying the recommended pricing flexibility (or those that applied a margin squeeze test instead of cost orientation), consider the approach to have contributed to promoting an efficient investment in NGA/VHC networks, leading to an increase in NGA/VHC networks and a better quality of service for end-users.

The use of the ERT recommended by the NDCM Recommendation faces certain challenges. NRA approaches regarding the transparency of the process of designing the test vary and are sometimes alleged to be unsatisfactory. The process through which the effectiveness of the ERT is monitored varies strongly and is in some Member States allegedly ineffective. Moreover, the timing of the execution of the tests and of their follow up also diverges substantially.

The study shows that a *copper anchor* continues to be potentially relevant in many Member States. However, different *anchor products* may be appropriate across the EU in the future given the diverging market evolutions in the various Member States.

Finally, only a few NRAs that have designated an operator as having SMP on the market for wholesale local access have departed from cost orientation beyond the scenario of ERT, effective non-discrimination remedies, and retail price constraints as envisioned in the NDCM. For example, a few NRAs have imposed ‘fair and reasonable’ pricing obligations on SMP operators for wholesale broadband access products.

b. Introduction

Starting from the theoretical assumption that access obligations, coupled with cost based price controls, can have a stifling effect on investment in NGA network elements[112], the NDCM Recommendation advocates pricing flexibility for NGA products where sufficient competitive safeguards are put into place (non-discrimination, ERT, pricing constraints coming from the regulated legacy product (the so called 'copper anchor') or alternative networks retail constraint). This approach is now reflected in EECC (Art. 74.1, third paragraph). It provides that NRAs must "consider not imposing or maintaining [price controls], where they establish that a demonstrable retail price constraint is present" and that other obligations "including, in particular, any economic replicability test imposed (…) ensures effective and non-discriminatory access"[113].

The Economic Replicability Test (ERT) advocated by the NDCM Rec is imposed in the absence of price control obligations. It is an *ex ante* margin squeeze test. In this report, we use the term 'ERT' only for that specific margin squeeze test to distinguish it from other *ex ante* use of a margin squeeze test, which we refer to as an *ex ante* MST. We refer to the use of a margin squeeze test by the national competition authority as an *ex post* MST. In this regard, BEREC NRA survey data concretely demonstrate that NRAs make extensive use of *ex ante* MSTs, but only a few use the ERT as an alternative to price control in the sense meant by the NDCM (because only a few of them implement pricing flexibility).

However, BEREC does not use the same distinction in its regulatory accounting reports because it considers an ERT to be two-sided in nature, 'It can be used as a price control remedy [Art. 74 of the EECC] or as a non-discrimination remedy [Art. 70 of the EECC]'[114]. For this reason, BEREC lists ERT as a specific form of price control (a subcategory of the "retail minus" category in their classification)[115]. In the same vein, BEREC includes price caps in the category of cost orientation because price caps are generally derived from cost computations. Nevertheless, a price cap may be set taking into account other parameters. E. g., an NRA may permit a price cap computed[116] on the basis of the Internal Rate of Return (IRR) that is potentially achievable by the fibre investor, based on an estimation of the CAPEX and OPEX considered to be relevant by the NRA. For practical reasons, the study covers ERT in this chapter without prejudice to its legal qualification (instead of discussing it in the chapter relating to the guidance on non-discrimination).

A more complex decision is classifying a conditional price remedy such as the 'fair bet' approach now applied by OFCOM for wholesale FTTH access. From the perspective of the five-year market reviews, such a rate of return remedy cannot be considered to be a pricing remedy. At the same time, the NRA limits the cumulative returns that the SMP operator is entitled to make over the lifetime of the investment, which spans over successive review

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[112] "Cost oriented access to an NGA network might introduce an asymmetry between the access provider and the access seeker. If the demand for the NGA product turns out to be less than expected, the infrastructure owner would bear the entire cost. On the contrary, if the take-up of NGA products is higher than expected the access provider would share the revenues with the access seeker. The downside risk of the investment are, therefore, born by the access provider whilst the upside benefits are shared. Such regulatory approach grants the access seekers for free the highly valuable option to wait and make a better informed and less risky decision to invest. Therefore, there is a risk that regulation negatively affects incentives to deploy an NGA network", Impact Assessment, SWD(2013) 329 Final, p. 40.

[113] EECC, Art. 74.1.

[114] BOR (20) 210, p.16. However, the wording of Art 74 EECC suggests that the relevant legal basis is Art 70 EECC.

[115] However, this classification is legally not accurate given that Art.70 EECC refers to ERT in the context of equivalence of access.

[116] OPTA Decision of 27 April 2010

periods. Where the NRA finds that the cumulative returns over the lifetime of the project are likely to exceed the percentage deemed necessary to compensate for the upfront risk and provide a fair bet[117], the NRA will impose eventually a price cap.[118] Once again, legal qualification does not correspond to business reality for the investor, for whom such an announced future intervention constitutes a constraint on its pricing, at least in cases where the investment is successful.

The price control designates the approach that NRAs adopt in order to set tariffs of regulated services. Table 3 below provides an overview of all price control remedies.

Table 3. Overview of price control remedies

Remedy type	Subcategory 1 Cost orientation	Subcategory 2 Margin squeeze test	Subcategory 3 Rate of return regulation	Subcategory 4 benchmarking
Single remedy	• Cost oriented price cap alone	• Ex-ante retail MS test • ERT (Economic Replicability Test)	• 'Fair bet' (UK) • Price cap set on the basis of DCF (NL)	• Price cap based on benchmarking
Combination	• MST as a complement to cost orientation • Fair pricing computed starting from cost of provision (BE) • Non-abusive pricing (DE)			

Source: Partly based on BoR (20) 210.

The Margin Squeeze test is currently applied by NRAs mainly as a tool complementary to price control[119], and defines a strict level of parameters within which NRAs presume that alternative operators have enough scope for fair competition. Annex II NDCM Recommendation lists the specific characteristics that an MST must fulfil to be considered adequate to test Economic Replicability (ERT). Contrary to the case for *ex-post* MST, NRAs may, among other things:

- make "adjustments for scale to the SMP operator's downstream costs in order to ensure that economic replicability is a realistic prospect" and
- identify "flagship products" among the retail products instead of a full product by product assessment.[120]

[117] "Fair bet" does not involve a "claw back" in case the investor earned returns above the cost of capital. The assessment is performed at the time of investment. The question is whether at that time the expected return is equal to the cost of capital, taking into consideration compensation for the additional downside risks that were faced when the investment was made, but may not have materialized.

[118] OFCOM illustrates the approach with the flexibility given to Openreach to price FTTC Vula from 2008/2009 when it started its investments until March 2018 when OFCOM imposed a charge control on wholesale access up to o 40 Mbps. See OFCOM. Regulatory certainty to support investment in full-fibre broadband, Strategic Policy Position, 24 July 2018, p.26, available on: https://www.ofcom.org.uk/__data/assets/pdf_file/0025/116539/investment-full-fibre-broadband.pdf

[119] BoR (20) 210, p.18.

[120] NDCM Recommendation, Annex II.

In addition, given that parameters are set by NRAs on the basis of assumptions on market evolution (take up, evolution of prices) as opposed to actually achieved market outcomes, an ERT will therefore not necessarily exclude the *ex post* occurrence of margin squeezes under Competition law. At the same time, an ERT will constrain wholesale prices more than an *ex post* MST would under Competition law, because ERT may disregard the economies of scale of the SMP operator to a certain extent and may require a margin for the provision of retail services that are provided only marginally by the SMP operator.

This chapter examines successively the implementation of the following eight recommended approaches:

1. Guidance on cost orientation of wholesale access
2. Guidance on the price band
3. Guidance on the application of an NGA specific risk premium
4. Guidance on the criteria put forward for the assessment of long-term access pricing and volume discounts
5. Guidance on the implementation of an economic replicability test (ERT)
6. Guidance on the "copper anchor"
7. Guidance on other circumstances in which pricing remedies are not appropriate
8. Guidance on pricing remedies other than cost orientation

c. Guidance on cost orientation of wholesale access

Provisions concerned

The following provisions are relevant:

- Under Art.74.1 EECC, NRAs may 'impose obligations relating to cost recovery and price control, including obligations for cost orientation of prices (…) for the provision of specific types of interconnection or access, in situations where a market analysis indicates that a lack of effective competition means that the undertaking concerned may sustain prices at an excessively high level, or may apply a price squeeze, to the detriment of end-users.'
- Point 25 NGA Recommendation states that 'the price of access to the unbundled fibre loop should be cost-oriented.'
- Point 30 NDCM Recommendation directs that 'where cost orientation is imposed as a remedy, where appropriate, proportionate and justified (…) NRAs should adopt a bottom-up long-run incremental costs-plus (BU LRIC +) costing methodology which includes a bottom up modelling approach using LRIC as the cost model[121] and with the addition of a mark-up for the recovery of common costs.' This model estimates 'the current cost that a hypothetical efficient operator would incur when building a modern

[121] In an incremental costs methodology, only costs that would not be incurred if the incremental service was no longer produced by the operator are considered. This results in a cost accounting that does not correspond to the accounted costs of the regulated operator.

efficient network' based on an economic and/or engineering model (analytical cost model). The network concerned is described in the NDCM Recommendation (recital 32) as an NGA network, which "consists wholly or partly of optical elements (…) and should be capable of delivering the Digital Agenda for Europe targets in terms of bandwidth, coverage and take-up". Investment costs should be calculated "on forward-looking basis (i.e. based on up-to-date technologies, expected demand, etc.)" (recital 30), meaning that 'current costs' must be used instead of 'historic costs'.[122]

The recommended methodology aims to provide a clear framework for investment by providing an appropriate "build or buy" signal to alternative operators, and to establish predictable and stable regulated wholesale copper access prices. However, NRAs can deviate from the guidance provided they duly justify the choice of their alternative methodology in light of the policy objectives and regulatory principles of the Regulatory Framework and where the NRA considers that this is required on grounds related to the findings of the market review concerned, in particular the specific characteristics of the market of the Member State in question[123].

Did the NGA and NDCM Recommendations bring about a consistent application of SMP cost orientation remedies across the EU?

a) Cost orientation

Table 4 shows which EU NRAs imposed cost orientation for NGA access and access to ducts in the access segment in 2020. Nine of the 23 NRAs that replied to the online survey question stated that they had previously imposed pricing remedies other than cost orientation on the wholesale products currently under cost orientation.

[122] Contrary to the 2009 Recommendation regarding the regulation of MTRs/FTRs, the NDCM Recommendation does not provide guidance on the depreciation method, except in the case of re-usable civil engineering (RAB). However, the guidance provided in the 2009 Recommendation (that "The recommended approach for asset depreciation is economic depreciation wherever feasible") appears valid also beyond cost modelling for the purpose of narrowband termination. Most European NRAs have followed this reasoning, adopting the Economic Depreciation approach in the development of their costing models. These countries include Spain, France, UK, Belgium, and Portugal, among others.

[123] Judgment of 15 September 2016 in Case C-28/15, KPN, EU:C:2016:692

Table 4. NRAs applying cost orientation and/or ERT

Remedy type	VULA FTTC	VULA FTTH	Fibre unbundling	Dark fibre[124] in the access segment	Duct in the access segment	Bitstream over legacy	Bitstream over FTTC	Bitstream over FTTH
Cost orientation	BE, CY, DE, EL, HR, HU, IE, IT, ~~*LT*~~[125], LV	CY, EL, HR, HU, IT, ~~*LT*~~[126], LV	DK, EE, FI, HR, HU, LT, LV, *MT, PL*	CZ, DE, DK, HR, HU, IE, IT, LT, LV, PL, SI	DE, EE, ES, FR, HR, HU, IE, IT, LT, LV, PL, PT, SI, SK	BE, CY, DE, DK, EE, EL, *ES,* FR, HR, HU, IE, IT, LT, LV, PL, PT, SI	BE, CY, DE[127], EE, EL, HR, HU, IE, IT, LT, LV, PL	DK, EE, HR, HU, IT, LT, LV, PL
ERT only	AT, SI, LU, SK[128]	AT, *IE,* LU, SI, ES, MT, SK	SI, SK, *SE*, LU			SK, LU[129]	ES, SK, LU	ES, SK
Combination/ Fair pricing		BE					BE (cable access)	

Source: BEREC RA report 2020 (BoR (20) 210), p. 70; *Italics are used to indicate own research*.

Table 4 confirms that when VULA FTTC becomes a key access product, it is typically treated the same as ULL services, with the same price control and costing methodology approach. At the same time, ERT was used by up to 5 NRAs[130] in 2020 in the framework of pricing flexibility.

Finding 1. A limited number of NRAs made use of the pricing flexibility proposed by the NDCM Recommendation.

Moreover, Table 4 shows that for several regulated wholesale NGA access products, a significant number of NRAs do not impose pricing remedies, contrary to legacy access products which are still price regulated by nearly all NRAs.

The first explanation of the apparent divergence from the NGA Recommendation is that, at the time of its adoption, the approach advocated by the NGA recommendation to mandate cost-

[124] The category 'dark fibre in the access segment' refers to ancillary services mandated to the SMP operator consisting in the provision of access to dark fibre, often as an alternative to access to ducts (e.g. for backhaul to reach street cabinets in the case of sub-loop unbundling).
[125] VULA is not mandated and not provided in Lithuania.
[126] Ibid.
[127] For L2 BSA, the NRA applies a mix of LRIC+15% and a set of margin squeeze tests.
[128] The NRA decided to implement ERT instead of price control obligation except for co-location and passive infrastructure. Commission did not comment on it: Case SK/2017/1962, no-comments letter of 21 February 2017(C(2017) 1351 final).
[129] Art.8 of the 'règlement' ILR/T19/4 of 13 March 2019 'portant sur la définition du marché pertinent de la fourniture en gros d'accès central en position déterminée pour produits de grande consommation (marché 3b/2014), l'identification de l'opérateur puissant sur ce marché et les obligations lui imposées à ce titre' does not distinguish between legacy and NGA.
[130] Overall, the number of NRAs using ERT is increasing. In general, BEREC interprets the increase in the number of NRAs applying ERT by considering that, "This suggests that ERT is increasing at least for the VHCN wholesale product as a price control method and is used as a substitute with respect to cost orientation – in line with the principle suggested in the NDCM recommendation" (BoR (20) 210, p.17).

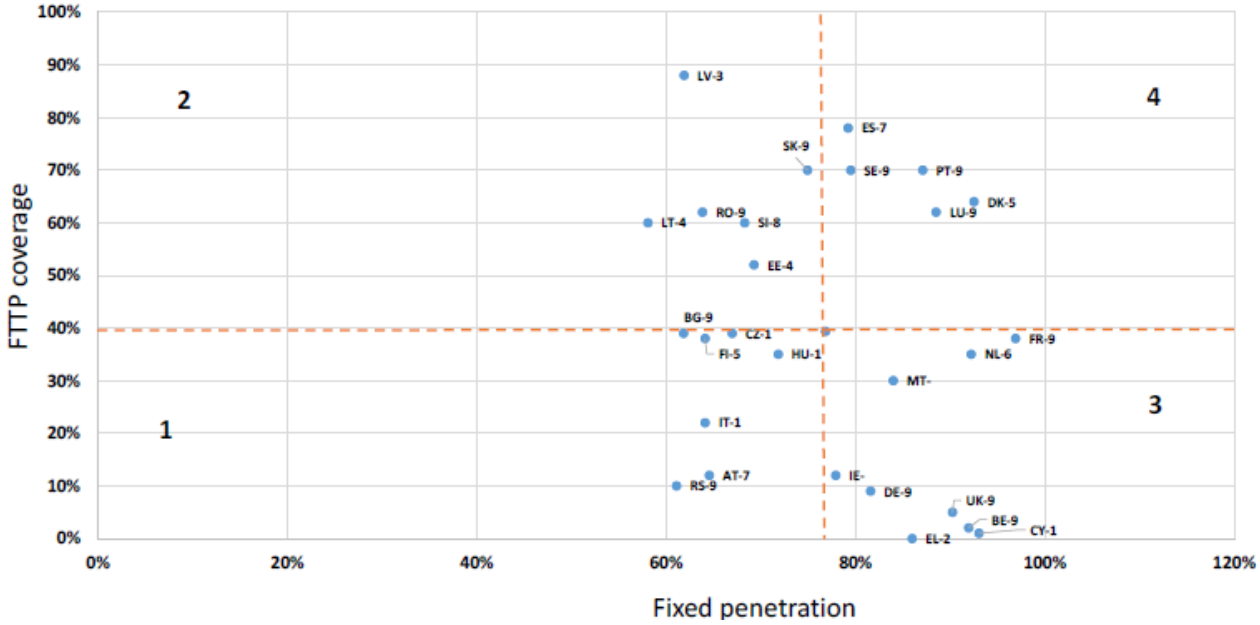
oriented SMP access to NGA networks[131] conflicted with the NGA regulation policies developed by some NRAs (in particular in France and Spain). For example, the Spanish NRA had already decided by 2008 not to impose obligations on the SMP operator to provide wholesale broadband access at a speed above 30 Mbps. The adoption of the Recommendation did not convince the NRAs concerned to reconsider their policies. One year after its adoption, the French regulator disregarded the Recommendation and did not impose asymmetric wholesale fibre access remedies at all, going even further than the Spanish regulator. In its Comments Letter of 26 May 2011, the Commission called on the Spanish NRA to "re-assess the need, in line with Article 8 of the Access Directive as well as Recommend 22 and Recommend 31 of the NGA Recommendation", to impose such remedies. however the Spanish NRA preferred to maintain its approach. When the Spanish regulator revised the regulation of Market 3a (Market 4/2007), it sought nevertheless to align its remedy with the NGA Recommendation by segmenting Market 3a geographically and exempting the SMP operator from providing virtual fibre unbundling (local 'NEBA') only in the 66 municipalities that were deemed to be sufficiently competitive. The Commission nevertheless responded that this approach could give rise to strategic investment behaviour by the SMP operator to ensure deregulation and might not be in response to market conditions and signals. However, the Spanish NRA maintained its approach.

Moreover, while Points 48 and 49 of the NDCM Recommendation state that NRAs, "should decide not to impose or maintain regulated wholesale access prices" where conditions for ERT are fulfilled, NRAs are always able to depart from recommendations when justified by specific national circumstances.

More generally, remedies must be proportional by accounting for other competitive conditions. In this regard, BEREC found that when competition and demand side conditions are more favourable (low SMP market share in combination with higher NGA service penetration), NRAs start replacing strict cost orientation and apply ERT. BEREC's 2019 Regulatory Accounting Report showed a correlation between fixed broadband (take-up) penetration and corresponding FTTP coverage and pricing remedies that were applied (see Figure 12).

[131] Beyond access to the terminating segment regarding which the NGA recommendation advocates symmetric access obligations (Point 18 of the NGAR)

Figure 12. The relationship between fixed penetration and FTTP coverage



Source: BoR (19) 240.

The X-axis represents penetration, while the Y-axis marks corresponding FTTP coverage. The access product examined is VULA FTTH (or fibre LLU in case no VULA product is regulated by the NRA). BEREC identifies four clusters ranging from cluster 1 (characterised by low penetration and low coverage) to cluster 4 (higher coverage and corresponding penetration rate). BEREC notes that, "In the latter case, the most common approach is to not regulate (or allow flexibility for) the FTTP product (this is in line with the Commission Recommendation on costing methodology). At the same time, stricter obligations on price regulation of the FTTP wholesale product are more frequent in cluster 1, where both coverage and take-up are lower; in this case a BU-LRIC approach is the most frequent".[132]

Finally, some anecdotal evidence heard during interviews suggests that some NRAs consider the flexibility option as more resource intensive than cost orientation. The purpose of the ERT is to establish obligations such that it is no longer necessary for the NRA to impose cost orientation obligations or to construct a BULRIC+ model. If an NRA chooses to take this route, it also has to impose obligations related to Equivalence of Inputs and Technical Replicability when EoI has not yet been fully implemented. This makes the whole package relatively onerous for smaller NRAs. Furthermore, the NDCM Recommendation requires that the ERT should be conducted "no later than three months after the launch of the relevant retail product and will conclude … within four months from starting the procedure"[133]. These timelines, and the fact that a re-run of the ERT could be required each time the flagship product offer is modified, or new bundles are susceptible to becoming flagship products, make the ERT potentially quite resource intensive.

A further argument was found in that a cost orientation obligation provides a greater price certainty for market participants compared to a lower price certainty for access seekers under ERT as the latter cannot anticipate changes to wholesale prices that the SMP operator may have to implement to ensure that its new retail offers pass the ERT[134]. At the same time, when

[132] BoR (19) 240, p. 31.
[133] Point 56, NDCM Recommendation.
[134] Irish NRA, ComReg 18/95, Decision D11/18.

ERT is applied after the launch of a new retail offer (under the NDCM Recommendation this may occur up to three months after a change is introduced in the commercial offer of a retail flagship product) introduces uncertainty for the SMP operator, inasmuch as the NRA might disagree with some aspects of the SMP operator's ERT analysis and thus disallow a wholesale price that has already been in effect for many months.

b) Costing methodology

NRAs should, in principle[135], apply a harmonised costing methodology to determine wholesale prices for access to the legacy copper network and related civil works of the operator with significant market power. The costing methodology should be based on a bottom-up long run incremental cost-plus model including a mark-up for common costs (BU-LRIC+). The valuation of a reusable civil engineering infrastructure should take due account of the depreciation of assets.

In its 2020 RA report, BEREC highlights that the recommended cost base CCA is by far the most often used methodology for all markets. In the access market (market 3a), a preference can be found for LRIC/LR(A)IC. In general, when LR(A)IC/LRIC is chosen as the main category, the most common approach is Bottom-up.

BEREC found that a cost orientation/price cap applied with BU/TD-LR(A)IC+ is the most frequent combination in cases where competition in the broadband market is at an intermediate stage (i.e. SMP retail broadband market share is between 40% and 50%). On the other hand, the use of cost orientation in combination with FDC (CCA/HCA) is more frequent in less competitive markets[136].

Several NRAs deviate in terms of the cost allocation method and use LR(A)IC instead of LRIC. LR(A)IC is also a modelling approach used for estimating the cost of service, but includes common and joint costs in the final cost of service, while LRIC does not. This is the reason why LRIC is combined with a mark-up for these costs. In addition, the German and Polish[137] NRAs are currently using a top-down model, instead of the recommended bottom-up approach[138], while the Croatian NRA uses a top-down approach for CEI pricing[139].

[135] Point 40 of the Recommendation indicates that NRAs may continue to use the methodology they applied at the time of entry into force of the recommendations, provided that it meets the objectives of the recommended costing methodology and satisfies certain criteria.
[136] BEREC RA report 2020 (BoR (20) 210)
[137] Commission Comments of 24.5.2019 concerning Cases PL 2019/2160-2161
[138] BEREC RA Report 2020 (BoR (20) 210)
[139] All other wholesale access prices are calculated using the BU approach. See No-Comments Letter of 8.2.2021 in Case HR/2021/2295, p. 2.

Table 5. Use of LRIC, LR(A)IC and FDC in Member States

Methodology	ULL	VULA FTTC	VULA FTTH	Fibre unbundling	Dark fibre in the access segment[140]	Duct in the access segment	Bitstream FTTC	Bitstream FTTH
LRIC	CY, ES, HU, LU, SE, SI	CY, HU, SI	CY, ES, HU, SI	FI, HU, SI	CZ, HU, SI	HU, SI, SK	CY HU	EE LT LV
LR(A)IC	AT, BE, DE, DK, EL, HE, IE, IT, PL	BE, DE, EL, HR, IE, IT	EL, HR, IT	DK, HR, PL	DE, DK, HR, IT, PL	BE, DE, EL, IT	BE DE EL HR IE IT PL	DK HR IT PL
FDC	EE, FI, *PT*[141], LT, LV, MT	~~*LT*~~[142], LV	~~*LT*~~[143], LV	EE, LT, LV, MT	LT, LV	EE, ES, FR[144], HR, LT, LV, PT[145]	EE, LT, LV	EE, LT, LV

Source: BEREC RA report 2020 (BoR (20) 210) *and own research (in italics)*.

The Dutch NRA applied still another approach to cost allocation. In March 1999, NRA (OPTA) issued guidelines on access to the ULL, which were carried over in subsequent years[146]. The guidelines determined that tariffs are calculated on the basis of the Embedded Direct Costs (EDC) model. EDC includes only the directly allocated costs of a service, not including any share of common costs. This reflects the incremental cost of providing the service on top of all of the other services. In relation to the cost base that should be used, OPTA's guidelines determined that there should be a gradual transition period from a tariff based on historical costs to a tariff based on current costs[147]. It was decided to have a transition period of five years. Eventually asked by the Commission why BU-LRIC+ had not been considered, the

[140] The category 'dark fibre in the access segment' refers to ancillary services mandated to the SMP operator consisting in the provision of access to dark fibre, often as an alternative to access to ducts (e.g. for backhaul to reach street cabinets in the case of sub-loop unbundling).

[141] The Commission Decision of 29.11.2016, in cases PT/2016/1888 and PT/2016/1889 mentions that "if MEO fails to guarantee that the price under the reference offer will not increase, a BU LRIC+ model will be used; otherwise, the current costing system will be kept" (footnote 26, p.5.).

[142] VULA is not mandated and not provided in Lithuania.

[143] Ibid.

[144] The French NRA in its Decision n 05-0834 states that the method "permet un lissage de l'effet des cycles d'investissement, ce qui favorise une plus grande stabilité des tarifs et une meilleure visibilité pour le secteur. En outre, elle introduit une différence méthodologique moindre par rapport à l'ancienne méthode pratiquée" (ARTE0500123S, JORF no. 19 of 22 January 2006).

[145] See NRA decision available at: https://www.anacom.pt/streaming/relatorioSCAMEO2018.pdf?contentId=1594181&field=ATTACHED_FILE). However, the Commission noted that the "costs of assets corresponding to ducts and poles will be based on the regulatory net book value of the accumulated depreciation, indexed by a suitable price index, taking into account an appropriate depreciation period". See Commission recommendation of 29 November 2016, in cases PT/2016/1888 and PT/2016/1889 footnote 27, p. 6.

[146] See EDC-rapportage KPN voor tariefbesluit ontbundelde toegang FTTH, 21 September 2016 available at: https://www.acm.nl/nl/publicaties/publicatie/16319/EDC-rapportage-KPN-voor-tariefbesluit-ontbundelde-toegang-FttH

[147] Europe Economics, Pricing Methodologies for Unbundled Access to the Local Loop, Final Report, May 2004, p.90. In 2001, Logica argued nonetheless that this "however leads to immediate 'ghost costs' and excess profits and thereby a discriminatory cost advantage for the incumbent. The incumbent's actual costs would in normal practice be calculated using Historic Cost Accounting while making only a small CCA allowance for local loop maintenance and extensions", Tariff regulation, the way forward, November 2001, p.72."

Dutch NRA argued that the EDC methodology is appropriate for determining the short-term regulatory costs of existing networks. The Commission did not comment on this point[148].

Fully distributed Cost (FDC) is susceptible to lower value yields than LRIC, as shown by the price hikes of ULLs' monthly charges which could be observed in the countries that switched to the latter (see Table 6).

Table 6. Monthly ULL chargers in selected countries

Country	FDC (euro/month)	LRIC (euro/month)	Variation
Denmark	8.29	10.28	24.00%
Greece	8.1	8.66	6.91%
Italy	8.49	9.28	9.31%
Sweden	14.11	15.28	8.29%
UK	7.48	11.19	49.60%

Source: Giancarlo Ferraiuolo, The European approach for regulating prices in fixed access markets (with a focus on the Italian case): Costing/pricing methodologies vs incentives to investments, PowerPoint presentation, Amman (Jordan), 18- 19 June 2019, Slides 34 and 35.

In Italy, the pricing difference was the result of changes in the following cost components: network costs: +21.38%, maintenance costs: -20.48% (taking into consideration the inflation rate) and marketing costs: -1.87% (taking into consideration the inflation rate).

The NRAs which continue to apply FDC in the current market 1/2020 justified their deviation from the recommended approach as follows:

- The Lithuanian NRA justified continuing the use of its FDC-HCA model instead of developing an LRIC+ model based on the need to apply the same methodology for costing remedies on copper LLU and NGA access. The NRA deems FDC-HCA more appropriate to price-regulate copper LLU and, more importantly, duct access, because:
  - (i) The SMP network was built a long time ago and, in light of the "build or buy" decision, the SMP's assets indexed by their current value would provide an enormous income compared to the current one.
  - (ii) 50-80% of the total cost is the cost off long-term asset depreciation.
  - (iii) Current prices in Lithuania are very low compared to the overall EU level.
  - (iv) Implementation of an LRIC model in Lithuania would increase the level of wholesale service prices, leading to an increase in retail prices as well.

  RRT was most concerned that using BU-LRIC+ would increase the price of access to ducts, which is troubling since this is the main product alternative that operators use to deploy their own networks at increasing volumes[149]. It was the RRT's view that the civil engineering infrastructure in particular (on which the deployment of alternative infrastructure largely depends) would not be re-created and therefore, should not be measured on the basis of its current value (as is the case in the BU-LRIC+ model.) In 2019, the Commission called on the NRA to closely analyse the evolution of wholesale access prices and their impact on the market because an FDC HCA model is unlikely

[148] Commission Decision of 14.12.2016 concerning Case NL/2016/1947: Wholesale local access provided at a fixed location in the Netherlands – remedies, 14.12.2016. However, in case 2015/1794 EC had "invited ACM to re-consider the relevance of using a BULRIC+ approach in the next review, consistent with the Commission's 2013 Costing and non-discrimination recommendation".

[149] RRT Market analysis (3a/2014) No. LD-1926 of 19 July 2019

to send the appropriate "build or buy" signals, in particular "when pricing access to legacy assets that may have been substantially depreciated, but which could be replicated in the competitive process, such as technical equipment or the transmission medium".[150]

- In 2013, the Latvian NRA clarified in response to the Commission's request for information that their applied cost model was based on an FDC CCA approach. The model yielded a cost-oriented price of € 8.34 per month for LLU. However, the NRA announced a new model for the calculation of cost-oriented prices for the next review period[151].
- The Estonian NRA explained that a top-down historical cost FDC model is less burdensome to the regulated communication company and for the regulator compared to the current cost accounting method and that it guarantees that the regulated communication company will recover its investment costs[152]. In 2021, the Commission repeated its criticism that had already been made in the previous market analysis that, "TD HC FDC can have potential negative effects, in particular with regard to the promotion of competition and deployment of very high-capacity networks"[153].

Cost modelling of a hypothetical efficient NGA network

Point 32 NDCM Rec says that when "modelling an NGA network NRAs should define a hypothetical efficient NGA network, capable of delivering the Digital Agenda for Europe targets set out in terms of bandwidth, coverage and take-up, which consists wholly or partly of optical elements". Recital 41 NDCM Rec indicates, "An FTTH network, an FTTC network or a combination of both can be considered a modern efficient NGA network". However, the modern equivalent assets of 2013 no longer correspond to state of the art assets in the 2020s.

Obviously, changing the assumptions of the model could lead to wholesale access price hikes, as illustrated by the Finnish 2017 notification, about which the Commission raised serious doubts under the Art.32 procedure (then Art.7)[154], or decreases in price. In particular, the Commission objected against the assumption in the BU-LRIC model of an ubiquitous fibre presence that would lead to unjustified higher price caps. The Finnish NRA subsequently withdrew its notification and amended its assumption on a fibre roll-out to better reflect reality. In particular, the revised model no longer assumed full fibre deployment within SMP areas. Instead, the model's cost accounting focused on areas where fibre networks were available. As a result, the cost base in the model was reduced and SMP operators like Telia and DNA had lower price ceilings imposed on them than earlier due to the change in the cost accounting assumptions[155]. The Commission did not comment on the revised method[156].

However, other NRAs use models which factor in a progressive evolution to full FTTH coverage. E. g., the 2013 model used by the Spanish NRA integrates an estimate of the

[150] Commission Decision of 15.7.2019 concerning Cases LT/2019/2183 and LT/2019/2184, p.9.
[151] Commission Decision of 12.8.2013 concerning Cases LV/2013/1487 and LV/2013/1492: Markets for wholesale (physical) network infrastructure access at a fixed location and for wholesale broadband access in Latvia, p.5. During the subsequent market review, the NRA explained that the new model has not been developed yet, but that it was developing an ERT. The Commission urged the NRA to accelerate the development of such a cost model, in line with the NDCM Recommendation (comments letter of 19 July 2018 in Case LV/2018/2097).
[152] Commission Decision of 24.5.2017 concerning Case EE/2017/1980-1981.
[153] Opening of Phase II investigation of 16.4.2021 in Cases EE/2021/2310 and EE/2021/2311, p.13.
[154] Commission Decision of 3.7.2017 concerning Cases FI/2017/1991-1992.
[155] JM Economics, "Ficora sticks to BU LRIC in fibre access regulation", 21st December 2017. Available at: https://www.jmeconomics.fi/ficora-sticks-to-bu-lric-in-fibre-access-regulation/
[156] Commission Decision of 21.2.2018 concerning Case FI/2018/2052.

evolution of both FTTH coverage (passed homes) and FTTH service demand (connected homes)[157]. Moreover, no efficient operator will deploy fibre to cover 100 % of homes/businesses, while less expensive alternative technological solutions exist. E. g., in France, the plan "France Très Haut Débit" considers 'marketable' connections to be 100% of main residences, 20% of secondary homes and 100% of business premises. In France, there were more than 3.1 million holiday homes in 2019, which means that French authorities consider the FTTH coverage objective to be on the order of 92%[158].

In addition, as far as the pricing of LLU is concerned, the guidance that NRAs should adjust the cost calculated for the modelled VHC network to reflect the different features of wholesale access services that are based entirely on copper, should be carried over. NRAs should continue estimating the cost difference between an access product based on e. g. FTTC/FTTH and on an access product based entirely on copper by replacing the optical elements with efficiently priced copper elements where appropriate in their VHCN engineering model.

Rephrasing the MEA that NRAs should model, would, nonetheless, emphasize the duty of NRAs to regularly update the prices of key access products and services such as the prices of regulated access to ducts and poles, which e.g. in Portugal date from 2006 and 2010 respectively, and to local copper loops, which in Portugal date from 2010[159],

Finding 2. The costing methodology put forward in the NDCM Recommendation is widely supported across various stakeholders and countries. However, Recital 41 NDCM Rec refers to modelling the hypothetical efficient NGA network in the 2013 context referring to DAE. In defining the appropriate technology/level of performance "depending on the access technology and network topology that best fit national circumstances", NRAs do not yet pay much attention either to the VHCN notion or the 2030 policy targets (just as the NDCM). In that regard, the reference to FTTC does not appear very future proof. At the same time, the remainder of the approach advocated in Point 37 remains to be fit for purpose.

On other points, some comments suggest the possible need for improvement i.e. regarding guidance on the valuation of re-usable assets on a regulatory asset basis (RAB) and on the frequency of reviews of the parameters of the cost models used.

Costing methodology for the pricing of access to CEI

The Recommendations do not give specific guidance on the pricing of CEI, beyond the requirement in the Annex I NGA Recommendation that, "NRAs should regulate access prices to civil engineering infrastructure consistently with the methodology used for pricing access to the unbundled local copper loop".

As a matter of fact, most NRAs follow this guidance. The Croatian NRA appears to be using FDC for the pricing of CEI, but in the framework of symmetric access obligations and thus outside the scope of the NGA Recommendation. The Spanish NRA, which has been

[157] Methodology available at: https://www.cnmc.es/sites/default/files/editor_contenidos/Telecomunicaciones/Modelos%20de%20coste/20180221_Modelo%20BU-LRIC%20red%20de%20acceso.zip

[158] Quoted in Iliad's October 2020 response to the public consultation on ARCEP's draft market review ARCEP's Draft Decision 'setting a tariff framework for access to the copper local loop for the years 2021 to 2023'.

[159] Commission Comments of 18.2.2021 concerning Case PT/2021/2294.

determining its regulated prices of access to the civil engineering infrastructure since 2011 (based on Telefonica's 2008 cost accounting i.e. top-down approach), has recently decided to apply a bottom-up model (BU-LRIC+) also for the pricing of access to the civil engineering infrastructure[160].

Impact of the application of the recommended cost orientation approach by NRAs

Cost orientation is perceived as a key tool for ensuring a competitive market by a substantial share of the NRAs that responded to the online survey. Out of 21 NRAs responding to the question, 12 NRAs consider that the retail broadband market shares of alternative operators increased due to cost orientation, while 7 NRAs think that the entry of new alternative operators in retail broadband markets was facilitated. Many NRAs also consider the cost orientation to promote consumer welfare. Out of 20 NRAs responding to the question, 10 NRAs indicated that lower end-user prices, an increased selection of service providers and an increase in NGA/VHCN coverage were the result of cost orientation. Eight NRAs also think that it improved QoS for the NGA/VHCN connections that were provided. Only 4 NRAs perceived no impact of cost orientation on consumer welfare.

For copper LLU, most NRAs apply a cost orientation alone/LRIC-LR(A)IC/CCA approach. However, market players and some NRAs warned that if the costing methodology of the current NDCM Recommendation will continue to be applied in coming years, the stability and predictability of copper access prices might be endangered. As the copper market continues to inevitably shrink, there is a risk that the LRIC model has overstated the appropriate price of copper access because fixed costs are distributed among a smaller number of users[161]. WIK Consult explains that "the [LRIC] standard was developed for an expanding market (with regards to investments and maintenance of the network). It is difficult to apply (…) the cost standard for an expanding market for a shrinking demand like for the service of copper access. (…) When demand is shrinking, the economies of scale melt away leading to increased costs per user which will particularly hit alternative network operators and access seekers and make a margin squeeze possible. Given the problems that come along with the LRIC standard, it is worthwhile to investigate existing alternative pricing approaches"[162]. "An alternative to LRIC based pricing can be the short-run incremental cost standard (…). In the short run, not all costs are to be viewed as variable, therefore the SRIC do not incorporate fixed costs and are therefore much better able to reflect the marginal costs which form the basis for the producing operator's decisions in the short run. Short-run costs mostly consist of the operational costs of the network as well as the repair maintenance. Fixed costs are sunk and therefore do not affect short run decision making".[163]

Another issue raised was the interpretation of the concept of Point 33 which requires the NRAs to value all assets constituting the RAB of the modelled network on the basis of replacement costs, except for the reusable legacy of civil engineering assets. According to some comments both from an NRA and an operator, limiting the exception only to civil engineering assets is overly restrictive, in particular in cases of upgraded cable networks which were not deployed in ducts but nevertheless are largely re-used to provide VHCN services. This criticism was also made regarding Germany. A German operator[164] complained that, due to the very limited

[160] Commission Comments of 21.5.2021 concerning Case ES/2021/2316, p.3.
[161] An NRA's response to the online survey.
[162] WIK-Consult (2020), *Copper switch-off, fibre take-up and ULL tariffs in France*, 9 April 2020, p.86.
[163] Idem, p.88.
[164] Operator's Response to the Targeted Consultation: "Die Bundesnetzagentur hat die NDCM-Empfehlung zwar angewendet, sie hat allerdings bei der Anwendung gegen die Vorgaben der Empfehlung verstoßen. Aus diesem Grund hat das Verwaltungsgericht Köln mit rechtskräftigen Urteilen vom 11. Dezember 2019, Az. (u.a.) 21 K

usage of ducts in Germany, the vast majority of costs used for the calculation of ULL tariffs are valued at current costs[165], and that has led to a significant price hike. Vodafone concurs, "due to various effects (rising civil engineering cost, decreasing utilisation of copper network) access cost of ULL rose by 11% in 2019"[166]. The concern is that the regulator's cost modelling methodology does not properly reflect the decreasing value of the access products. The Greek NRA avoided this pitfall when setting access prices to the SMP operator's NGA FTTC-based vectoring network by assuming in its cost model that all civil engineering assets in the distribution/drop part are reusable, although in practice the SMP operator did not deploy ducts. The NRA justified its methodology with the argument that an efficient provider would make maximum use of the existing copper network (laid in-ground) to implement the FTTC architecture. However, current costs (replacement costs) are used for calculating cabling costs.

In addition, certain NRAs expressed criticism regarding the execution of the cost-orientation remedy. E. g., Vodafone claimed that in Portugal, "the prices for access to ducts and poles are not effectively cost-oriented"[167], and expressed concern about "ANACOM consistently failing to consider economies of scale when setting cost-oriented prices"[168]. Similar criticism regarding the setting of cost-oriented prices was expressed by LKTA in the case of Lithuania (see Box 5).

6734/16, die betreffenden Entgeltgenehmigungen aufgehoben. Vor diesem Hintergrund ist eine Bewertung der Folgen der Anwendung der NDCM-Empfehlung nur mit Einschränkungen möglich." Der Ansatz, im Rahmen der TALEntgeltbestimmung Wiederbeschaffungs- und keine historische Kosten anzusetzen, hat zu einer deutlichen Erhöhung der TAL-Entgelte geführt.

[165] In German. Entgelt für die Teilnehmeranschlussleitung (TAL). The market review is available at: https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Marktregulierung/Marktanalysen/Festlegung_Markt3a_ME2014.pdf?__blob=publicationFile&v=3

[166] Vodafone response to the Targeted Consultation, Q15.

[167] Ibid.

[168] Ibid.

Box 5. Stakeholder views on implementation of cost orientation for pricing access to ducts in Lithuania

Regarding the implementation by the NRA of the guidance provided in Point 31, LKTA (Lithuanian Cable Television Association[169]) has expressed concerns over the depreciation costs used to set the rates of access to CEI. According to their own calculations, the majority of the SMP operator's infrastructure was built in the 1960s, so they assume that this infrastructure has been fully depreciated over time. However, costs are increasing annually and LKTA does not understand the logic behind the calculations. Their cost model has not been published. There is also some discontent from the market for the inclusion of protective cable pipes into the calculation of costs for the duct network. After a dispute regarding entry to a building and after it was included into the scope of the access obligation, it became apparent that Telia had used cable pipes for entry to the building as opposed to regular ducts. Cable pipes are much smaller in diameter than ducts (which are 110 mm). After entry to the building became part of the duct network, Telia started to include these costs for all cable pipes (since they used them as entry to the building). Telia also deployed fibre in these protective pipes. However, RRT has explained that any ducts that can be used by any ANO to deploy loops are part of the telecommunications physical infrastructure and there are no grounds for excluding such protective tubes from the scope of an access obligation (and thus from the associated costs) [170]. LKTA regrets the lack of transparency around the pricing methodology implemented by the NRA. LKTA notes that it is difficult to understand the rationale behind the access price without being able to see the methodology of calculating the price. E. g., they note that in Telia's public regulatory reports there are inconsistencies in the way costs are allocated (e.g. the same service is allocated according to different criteria over the years, and it is unclear why this is done). LKTA notes that Telia has complained that the access product concerned has not been profitable for them for years, and only last year has this product returned a profit. However, the price had not changed for about 9 years and LKTA claims that there were no substantial changes in the market during that time.

Source: Case Study of Lithuania.

Sustainability of the current guidance

NRAs are generally supportive of carrying over the current recommended cost methodology to the new recommendation. BEREC says that this cost methodology "should be applied irrespective of the technology of the new and enhanced network deployed/to be deployed. As long as cost models take into account the costs and asset life associated with a particular new technology, the appropriate economic signals will be sent and operators with SMP will be adequately compensated. Hence, there is no requirement for differentiating between new technologies in cost methodologies"[171]. The Hungarian NRA concurs[172] that BULRIC+

[169] Lithuanian Cable Television Association (LKTA) unites operators of telecommunications networks that offer cable television, Internet and other services, represents and protects their legal, economic, commercial and other interests in different state and business institutions. LKTA represents all of the largest alternative operators, such as Cgates, Init, Balticum, 5cc centras, Splius, Telecentras, among its 32 members.

[170] RRT, summary table of comments received from the public consultation on WLA market analysis, 12.06.2019.

[171] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q22. See also response to Q21: "(recommends. 30 – 47) are still relevant state-of-the art principles as it provides the appropriate build or buy signals that can promote efficient entry and maintain incentives to invest in new and enhanced networks, in particular VHC networks"

[172] Hungarian NRA response to the Targeted Consultation, Q22. Other NRAs are replying in a similar way to the online survey.

represents a technology-neutral approach, and an investor's decision should not be distorted by different cost methodologies.

The majority of NRAs that replied to the online survey reported having used at least some parts of the current Recommendation when setting their regulated prices (see Table 7). Only three NRAs responding to the question indicated that they did not use the guidance at all.

Table 7. Use of guidance of the Recommendation

Guidance used	No.
Guidance on estimating the current cost that a hypothetical efficient operator would incur to build a modern efficient network[173]	16
Guidance on defining a hypothetical efficient NGA network, capable of delivering the Digital Agenda for Europe targets set out in terms of bandwidth, coverage and take-up, which consists wholly or partly of optical elements	15
Guidance on valuing all assets constituting the Regulated Asset Base (RAB) of the modelled network on the basis of replacement costs, except for reusable legacy civil engineering assets.	15
Guidance on valuing reusable legacy civil engineering assets and their corresponding RAB on the basis of the indexation method	15
Guidance on setting the lifetime of the civil engineering assets, i.e. at a duration corresponding to the expected period of time during which the asset is useful and to the demand profile	14
Guidance on locking-in the RAB corresponding to the reusable legacy civil engineering assets and then rolling it forward from one regulatory period to the next	10
None	3
Other	1

Source: Online survey of NRAs. N = 21. Note: this data includes responses from all NRAs responding to the question irrespective of their approach towards price regulation.

Nonetheless, some NRAs identified shortcomings in the cost orientation approach[174]:

- One NRA notes that in order to develop a theoretical approach for the LRAIC method, one needs to use the SMP operator's information. However, for fibre it is hard to validate whether the information provided by the operators is representative of its true costs. Therefore, there is the risk of Type I and Type II errors: computing prices that are too low and limiting future fibre roll-outs or, alternatively, setting prices that are too high that in the end hurt the welfare of the end-customer.
- Another NRA addresses the difficulty of calculating efficient cost-oriented prices for multiple operators. This may require burdensome data collection. At the end of 2020, the Supreme Administrative Court annulled *ex ante* price caps calculated for fibre products with the LRIC+ model. This was done partly on the grounds that the NRA should have further investigated possible differences in digging costs.
- Under Recital 36 NDCM Recommendation, the current costs of Reusable legacy civil engineering assets in the BU LRIC plus model are calculated using the indexation method. Such assets will not require further investment or renewal and will not represent a significant incremental cost to the SMP operator. The indexation method uses historical data on acquisition prices, accumulated depreciation (amortization) and disposal of assets, as historical data are available in the accounts of major enterprises (statutory accounting as well as accounting for regulatory purposes), financial statements and publicly available price indices, such as e. g. the retail price index. The

[173] NRAs which did not deem the guidance useful said that they (1) did not impose cost orientation, (2) used another model, (3) modelled only a copper-based network or (4) did not provide any explanation at all.
[174] The bullet points below summarize anonymous NRA answers to the online survey.

index is applied to the regulatory asset base, which is the historical cost less accumulated amortization. This value in the reference period continues into subsequent periods and is adjusted by an index, while the residual value of assets decreases annually until the total depreciation of the asset. This procedure ensures that assets that have already been fully depreciated by a major company will no longer be included in the cost of physical access to the infrastructure[175]. An NRA flags that such indexation[176] of reusable legacy civil engineering assets is not necessarily straightforward. It is unclear on which data such indexation should be based. One cannot use the data from the SMP operator in a bottom-up model because a bottom-up model is totally independent of the cost accounting data of the incumbent. The NRA therefore suggests not to take reusable legacy civil engineering assets into consideration if they were fully depreciated and, in cases where they were not fully depreciated, to use net replacement values based on the assumption that this will lead to the same results as a depreciation and interest yield of indexed RAB over the remaining time.

- In case a margin squeeze test is applied on top of cost orientated wholesale access tariffs, the outcome could be that the SMP operator is prevented from launching attractively priced retail offers or alternatively would have to forebear a normal margin and decrease wholesale access prices below the regulated cap, distorting the make or buy decision of access seekers. In response to the online survey, one NRA suggested that this situation may be addressed by setting cost-oriented prices as price caps, allowing the SMP operator to propose lower prices in its reference offer. However, this would not take away the risk of distorting the 'build or buy' signal that regulated access prices seek to provide.

As previously mentioned, operators' comments focus more on the concrete application of BULRIC by the NRAs. A specific issue is the impact of Point 33 NDCM Rec which recommends that NRAs value all assets constituting the RAB of the modelled network based on replacement costs, except for reusable legacy civil engineering assets. This guidance leads to divergent access pricing between countries without legacy ducts and those with them. Are these divergences justified? We have seen that the Greek NRA applies an approach that addresses this problem.

One comment noted that models used may become obsolete over time due to network evolution or lack of updates (including demand and volume). Accordingly, cost models should be aligned with current network topology bearing in mind that the copper switch off is going to progress. The comment related to the interpretation of Points 46-47 NDCM Recommendation stating that NRAs must maintain cost models in order to promote regulatory predictability by ensuring stable access prices over at least two appropriate review periods and NRAs should only update the data input into the costing methodology when conducting a new market review. The wording is indeed ambiguous. What exactly is covered by 'cost models'? Does the term include the weighting used? Moreover, now that the time period between market reviews has been increased to five years, should NRAs still wait for the subsequent market review before updating their data?

[175] Method as summarized in SK NRAs market analysis of 2014 relating to Market 4/2014.
[176] According to Point 34 NDCM.

d. Guidance on the price band

Provisions concerned

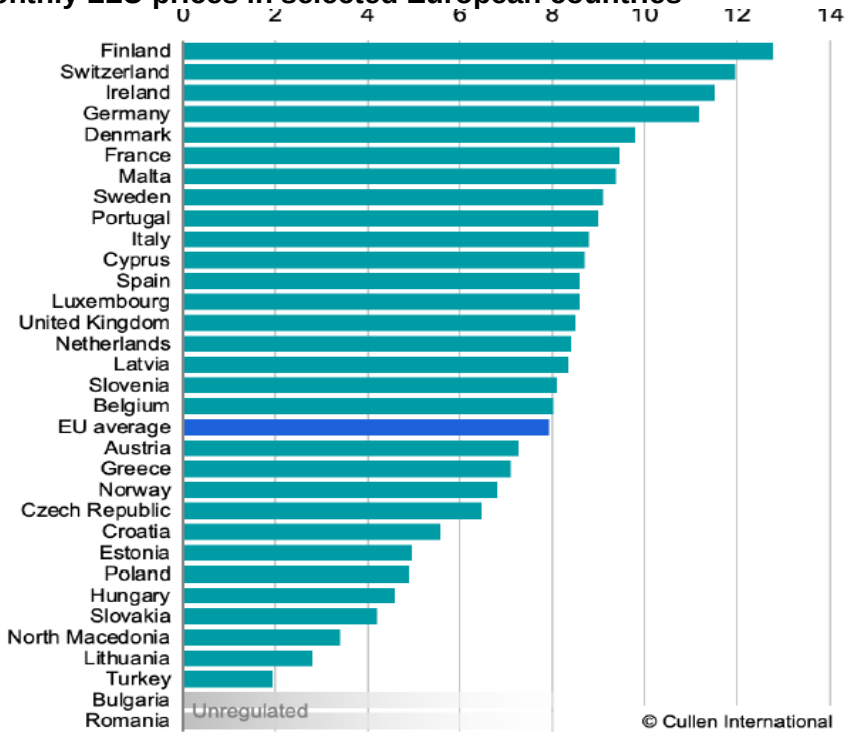
- Point 41 of the NDCM Recommendation anticipates "that, in light of access prices in Member States observed and bearing in mind the potential for limited local cost variations, the application of the key features of the recommended costing methodology, i.e. being based on a modern efficient network, reflecting the need for stable and predictable wholesale copper access prices over time, and dealing appropriately and consistently with the impact of declining volumes, and of the methodologies used pursuant to Point 40, is likely to lead to stable copper access prices and a Union average monthly rental access price for the full unbundled copper local loop within a band between EUR 8 and EUR 10 (net of all taxes) expressed in 2012 prices (the price band)".

Impact of the pricing of copper LLU

According to the international comparison provided by the French NRA in its latest market review[177], monthly prices in several Member States remain below the band[178]. However, there are substantial differences even if looking only at the tariffs set above the EU average.

[177] Décision No. 2020-1493 of 16 December 2020, p.20.
[178] On 27 July 2013, the Commission had issued serious doubts against ULL tariffs resulting from a margin squeeze test applied by the Austrian NRA because they do not send the appropriate "build or buy" signals. Moreover, the Commission feared that very low access prices are also likely to impede the SMP operator's efficient investment and innovation in new and enhanced infrastructures (such as e.g. fibre to the cabinet). See Commission Decision of 25.7.2013 concerning Cases AT/2013/1475-1476, p. 8.

Figure 13. Monthly LLU prices in selected European countries



·if récurrent mensuel du dégroupage total en Europe au 1er octobre 2020, e
(source : Cullen International)

Source: Cullen International quoted in Decision Nr 2020-1493 of 16 December 2020, p.21.

Among the larger European countries, monthly tariffs are the highest in Germany. However, the difference with the pricing in France or Spain is most likely due to the fact that few ducts are used in Germany and consequently their cost-model mostly uses current costs in the absence of significant re-usable assets.

Table 8. Monthly fees and other key parameters in largest current (and former) EU Member States

	France	Germany	UK	Italy	Spain
Fixed BB penetration, 2019	29.8m	35.1m	26.8m	17.5m	15.3m
Market share SMP operator, 2019	40%-45%	61%	34%	44%	40%
Share xDSL in BB market, 2019	67%	72%	77%	72%	17%
GDP/inhabitant (EU-100%), 2019	106	121	105	95	91
Monthly fee (€/month), 2020	€9.46	€11.19	€8.50 (£7.54)	€8.79	€8.60

Source: ARCEP, Décision no. 2020-1493 of 16 December 2020, p.21.

The difference between, on the one hand, the monthly rates in France and, on the other, in Italy and Spain, is more difficult to explain. The Commission accordingly drew the attention of the French NRA to the fact that the latter's new cost model estimated a price band for copper based LLU appreciably above those calculated previously (an increase of around 16%), only partly compensated by the revised, lower WACC (decreased from 7.6% to 4.8%). The Commission therefore invited the NRA to verify whether the significantly increased modelled

costs (i.e. regardless of WACC) were indeed reflecting the actual cost of deploying the relevant infrastructure[179].

Sustainability of the current guidance

Point 41 of the NDCM recommendation was clearly conceived as a transitory measure, which has achieved its objective by now. Open Fiber therefore believes that the price band should be removed gradually over the next market analysis cycle. It argues that allowing the ULL price to increase will, on the one hand, stimulate the take up of VHCN services and, on the other, send appropriate price signals for investors in VHCN networks[180].

However, the objectives that NRAs must pursue according to Point 42 of the NDCM Recommendation are regulatory transparency and predictability as well as the need to ensure price stability without significant fluctuations, while, at the same time, guaranteeing the SMP operator adequate remuneration and providing the right 'build-or-buy' signal[181] to entrants. The last objective will become increasingly obsolete in a context where copper networks are being switched off. In addition, the 'build' option only exists where there is an economic case for parallel deployment of fibre infrastructures, which is often not present in the absence of usable civil engineering. One can assume that ULL (or sub-loop unbundling) will be used less and less in areas where FTTH deployment is economically viable, as opposed to less dense areas where, in the absence of subsidies, xDSL may remain a key NGA technology.

At the same time, the objectives of "regulatory transparency and predictability as well as the need to ensure price stability without significant fluctuations"[182] continue to be of utmost importance. The guidance Points 31 and 32 NDCM Recommendation that the cost model must be based on a modern efficient network, reflecting the need for stable and predictable wholesale copper access prices over time, and dealing appropriately and consistently with the impact of declining volumes, will remain fully relevant as long as the legacy copper networks are not fully switched off, which is not likely to occur in the near future. The recommended approach should avoid volume effects that are the result of a decreased demand for copper wholesale access and that lead to higher unit costs (i.e. the same cost base of copper must be distributed between a smaller number of lines), would inflate unit costs[183], and would lead to price hikes.

One operator advocates that, in this regard, NRAs should fix an "appropriate ceiling for ULL prices fully independent of current cost developments and usage of copper lines"[184]. Such ceiling could be set on the basis of short-run incremental cost (SRIC)[185].

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[179] Commission Comments of 4.12.2020 concerning Case FR/2020/2284, p. 7.
[180] Written feedback to the stakeholders' workshop of 9 June 2021.
[181] Recital 27 NDCM Recommendation.
[182] Recital 44 NDCM Recommendation
[183] BoR (19) 240, p.44
[184] Vodafone response to the Targeted Consultation, Q15.
[185] J. Eisenach and B. Soria (2017), *Balancing incentives for the migration to fibre networks*, A report by NERA Economic Consulting for Vodafone Group Plc.

Finding 3. The recommended price band has ensured the stability of the monthly wholesale rates for ULL. However, one notes a growing divergence between the regulated ULL maximum rates set across the EU. It is not clear whether this evolution reflects only national differences or is due to the application of the costing methodology used.

e. Guidance on the application of an NGA specific risk premium

Provisions concerned

- Under Art. 3.4 EECC, the NRA shall "(d) promote efficient investment and innovation in new and enhanced infrastructures, including by ensuring that any access obligation takes appropriate account of the risk incurred by the investing undertakings (….), while ensuring that competition in the market and the principle of non-discrimination are preserved".
- Art.74.1 EECC provides that "where the NRAs consider price control obligations to be appropriate, they shall allow the undertaking a reasonable rate of return on adequate capital employed, taking into account any risks specific to a particular new investment network project".
- The NGA Recommendation puts forward that NRA should assess the risks incurred and include where appropriate a higher risk premium to reflect any additional and quantifiable risk incurred by the SMP operator (NGA Rec. Annex I, pt. 3).
- Annex I, pt. 6 NGA Recommendation lists the criteria to be taken into account by NRAs and to be reviewed periodically (see Box 6 below)

Box 6. Criteria set out in Annex I NGA Recommendation

Investment risk should be rewarded by means of a risk premium incorporated into the cost of capital. The return on capital allowed *ex ante* for investment into NGA networks should strike a balance between on the one hand providing adequate incentives for undertakings to invest (implying a sufficiently high rate of return) and promoting allocative efficiency, sustainable competition and maximum consumer benefit on the other (implying a rate of return that is not excessive). To do so, NRAs should, where justified, include over the pay-back period of the investment a supplement reflecting the risk of the investment in the WACC calculation currently performed for setting the price of access to the unbundled copper loop. The calibration of revenue streams for calculating the WACC should take into account all dimensions of capital employed, including appropriate labour costs, building costs, anticipated efficiency gains and the terminal asset value, in accordance with Recital 20 of Directive 2002/19/EC.

NRAs should estimate investment risk, *inter alia,* by taking into account the following factors of uncertainty: (i) uncertainty relating to retail and wholesale demand (ii) uncertainty relating to the costs of deployment, civil engineering works and managerial execution (iii) uncertainty relating to technological progress (iv) uncertainty relating to market dynamics and the evolving competitive situation, such as the degree of infrastructure-based and/or cable competition and (v) macroeconomic uncertainty. These factors may change over time, in particular due to the progressive increase of retail and wholesale demand being met. NRAs should therefore review their situation at regular intervals and adjust the risk premium over time, considering variations in the above factors.

Criteria such as the existence of economies of scale (especially if the investment is undertaken in urban areas only), high retail market shares, control of essential infrastructures, OPEX savings, proceeds from the sale of real estate as well as privileged access to equity and debt markets are likely to mitigate the risk of NGA investment for the SMP operator. These aspects should also be periodically reassessed by NRAs when reviewing the risk premium.

The above considerations apply in particular to investments into FTTH. Investments into FTTN, on the other hand, which is a partial upgrade of an existing access network (such as e.g. VDSL), normally have a significantly lower risk profile than investments into FTTH, at least in densely populated areas. In particular, there is less uncertainty involved about the demand for bandwidth to be delivered via FTTN/VDSL, and overall capital requirements are lower. Therefore, while regulated prices for WBA based on FTTN/VDSL should take into account any investment risk involved, such risk should not be presumed to be of a similar magnitude as the risk attaching to FTTH based on wholesale access products. When setting risk premia for WBA based on FTTN/VDSL, NRAs should give due consideration to these factors, and should not in principle approve the pricing schemes (…). NRAs should publicly consult on their methodology to determine the risk premium.

Source: NGA Recommendation, Annex I.

Did the NGA Recommendation bring about a consistent approach?

According to BEREC's Regulatory Accounting report 2020, 14 NRAs imposed pricing remedies on VULA (FTTC) and 17 on VULA (FTTH). The Dutch NRA imposed pricing remedies for both types of wholesale access, but its decision was eventually annulled by the Appeals Court. BEREC's RA 2019 report noted that "12 NRAs estimate a risk premium for NGA FTTH

services, 5 NRAs apply this risk premium also to the FTTC network without differentiating the final value with respect to the one applied for NGA. Two NRAs apply a decomposition approach, three NRAs use a benchmark approach and three NRAs use methodology mainly based on the outcome of a DCF calculation."[186] Some NRAs computed an NGA specific risk premium but do not use it in practice (e.g. the Czech NRA[187]). The following Table 9 provides an overview of the situation in 2019 and is further updated by our research.

Table 9. Pricing remedies and/or ERT and NGA specific risk premium applied

Wholesale product	Countries imposing pricing remedies or ERT	NRAs allowing NGA specific risk premium
VULA FTTC		
Cost orientation (BULRIC+ for LRAIC)	DK[188], CY, DE, EL, HR, HU, IE, IT and LV	DK
MST/ERT	AT, SK, SI	SI
Other	FI	
VULA FTTH		
Cost orientation (BULRIC+ or LRAIC)	DK, PL, CY, EL, HR, HU, IT[189] and LV	DK, PL, IT[190] and HR[191]
MST/ERT	AT, ES, SI, LU[192], MT, SK	SI[193]
Other	FI, BE	*BE*[194], FI
Fibre unbundling		
Cost orientation BULRIC+ or LRAIC	DK, PL, EE, HU, IT, LT[195]	DK, PL, IT
MST/ERT	LU, SE, SK	
Other	FR[196]	FR

[186] Annex I, p.52
[187] CTU regulation no. OOP 4 of Feb. 2019
[188] Commission No-Comments Letter of 22.11.2019 concerning Case DK/2019/2212: Setting maximum network access prices according to the LRAIC method for 2020
[189] NRA decision: https://www.agcom.it/documents/10179/15564025/Delibera+348-19-CONS/1fe1fd57-1b27-4755-bfd6-89455e12ce09?version=1.0
[190] The Italian NRA follows the NGA Recommendation's guidance to include a supplement reflecting the risk of the investment in the WACC calculation currently performed for legacy products "(…) riconoscendo all'operatore SMP un premio di rischio aggiuntivo che deve essere **incorporato** nel costo del capitale".
[191] NRA decision 11 Oct 2019. The NRA is using a benchmark, taking into account its limited resources. The NRA computed the average of the risk premia in France to be 2%, Italy 3.20%, Denmark 2%, Czech Republic 1.41%, Slovenia 2.50%, Luxembourg 2.50%, the Netherlands 2%, Poland 1.25% and the United Kingdom 0.9% and arrived at 1.97%, which is then added to the legacy WACC of 6.28%. 1.97% is lower than the previously applicable premium. The decrease was justified by the NRA because the additional risk premium should reflect the risks related to demand, i.e. the risks related to the use of broadband access services at NGA speeds (speeds higher than 30 Mbps). The NRA noted in this regard a significant increase in the use of NGA speeds in Croatia – at the end of 2018, about 330,000 users used NGA speeds, which was a significant increase over previous three years (more than five times).
[192] The risk premium is set in Art. 3.(1) of NRA Decision 16/206/ILR du 14 juin 2016: "Pour les produits et services régulés sur les marchés pertinents des communications électroniques fixes, l'Institut arrête le coût moyen pondéré du capital en termes nominaux avant impôts à 7.10%. (2) Pour les éléments de réseau fixe de nouvelle génération (NGA), l'Institut fixe le coût moyen pondéré du capital en termes réels avant impôts incluant une prime de risque à 7.71%". The risk premium is calculated on the basis of a benchmarking.
[193] Commission No-Comments Letter of 29.06.2021 concerning Case SI/2021/2326.
[194] The Belgian NRA applies a higher WACC (8.77% instead of 7.12%) for FTTH, but regulated access is subject to 'fair pricing' rather than strict cost orientation.
[195] Risk premium is allowed, but the SMP operator did not request it. There is zero take-up of fibre unbundling.
[196] The NRA decision no. 2020-1446 of 15 December 2020 does not impose fibre unbundling or VULA beyond the obligation to negotiate reasonable demands to serve specific needs of the business sector. However, France has implemented a symmetric FTTH framework (applicable to all FTTH operators) for access to the terminating part of the FTTH network (from the first concentration point onwards. The risk premium is taken into account for the setting of the WACC that is used in the case of dispute resolution (negotiated access must comply with the principles of "efficacité, de pertinence, d'auditabilité et de non- discrimination").

Source: Data published in the BEREC 2019 RA report, Annex I, Figure 61, p. 52 complemented with data from BEREC RA report 2020 (BoR (20) 210 and own research, NRAs allowing NGA specific risk premium not indicated in the BEREC report are *in italics*.

The FTTH specific risk premium, whether calculated as the difference between the project specific WACC for the FTTH business of the relevant companies and their WACC calculated for their other businesses or as an additional premium based on a benchmark, is between 0.90% and 3.20%. Added to the legacy WACC, this gives a WACC specific for FTTH between 6% and 11%, which is very high compared to interest rates observed on the general market. However, these figures are partly influenced by the high-risk premium (4.81%) in Spain which is no longer applied.

Finding 4. Six of the ten NRAs imposing cost orientation on VULA FTTH access and/or fibre unbundling do not (or no longer) apply NGA specific risk premia. This raises the question as to why. A closely related question is the impact of such NGA specific risk premia on wholesale access prices.

Consistency in the application or not of an NGA specific risk premium

NRAs appear to follow two different approaches (that can be combined in certain cases):

- The approach recommended by the NGA Recommendation which is "to include (…) a supplement reflecting the risk of the investment in the WACC calculation currently performed for setting the price of access to the unbundled copper loop"[197], as the Belgian and the Italian NRAs do.
- Any other additional margin added on top of the legacy WACC to encourage NGA/VHCN investments, e.g. based on international benchmarks as the Luxembourg and Polish NRAs do.

However, any method which in practice reflects a genuine estimation of the project specific investment risk could be deemed to be in line with the guidance provided. It relates more to the factors of uncertainty that should be taken into account than to the specific method applied. Conversely, the application of an additional margin on top of the WACC in order to support fibre investment (e.g. to allow for sufficient upside potential in investment returns compensating for the downside potential) would be at odds[198] with the criteria in Annex I of the NGA Recommendation. Such an **additional premium** would encourage or accelerate NGA investments for the purposes of achieving various policy goals, such as a minimum level of NGA network penetration. They refer with that concept to any "premium granted to encourage or accelerate NGA investments for the purposes of achieving various policy goals, such as a minimum level of NGA network penetration."[199]

[197] Annex I, NGA Recommendation
[198] The Commission recalled that "it might be more appropriate to take account of the investment risk in the calculation of the cost of capital, instead of an additional mark-up to the cost oriented prices" (Commission Comments letter of 25.02.2021 concerning Case BE/2021/2301, p.7).
[199] Dan Harris, Richard Caldwell, Lucia Bazzucchi, and Francesco Lo Passo (2016), *Review of approaches to estimate a reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization*, the Brattle Group.

The authors distinguish such purpose from two other possible reasons "for providing a WACC premium for NGA network investments":

- Compensation for a higher **systematic risk** (in comparison to legacy networks) – that is, risk that is correlated with the broader macroeconomic environment, and which investors cannot address by diversifying their investments. Harris et al (2016) go on to recommend that "the WACC should only compensate for systematic risk".
- Compensation for **non-systematic risk** – these are project specific risks such as cost and technical risks. Non-systematic risks should, according to the authors, be dealt with, but in careful modelling of project cash flows rather than the WACC. For example, a number of demand and cost scenarios should be modelled to account for the risks associated with these parameters. The final return for the project should be calculated using data that has fully accounted for the spread of possible outcomes, from those better than the base case assumptions to the worst. This also includes an estimation of the effect of regulation on an expected return (e.g. the truncation introduced by price caps).

Finding 5. The few NRAs applying risk premia follow the guidance of the NGA Recommendation. Some explicitly do the computation themselves, while others use benchmarks.

Possible gaps: appropriateness of an additional premium, on top of the project specific WACC

In line with the mentioned examples, a slight majority of NRAs responding to a question in the online survey (11 out of 19) consider that there can be cases where a 'premium on top of the project specific cost of capital could be justified, for instance to allow for sufficient upside potential in investment returns compensating for the downside potential. However, it is necessary to distinguish such an **additional premium** clearly from the WACC to avoid any confusion with the risk premium on which the NGA Recommendation provides guidance.

Echoing the responses from the 11 NRAs, Oxera says that VHCNs are exposed to a number of risks "that are not fully reflected in the asset beta which, if not properly accounted for in the regulatory framework, could sufficiently impede investment and/or result in a regulatory failure to allow investors the opportunity to earn a 'normal return'. That is, while the WACC estimated through the CAPM contains an allowance for systematic risk, it does not include any allowance for specific risks. These risks are assumed to be diversified and so, in theory, investors do not need to be rewarded for bearing them. However, implicit in the CAPM methodology is an assumption that investors are allowed to keep the full upside of their investments and bear the full downside of outcomes affected by specific risks. Hence, for diversification to lead to cost recovery it is vital that upsides are retained as well as downsides. This means that a further allowance for risk has to be considered separately from and in addition to the WACC estimated by the CAPM. While some regulators have recognised that investment decisions are also materially affected by non-systematic risks, and some attempts have been made to take into account a 'risk premium', in our opinion, none has truly grappled with the issue in a satisfactory manner"[200].

Nevertheless, an NRA raises the question whether such an additional premium on top of the project specific cost of capital could be justified outside of specific geographic areas "where

[200] Oxera response to the Targeted Consultation, Q16.

deployment of NGA networks is very expensive (because there are only a few potential customers)"[201].

Another NRA flags in this regard an operational issue: "it might be difficult to draw lines between different kind of projects, which ones are allowed to get risk premium and which ones not"[202].

Orange considers that such premia should additionally have a function to offer an incentive in the framework of a political action[203], such as coverage objectives.

Possible gaps in the guidance relating to the project specific WACC

The NGA Recommendation (Annex I, Point 6) stresses that "investments into FTTN, which is a partial upgrade of an existing access network (such as e. g. VDSL), normally has a significantly lower risk profile than investment into FTTH, at least in densely populated areas. In particular, there is less uncertainty involved about the demand for bandwidth to be delivered via FTTN/VDSL, and overall capital requirements are lower". Consequently, the requirement for a higher WACC for FTTC investment is much less obvious than it might be in the context of FTTH. Therefore, the finding that only a minority of NRAs calculates an NGA specific WACC for the computation of NGA access prices also reflects the fact that in countries where NRAs impose cost orientation as a pricing remedy, the high speed broadband services of the SMP operators are mainly still copper-based and that the NRAs concerned deem it reasonable to apply the same WACC for FTTH as for other copper-based services[204]. Today, an NGA risk premium for FTTC deployment is in any case no longer justified according to Sky Italy[205].

Moreover, Hungarian NRA opines that there is no "compelling need to introduce special other risk elements"[206] since industry risks are covered by the Beta which together with relevant Equity Risk Premium (ERP) covers the systematic risk. The "telco's Beta reflects that they are investing the majority of their CAPEX into Fibre (NGA, VHCN) and the related potential risk is thus reflected in the market prices (perhaps investing solely into copper might be considered a much higher risk in the current market situation)"[207]. The Capital Asset Pricing Model (CAPM) underlying the WACC is "based on the efficient market hypothesis, so the risk is assessed in the financial markets reflecting all available information and expectations, therefore, all risks (systematic) are objectively factored into the market price"[208]. The Hungarian NRA furthermore stresses that a technology neutral approach is required to avoid any potential distortion from setting a potentially inappropriate risk premium[209].

ECTA calls into question the need to further allow risk premia given "that the uncertainties listed in paragraph 2 of section 6 in Annex I NGA Recommendation have been lifted by now. Retail and wholesale demand for improved connectivity at home has clearly materialized and

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[201] An NRA's response to the online survey.
[202] Therefore, the NRA does not estimate certain fixed risk premium level, rather the higher risk has been calculated in WACC by higher asset beta value compared to legacy infrastructure. An NRA's response to the online survey.
[203] Orange response to the Targeted Consultation, Q16.
[204] As the Irish NRA did: see ComReg Document 20/96 point 7.98: "ComReg notes further in respect of FTTC that Eircom's FTTC service is primarily a copper-based service and it is reasonable to apply the same WACC for FTTC as for other copper-based services".
[205] Stakeholders' workshop, 9 June 2021.
[206] Hungarian NRA response to the Targeted Consultation, Q16.
[207] Idem, Q17.
[208] Idem, Q16.
[209] Idem, Q22.

has translated into a higher uptake of FTTB/C (as well as DOCSIS and VDSL), even though many customers remain satisfied with the speed of their current connection. The costs of deployment/civil engineering and managerial execution are well known, since over 34% of EU homes are now covered by FTTB/H"[210]. According to Bouygues Telecom,[211] in France, there is hardly any risk of deploying FTTH given that *le Plan France Très Haut Débit* has detailed the deployment phases of full fibre coverage and set the date of 2025 for full optical fibre coverage. No additional premium on top of the standard ERP can be justified.

At the same time, 15 of the 23 NRAs replying to the question in the online survey consider the NGA and VHCN networks to possibly carry an additional investment risk compared to the legacy infrastructure. However, this raises the question of where the line should be drawn. Operators like Liberty Global argue that VHCN operators face similar demand uncertainty across various technologies[212]. This raises the next question as to whether premia should be reserved for certain types of VHCNs.

A second explanation for the limited number of NRAs calculating with an NGA specific WACC is the use of pricing flexibility instead of a price control obligation. In such cases, there are fewer reasons to apply a higher WACC because the assets relevant for the FTTH (or FTTC) economic replicability obligation are not a part of the access network but relate to the downstream retail activity. Therefore, these assets are not subject to a risk premium. Moreover, the SMP operator is free to determine the wholesale charge for a FTTH rental as long as it does not cause a margin squeeze and the question of the application of a WACC premium to a FTTH rental therefore does not arise[213]. BEREC also recalls that NRAs may consider it appropriate to not impose or maintain price controls and instead allow price flexibility in case an ERT is in place, leaving it "to the SMP operator to find a way to deal with any risks specific to a particular new investment network project"[214]. This is the preferred option of several operators, which remind us that if "economic replicability is applied instead of cost-oriented prices, there is no need for such predictability nor for a risk premium nor an application of the "fair bet principle". The SMP operator will adjust retail and wholesale prices in order to cope with market dynamics"[215]. However, two NRAs using ERT without a price control obligation for certain wholesale access products responded to the online survey that they nevertheless applied a higher NGA WACC[216].

A more fundamental criticism comes from Tony Shortall (Telage consulting)[217] who argues that both the use of risk premiums and option values are part of an outdated regulatory approach, based on the presumption that there is no meaningful prospect of entry and that the SMP operator should therefore be incentivised to invest. Today, the main question is how to incentivise infrastructure competition. Where there is a prospect for meaningful entry, any price regulation will undermine ANOs' incentives to invest. The risk related to maintaining the old approach is the crowding out of investment in alternative networks. This view is strongly supported by Open Fiber[218], which advocates that SMP operators should, in areas where there

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[210] ECTA response to the Targeted Consultation, Q17.
[211] Stakeholders' workshop 9 June 2021.
[212] Liberty Global response to the Targeted Consultation, Q19.
[213] As noted by the Irish NRA in Comreg Document point 7.95, p.110.
[214] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q16.
[215] Vodafone response to the Targeted Consultation, Q19.
[216] None of the respondents specified, but they may use the higher NGA WACC to determine the discounting rate they use in their calculations. See e.g. Luxembourg NRA's Regulation ILR/T19/2 of 13 March 2019 Art.24 " (…) Le taux d'actualisation utilisé correspond au coût moyen pondéré du capital (WACC), fixé et pré-rempli dans l'outil de calcul par l'Institut".
[217] Stakeholders' workshop 9 June 2021.
[218] Ibid.

is a credible scenario for the deployment of an alternative infrastructure, never be allowed to apply wholesale access prices below cost levels increased with a sufficient margin to remunerate investment risk.

Implementation issues

Sky Italy[219] considers the current guidance to be flawed. In order to decide whether to compute NGA risk premia NRAs should:

- First, determine where it is needed, whether: (i) the NGA risk premia allowed delivered (some of) the intended outcomes in terms of fibre deployment and (ii) what are the side-effects on the market. The Bourreau study says that the risk premium can incentivize investment, but it also says that it distorts retail pricing. Sky Italy claims that today there is enough data to analyse this empirically, including in Italy. Italy has one of the higher NGA risk premia for FTTH in the EU. However, factual evidence shows that the emergence of infrastructure competition rather than the NGA premium boosted VHCN coverage.
- Second, there should be no NGA risk premium in the presence of risk mitigating factors, such as public subsidies or co-investment.
- Third, the methodology should be granular enough to reflect the real extent of risks. For example, the Italian NRA makes a real options computation based on hypothetical investment plans, distinguishing between the risks according to different geographies with different densities and subsequently summing up the outcomes to a national average. However, if the SMP operator deploys its fibre overwhelmingly in denser areas with lower risk, the risk actually incurred by incumbent will be lower than the figure computed by the model. Sky Italy considers that the only way to address such flaw is to calculate the granting of the NGA risk premium based on concrete deployment commitments from the SMP operator instead of hypothetical willingness to invest. This is the only way to compute the real risk that the SMP operator incurs.

The need to differentiate NGA WACC according to different geographic deployment areas to reflect potential different risks is also advocated by Orange[220]. The French operator SFR,[221] supported by a report from Frontier economics, pleads for the differentiation of NGA risk premia not only according to the areas covered, but also accounting for the different risk profiles of the investors. The company challenged in court dispute settlements by the NRA[222] in which the latter refused such differentiation and aligning the tariffs requested by XpFibre[223] on the (lower) tariffs applied by the incumbent operator Orange. It argues among other that the methodology to determine the NGA risk premium should not be based on a 'similarly efficient standard'. The Court of appeal's judgment is not expected earlier than in 2022/2023.

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[219] Ibid.
[220] Ibid.
[221] Case study interviews.
[222] Décision no. 2020-1498-RDPI du 17/12/2020, available at: https://www.arcep.fr/uploads/tx_gsavis/20-1418-RDPI.pdf and Décision no. 2020-1168-RDPI du 05/11/2020 available at https://www.arcep.fr/uploads/tx_gsavis/20-1168-RDPI.pdf
[223] Independent infrastructure operator that emerged following the takeover of Covage by SFR FTTH.

ETNO[224], Orange[225] and Deutsche Telekom[226] point to a more fundamental problem where the legacy WACC is used as a benchmark or basis for the VHC WACC calculation[227]. The legacy WACC calculation as recommended by the Commission is based on a purely historic perspective of ERP which goes against the forward-looking nature of CAPM. Using purely historic data leads to a significant underestimation in countries where the effects of quantitative easing are the most visible. Moreover, the legacy WACC calculation combines the EU ERP with national risk-free rate which allegedly creates methodological inconsistency and results in underestimated expected returns on EU equity markets as it reduces national risk differences to differences in government credit ratings. In addition, the Commission notice would wrongly assume that legacy assets can be refinanced under terms comparable to those of the past five years, while in fact these assets have been developed and financed in much older periods. As a result, the resulting cost of debt may underestimate the actual legacy debt related to these assets[228].

Impact of the application of NGA specific risk premia

The Italian operator Open Fiber points out that in Italy "risk premia initially led to very high prices for FTTH services and very low investments in new infrastructures. The market entry of a competitor (i.e. Open Fiber) led to a sharp reduction in prices (at levels that did not take into account any risk premium) and an increase in the investment in new infrastructures both of the incumbent and the new entrant"[229].

However, the level of risk premia calculated by NRAs may be the result of national estimation methods more than a result of the (broad) principles set out in the NGA Recommendation. Harris et al (2016) noted that NRAs have not applied a consistent methodology to estimating the NGA network WACC, which "leads to different NGA WACC premia in different MSs" and, in addition, "some included in the WACC a compensation for both systematic and non-systematic risks. For example, the risk of a cost overrun on any given NGA project is a non-systematic risk that should not be included in the WACC. Some NRAs also seem to have increased the WACC to provide incentives to invest in NGA networks"[230]. Table 10 below illustrates the different approaches to a risk premium taken by different NRAs at that time, with updates for situations in FR, NL, and PL.

Table 10. The lack of consistency was illustrated by the following overview of approaches by NRAs

MS	NRAs' approaches to risk premium
IT	To estimate the risk premium of NGA networks, the NRA followed real option theory taking into account the "option premium" relative to the "wait and see" and "flexibility" alternatives respectively. The "wait and see" option rewards the investor for uncertainty about future market dynamics, while the "flexibility" option rewards the incumbent for being obliged to guarantee open access to the network (once built) to alternative operators in case of high demand rates. According to the NRA, these risks are not measurable through the beta, and the two options premia cannot be summed together. To price both options, the NRA has used standard financial techniques, such as the Black-Scholes model, the Cox model, and the

[224] Written comments subsequent to the Stakeholders' workshop of 9 June 2021.
[225] Stakeholders' workshop of 9 June 2021.
[226] Ibid.
[227] Set in the Commission 2019/C 375/01 of 6.11.2019 Notice for legacy assets.
[228] The criticism of the methodology by ETNO is detailed in the ETNO Statement on the WACC Notice of the European Commission of 21 January 2021, available at: https://etno.eu/library/positionpapers/420:etno-statement-wacc-ec.html#_ftnref1
[229] Open Fiber response to the Targeted Consultation, Q17.
[230] Brattle Group (2016). *Review of approaches to estimate a reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization*. Final Report, p.105.

MS	NRAs' approaches to risk premium
	Market Asset Disclaimer (MAD) technique, which allow for simulating the value of an asset that has not yet been realized yet and therefore cannot be exchanged on the market. The assumptions include: take-up rates, average revenues by client, the technology used, capital costs, and the probability distribution for each variable. Taking into account different scenarios for the length of the option contract and the payment method, the NRA has estimated an NGA premium of 3.2%, including both options (i.e. "wait and see", and "flexibility").
FR	The NRA applied a premium to both FTTP and FTTC in the period 2018-2020. The premium was calculated in a DCF framework as the add-on to the discount rate such that the NPV of a fiber based network project is zero[231]. Arcep considers a 2% risk premium beyond WACC in its non-normative pricing model for a typical co-investment, and 5% – for a typical line rental.
NL	The NRA applied a 2% premium on the WACC for FTTP until 2019. The NRA eventually removed price controls for fibre access services. Therefore, no premium has been applied since 2020[232].
PL	The NRA determines the risk premium based on benchmarks including those of other EU countries[233]. Cost oriented access in that country is only imposed outside of the 51 districts that were found to be competitive[234].

Source: Brattle Group (2016). Review of approaches to estimate a reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization. Final Report, as well as sources indicated in footnotes.

Harris et al (2016) are of the view that NGA networks face higher systematic risks (i.e. risks that correlate with the broader macroeconomic environment and that investors cannot address by diversifying their investments) than legacy networks due to the following three main reasons[235]:

- Capital leverage
- Long-lived investments with payoffs extending far into the future
- Demand for NGA services is likely to be more sensitive to income

As previously noted, it adds that "non-systematic risks[236] must be dealt with, but in a careful modelling of project cash flows rather than the WACC. For example, a number of demand and cost scenarios should be modelled to account for the risks associated with these parameters"[237].

Annex I, Point 6 of the NGA Recommendation lists factors of uncertainty that NRAs should take into account when assessing the specific risks of NGA deployment. Some of these factors might have both systematic and non-systematic components. For some of those, the

[231] Brattle Group (2021), *Cost of Capital: Beta and Gearing for WFTMR 2021*, 12 March 2021, p.75.
[232] Ibid.
[233] Commission Comments of 22.05.2021 concerning Case PL/2021/2314.
[234] The competitive districts are those (i) counting at least three operators are active in the retail broadband market; (ii) with Orange Polska's retail market share in terms of subscribers below 40%; (iii) a minimum of 65% premises having access to infrastructure of at least three operators; (iv) not more than 10% premises have no internet access. Of the total of 3,099 districts in Poland, these criteria are met in 51. In these districts (i) there were on average 16 operators providing retail broadband services; (ii) Orange Polska had an average share of 13.8% in terms of subscribers; (iv) the average level of network triplication was 72.5%; and (iv) the average service availability was 98.4%.UKE decision DR.SMP.6040.1.2019.
[235] Brattle Group (2016). *Review of approaches to estimate a reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization*. Final Report.
[236] Defined as "project specific risks such as cost and technical risks", p.95.
[237] Brattle Group (2016). *Review of approaches to estimate a reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization.* Final Report, p. 96.

systematic component is more obvious (e.g. demand) than others (e.g. costs, although labour cost might be affected by the overall market performance).

Eleven NRAs also stated that the guidance on factors of uncertainty in the NGA Recommendation on the risk premium was useful for their WACC estimation. Not surprisingly, the majority of the 19 NRAs responding to the question find that a relevant factor is uncertainty relating to demand (see Table 11 below). The other factors of uncertainty were considered relevant by a smaller number of NRAs. Two other factors were also mentioned:

- Regulatory risk and financial risk
- COVID pandemic, which is likely to impact the dynamics of markets, both in terms of retail demand and also in investments (for NGA expansion)

At the same time, one respondent stressed that the deployment risk varies geographically and is due to the high cost of reaching the last 10% of the population because households in rural areas are spread out. This translates into low density and long distances, increasing the cost of deployment. Thus, alternative financing beyond risk premia should be contemplated for that market segment.

Table 11. Listed factors of uncertainty identified by NRAs as being relevant in their respective national market

Factors of uncertainty	No.
Uncertainty relating to retail and wholesale demand	14
Uncertainty relating to market dynamics and the evolving competitive situation, such as the degree of infrastructure-based and/or cable competition	10
Macroeconomic uncertainty	10
Uncertainty relating to the costs of deployment, civil engineering works and managerial execution	8
Uncertainty relating to technological progress	8
Other	2
None	2

Source: Online survey of NRAs. N = 19. Note: this data includes responses from all NRAs responding to the question irrespective of their approach towards price regulation.

Possible gaps in the guidance on factors of uncertainty and their implementation

Factors of uncertainty invoked should be based on evidence to avoid providing an undue economic rent to SMP operators. The FTTH Council reminds us that "It is notoriously difficult to price access in an appropriate manner and bright line decisions on access are far more effective in eliciting investment"[238]. Open Fiber is also flagging the risk of granting rents: "(…) in the presence of infrastructural competition, the application of a risk premium should represent extra remuneration for the incumbent. In case of competition, the VHC network price will be fixed by the fair competition itself"[239].

Possible other gaps in the current guidance as regards the frequency of reviews

Oxera flagged the issue of the periodicity of market reviews – the recommended risk premium approach does not contemplate setting a premium for the whole lifetime of the investments, which extends beyond the period covered by market reviews. TDC NET argues that risk premia "should not be reviewed *ex post* for existing investments made under the assumption that there would be a risk premium. (…) For an investment to be a fair bet, the operator should be allowed

[238] FTTH Council response to the Targeted Consultation, Q17.
[239] Open Fiber response to the Targeted Consultation, Q17.

to enjoy some of the upside benefits when demand turns out to be high or costs low (i.e. be allowed returns higher than the cost of capital) in order to balance the probability that it will earn returns below the cost of capital if demand turns out to be low or costs high. The fair bet principle will be useful to incorporate in a revised recommendation because the risk premium must be seen in the light of the lifetime of the asset. The investor would have assessed possible outcomes and set the return requirement accordingly. Should the return turn out to be in the better end of the possible outcomes, NRAs should not consider removing or revising the risk premium (…) Fair bet means that the risk premium stays in place until it has been proven that the return is better than the pre-investment best case scenario"[240]. Orange[241] also argues that pricing conditions should be transparent and clear from the beginning as well as stable over the lifetime of the investment. Updated parameters should only apply to new investments and with sufficient notice (legal certainty).

Although the Irish NRA does not accept an NGA risk premium in comparison to the legacy WACC, the NRA stated its preferred approach of no "retrospective application". Any "changes made to a specified regulated price following the updated WACC and the review of other parameters would apply on a forward looking basis"[242].

The concern that too-frequent reviews undermine investment incentives seems to be valid. Even so, at some point in time, investors can be assumed to have achieved a reasonable return on their investment – they cannot be entitled to supra-competitive profits forever. Adjustment to current circumstances must eventually be made, but how often remains to be seen.

f. Guidance on the criteria put forward for the assessment of long-term access pricing and volume discounts

Provisions concerned

- Annex I, Point 7 of the NGA Recommendation specifies how to assess pricing in cases of long term contracts with upfront commitments. In addition, Annex I, Point 8 of the NGA Rec. foresees a possibility for volume discounts.
- Recital 188 EECC provides that "in the event that price controls are considered to be appropriate, such terms and conditions can include pricing arrangements which depend on volumes or length of contract in accordance with Union law and provided they have no discriminatory effect".

Did the Recommendation bring about consistency between the practices of NRAs across the EU?

Ten NRAs report that long term access pricing is applied by the SMP operator for the pricing of regulated offers, while only five report volume discounts[243]. Among other considerations, some NRAs report reviewing such pricing based on the guidance. Subjecting volume discounts to the scrutiny of the NRA is supported by Italian alternative operators. For example, the AIIP association argues that "since the aim of such discounts was to reduce investment

[240] TDC response to the Targeted Consultation, Q19.
[241] Stakeholders' workshop of 9 June 2021.
[242] ComReg Document 20/96 Point 7.46, p. 98
[243] Online survey data.

uncertainties and the WACC has the same aim, according to AIIP, there is no need to consider long term pricing and volume discounts"[244].

How effective are volume discounts?

The views on the impact of volume discounts on the deployment of NGA networks are divided, with some convinced of their usefulness to promote fibre deployment and some expressing strong doubts. The latter view corresponds to BEREC's Opinion on the original Draft NGA Recommendation, where BEREC stated that "volume discounts are rather an instrument to foster penetration ("penetration pricing"), so reducing costs leads to the fact that scale is reached more quickly and gains are shared with access seekers. However, this applies not only to new infrastructures, but generally. (…) The level of investment risk is only impacted to a limited extent, if any, by the presence of volume discount schemes to the extent that the investment has already taken place prior to the volumes being purchased"[245].

Finding 6. Only a few NRAs report volume discounts being applied by the SMP operator on the price of regulated wholesale access products. No NRA reports specific evidence of a link between volume discounts and investments in VHCN.

Long-term access pricing

Long-term pricing is reported to have an impact on NGA deployment, at least in some Member States. An NRA found that long term pricing agreements provided crucial support for NGA rollout[246]. The FTTH Council regrets the limited usage of such pricing schemes[247].

However, where conditions of long term pricing must be vetted by NRAs, volume discounts, according to an operator, "should be handled flexibly based on commercial agreements and, if applicable, be monitored by the NRA in each individual case, instead of an NRA setting out "minimum volumes" by area. The conclusion that volume discounts lose their justification in a

[244] AIIP response to the Targeted Consultation, Q32.

[245] BEREC's response to the Targeted Consultation, Q17, which refers partly to BEREC's Opinion on the original Draft NGA recommendation (BoR (10) 25 Rev1_final) which stated, "In contrast, BEREC considers that the main objective of volume discounts is not to reduce the risk of the investment as in the case of upfront commitments, but to stimulate network penetration rate and lower per end user unit costs. The reduction in unit costs occurs because in network industries there is a negative relationship between market penetration and the cost per connection: the higher the penetration, the lower the cost per connection. This means that, in order to minimise cost per connection, a supplier of NGA access will want to expand the network volume by encouraging buyers to purchase more lines. The introduction of volume discounts schemes is one way of incentivising buyers, whereby part of the achievable benefits of scale of the investor is shared with the operators purchasing access. However, this reasoning does not only apply to FttH as stated in Annex I. 18. In BEREC's view, the level of investment risk is only impacted to a limited extent, if any, by the presence of volume discount schemes to the extent that the investment has already taken place prior to the volumes being purchased. Potentially there could be an indirect impact on investment risk to the extent that an investor has certainty prior to the investment taking place that volume discounts will be allowed in principle, whereby the investor could expect that network penetration rates and total turnover will be higher than in case when such discounts are *ex ante* prohibited".

[246] An NRA's response to the online survey,

[247] FTTH Council response to the Targeted Consultation Q32, "Lower prices would be charged for long-term agreements with volume guarantees because the access seeker takes on some of the risks associated with uncertain demand and willingness to pay. Higher charges for short-term 'pay as you go' access services would then compensate the access provider for bearing greater levels of risk. However, such differentiated charging options so far do not seem to have been explored to any great extent".

more mature market appears counterintuitive, given the benefits of volume commitments for both sides and the continuous risk of investing in a multi-platform environment"[248].

Finding 7. A significant number of NRAs report the use of long-term pricing agreements in their respective Member States. Some say that these long-term commitments have supported NGA deployment.

Possible gaps

The Polish NRA notes the difficulty of accounting for "such long-term pricing and volume discounts in the case of FTTH (…) in the ERT tool"[249]. An NRA argues that factoring in long-term pricing and volume discounts in the ERT could result in squeezing out smaller operators, since it is usually large operators that have such volume discounts or long-term pricing. The NRA therefore favours using the regular price and not long-term pricing in ERT[250].

Oxera advocates that "a clear framework should be set out in order to reflect the differences in risk in a fair and robust manner, and to avoid price differentials resulting in distortions to competition or anti-competitive foreclosure (…) Furthermore, additional guidance will be needed to ensure that any price differentials do not result in distortions to competition. In particular, where access prices may vary between different access seekers, there must be sufficient additional protection in the form of obligations not to engage in a margin squeeze"[251]. In the case of vertically integrated operators, Oxera pleads for a "clearly defined *ex ante* economic replicability test"[252]. Oxera also says that further guidance would be welcome on what assumption should be made in any *ex ante* economic replicability test regarding the level of volume commitment that an equally or a reasonably efficient operator (EEO/REO) could make in the presence of volume commitment discounts.

Conversely, some operators plead for more flexibility and advocate a case-by-case assessment[253]. ETNO[254] argues that the ERT should not prevent the SMP operator from sharing some of the investment risk by differentiating wholesale access prices according to the access seekers' level of commitment by limiting long term pricing discounts.

By contrast, ECTA argues that as there is no longer an investment risk in deploying FTTN/VDSL, even in less densely populated areas, the possibility for applying considerations to long-term access pricing and volume discounts should be removed. However, it also "considers that the criteria set out in these sections for assessing long-term access pricing and volume discounts contain important safeguards against abusive practices by SMP operators notably by addressing the danger of these operators charging their retail arms lower than

[248] Deutsche Telekom response to the Targeted Consultation, Q32.
[249] UKE response to the Targeted Consultation, Q32.
[250] A comment during the NRA workshop.
[251] Oxera response to the Targeted Consultation, Q32.
[252] This concern is shared in an operator's response to the Targeted Consultation: "langfristige Zugangspreise sowie Mengenrabatte nur dann zulässig sind, wenn über einen angemessenen Zeitraum eine hinreichende Gewinnspanne zwischen Vorleistungs- und Endkundenentgelten besteht, die einem effizienten Wettbewerber den Markteintritt im nachgeordneten Markt ermöglicht".
[253] Telefonica response to the Targeted Consultation, Q32. Meanwhile, Orange responding to Q32 of the Targeted Consultation stresses that "prices must be flexible" and that guidance on the topic will also be provided by BEREC as regards co-investments under the Code. Orange therefore pleads to avoid overlaps.
[254] ETNO response to the Targeted Consultation, Q10.

regulated prices, including prices below cost. These criteria should therefore be maintained. ECTA suggests that individual elements (e.g. the setting of single discount levels) should see a thorough evaluation in view of current NRA practices"[255].

g. Guidance on the implementation of an ERT

Provisions concerned

- The NDCM Recommendation (Points 48 and 49 as well as Recital 67) provides that NRAs should remove cost-orientation obligations where the SMP operator is subject (i) to a non-discrimination obligation consistent with Equivalence of Input (EoI) or to alternative obligations relating to the technical replicability of retail products in cases where EoI has not been fully implemented, (ii) obligations relating to technical replicability and (iii) obligations relating to economic replicability, if two additional requirements are met:
    a) In cases of active NGA access products, a competitor is provided with sufficient upstream and regulated passive (or similarly functioning active) access products, or alternative infrastructures are available and create a demonstrable retail price constraint
    b) In cases of passive NGA access products, the SMP operator offers copper access at cost-oriented, controlled prices, or there are alternative infrastructures that exercise a demonstrable retail price constraint.
- Moreover, the NDCM Recommendation provides guidance on how to design and conduct the ERT (in particular in Point 56).
- Under Art. 74, EECC NRAs shall consider not imposing or maintaining a cost-oriented price obligation where they establish that a demonstrable retail price constraint is present and that access and non-discrimination obligations imposed (including, in particular, any economic replicability test imposed) ensure an effective and non-discriminatory access.
- In parallel, Recital 193 EECC embodies the underlying rationale for price flexibility, which was until then only provided in the NDCM Recommendation: "to prevent excessive prices in markets where there are undertakings designated as having significant market power, pricing flexibility should be accompanied by additional safeguards to protect competition and end-user interests, such as strict non-discrimination obligations, measures to ensure technical and economic replicability of downstream products, and a demonstrable retail price constraint resulting from infrastructure competition or a price anchor stemming from other regulated access products, or both".
- In December 2014, BEREC issued a guidance paper on the regulatory accounting approach to the economic replicability test (i.e. *ex ante*/sector specific margin squeeze tests)[256] to assist NRAs from the regulatory accounting point of view on how to understand and deal with the relevant provisions of the NDCM Recommendation.
- In parallel, CRA issued a report on 'Economic Replicability Testing for NGA Services – A consistent and proportionate approach to promote efficient investment and safeguard

[255] ECTA response to the Targeted Consultation, Q33.
[256] BoR (14) 190

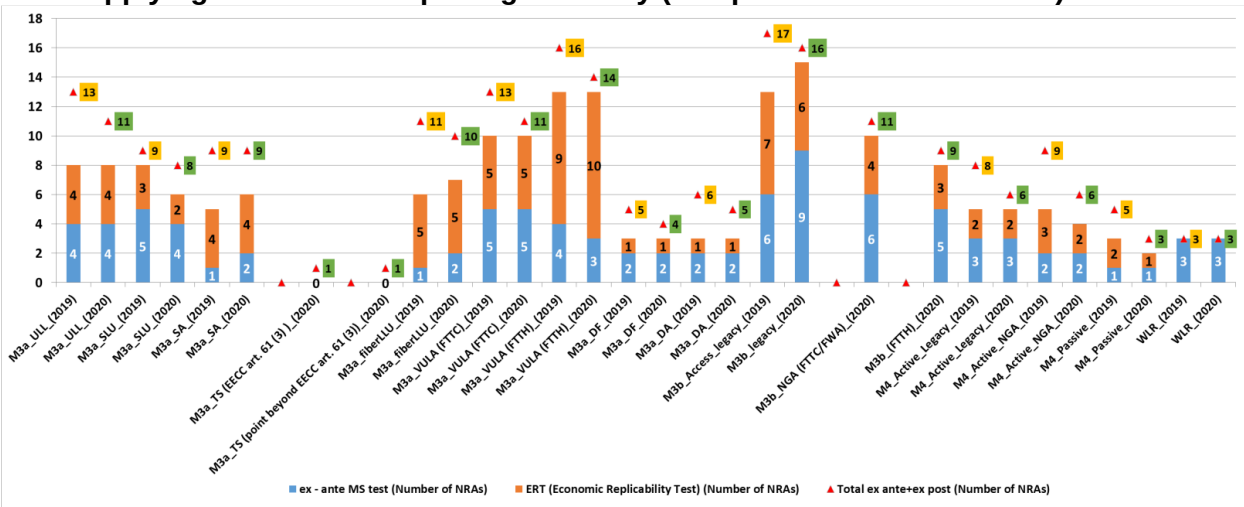
competition'[257] commissioned by ETNO. This report does not contain guidance supported by the Commission or BEREC, but we mention it nonetheless because a number of issues raised by CRA were repeated on the occasion of the Targeted Consultations and in response to the online survey.

A word about terminology

A word about terminology is in order. In this chapter we use the term *ERT* to refer to an *ex ante* margin squeeze test used to implement pricing flexibility, in the sense meant by the NDCM. We refer to any other *ex ante* use of a margin squeeze test only as an ex ante MST. We refer to the use of a margin squeeze test by the national competition authority as an ex post MST.

BEREC NRA survey data concretely demonstrate that NRAs make extensive use of *ex ante* MSTs, but only a few use the ERT as an alternative to price control in the sense meant by the NDCM (because only a few have implemented pricing flexibility). In Figure 14, BEREC compares 2020 survey results to those of 2019.

Figure 14. NRAs applying a retail ex ante MST as a complement to price control versus those applying ERT to enable pricing flexibility (comparison of 2019 to 2020).



Source: BEREC (2020), "BEREC Report: Regulatory Accounting in Practice 2020", BoR (20) 210.

Did the guidance from the NDCM Recommendation lead to a consistent application?

As mentioned above, only a limited number of NRAs use an economic replicability test in in the absence of price control obligation. The NRAs concerned seem to apply the remedy in line with the guidance provided. "Since 2014, ILR allowed the SMP operator to perform an ERT for its NGA wholesale access products if he respects an equivalence of inputs model (non-discrimination remedy) and if he publishes a technical replicability test (transparency remedy). ILR's experience showed that the regulated copper anchor wholesale cap worked on the retail market and that alternative operators are now switching their activities from copper LLU and bitstream services to fibre unbundling. The SMP operator also continued its fibre roll-out while using the pricing flexibility for its wholesale access prices (in both ways, heightening and

[257] CRA report of 18 March 2015, available at: https://www.etno.eu/datas/publications/studies/FinalCRAreport_18032015.pdf

lowering access prices). The experience gathered by ILR showed that the combination of all the regulatory measures (ERT, EoI, technical replicability test and copper anchor) lead to a well-balanced and predictable regulatory framework for the stakeholders in terms of competition, non-discriminatory access and fiber roll-out"[258]. Meanwhile, "for FTTH VUA and Bitstream, in line with the main objectives of the NDCM recommendation, ComReg took a more flexible approach whereby the incumbent is subject to a Wholesale and Retail Margin Squeeze Test along with a Price Floor. ComReg decided to continue to allow the SMP Operator pricing flexibility on FTTH-based VUA, subject to the obligation not to cause a margin squeeze. It was noted that, given cost and demand uncertainties, the FTTH price was likely to be very sensitive to the FTTH service take-up rate, such that an incorrect forecast could distort future market developments. If the price is too high, it may deter actual or potential purchasers of FTTH-based VUA from purchasing, and if the price is too low, the SMP Operator and, indeed, other infrastructure investors may reduce their investments in FTTH. ComReg considers this approach to have had a positive impact. Roll out of high capacity networks has continued (in Ireland) at pace over the last number of years over a number of different platforms. Multiple operators continue to invest in NGA/VHCN including the incumbent. ComReg considers that competition has been promoted at both retail and wholesale levels"[259]. In Spain, since 2018, "the SMP operator who sets the prices for [WBA] freely, with the only restriction of meeting the ERT"[260]. The Polish NRA says that "economic replicability tests taking account of the principles derived from NDCM Recommendation are currently under design"[261]. However, the test will be implemented as a non-discrimination remedy and applied on top of the cost-orientation obligation[262]. These comments should nevertheless not obfuscate the fact that in most cases, the access products subject to ERT were previously not subject to pricing remedies. Pricing flexibility is therefore not necessarily a successor remedy of pricing remedies. In the online survey, 8 NRAs responded that the guidance on the implementation of ERT provided in the NDCM Recommendation is likely to continue to be adequate to deal with future technological and market evolution, while only 3 disagreed (11 others could not answer the question).

Finding 8. Where NRAs apply flexibility, they tend to follow the guidance provided and consider that the guidance provided in the NDCM Recommendation will likely continue to be adequate to deal with future technological and market evolutions.

Effects of the application of ERT by NRAs

BEREC points out that while "pricing flexibility is an important factor for investing in new technologies, (…) other conditions must be met too to make a business case for the operator/investor, namely the willingness to pay of users (demand side) as well as a general environment conducive to investment, i.e. general economic conditions and competitive pressure (supply side). Pricing flexibility alone is not enough"[263].

In general, there is indication that in countries that applied the recommended pricing flexibility or those which previously applied only a margin squeeze test, NRAs consider that the

[258] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q9.
[259] Idem, Q11.
[260] Idem, Q11.
[261] UKE response to the Targeted Consultation, Q6.
[262] Case study interviews.
[263] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q11.

approach has contributed to promoting efficient investment in NGA/VHC networks, leading to an increase in NGA/ VHC networks and better quality of service for end-users. The competitive safeguards accompanying pricing flexibility have effectively protected competition according to several NRAs[264].

Finding 9. NRAs applying the recommended pricing flexibility or those that applied a margin squeeze test instead of cost orientation, consider the approach to have contributed to promoting efficient investment in NGA/VHC networks, leading to an increase in NGA/VHC networks and better quality of service for end-users.

Possible gaps

Among the NRAs applying margin squeeze tests, a number of difficulties in designing the tests and possible gaps in the current guidance were suggested:

- The Polish NRA advocates clarifications to the NDCM Recommendation (Annex II) regarding the implementation of the Discount Cash Flow (DCF) approach to the ERT tool and the issue of including in the ERT tool quantity discounts or long-term agreements on prices concluded between the SMP operator and entities access seekers[265].
- The Lithuanian NRA experienced some difficulties in implementing the test, because there were debates about some parts of the test itself. Stakeholders report that there are still debates ongoing regarding interpretation of the various parameters of the test[266]. Telia reports that the lack of clarity on the interpretation/calculation of the parameters negatively impacts regulatory certainty and competitive environment. Telia indicates that the Access Recommendations as well as BEREC guidelines lack more specific information on the conditions for ensuring equal competitive grounds, e.g., whether it is sufficient that an ANO has a return on investment equal to the SMP operator, and whether ANOs service provided over Telia's wholesale access product must be as profitable as the service provided by the SMP operator[267]. An alternative operator reports being very concerned with the pricing of wholesale central access – they claim it is not possible for them to provide a competitive retail price using bitstream. They have noticed that when Telia launched a promotional offer early 2020, the prices of wholesale central access were aligned only in the Autumn of 2020, leaving them subject to a margin squeeze for several months[268].
- One NRA reports that all aspects of the NRA's margin squeeze model have been debated and subject to redesigning with SMP operator. In addition, since individual discounts are not part of the test margin squeezes cannot be ruled out. Moreover, margin squeezes on products other than the flagship products are still possible, says the NRA[269].

[264] Online survey responses.
[265] Polish NRA response to the Targeted Consultation, Q10.
[266] Case study interviews.
[267] Written answer provided by Telia on 29.04.2021.
[268] Case study interviews.
[269] For that reason, in the response to the Targeted Consultation, Q10, Open Fibre advocates to abandon the 'flagship product' approach which "allows the SMP operator to use a different strategy for other promotions that are no classified as "flagship products" in order to avoid the replicability test".

- An NRA claims that, in its country, MSTs are not practicable because some retail prices are so low as the result of competition between network owners in major cities that there is not a sufficient margin between the regulated cost-oriented wholesale price and the retail price.
- Another NRA claims that some products, like co-location, are less suitable for ERT since the SMP operator itself does not buy them.
- Still another NRA reports that different contractual conditions of the constituting elements of bundles created difficulties for classifying of bundled offers, for example, when the bundles contain services provided by third parties (e.g. Amazon or Netflix). The lack of verified information beyond replies to requests for information from the operators on the costs of such services renders the outcome of the margin squeeze test uncertain. In the same vein, the NRA raises the issue of information limits provided by alternative operators for making adjustments to the EEO test. The NRA also makes a point about the convergence of fixed and mobile networks, which will be driven by 5G deployment. Network convergence will affect retail markets and, as a consequence, could require updated guidelines, in order to take into account the costs faced by a converging (fixed and mobile) operator at wholesale level and innovative offers including fixed and mobile services in bundle with other services at the retail level.
- An NRA also reported that adjustments to the EEO test were challenging due to difficulties in defining the appropriate efficiency level and possibly due to the need to recalibrate data from operators. Other considerations linked to bundled products (e.g. valuing the mobile services) also make the exercise more difficult.
- Issues were also identified regarding hybrid retail bundles encompassing unregulated products and applying adjustments to EEO costs.
- An NRA also suggested that modelling an equally efficient operator (EEO) may be problematic if other operators cannot achieve the same efficiency as the SMP operator.
- According to Annex II NDCM Recommendation, "the reasonably efficient scale identified by the NRA should not go beyond that of a market structure with a sufficient number of qualifying operators to ensure effective competition, bearing in mind also competition from other platforms". However, a 'sufficient' number can be lower than the optimum number. The NRAs should have the possibility, when designing their ERT, to give enough economic space for more operators, and in particular new entrants.[270]
- According to an NRA, factoring in long-term pricing and volume discounts to determine the wholesale prices used in the ERT may squeeze out smaller operators, as it is the large operators that mainly use long-term pricing and volume discounts.[271] However, the concrete effects will depend on specific market circumstances.

According to Deutsche Telekom, regulation using retail pricing as a parameter necessarily affects the commercial room of manoeuvre of the regulated operator in the market for very high capacity broadband services. At the current market stage, the willingness to pay for VHCN is limited on the retail market. Every operator should accept reduced margins in this early adopting stage of the market. Therefore, restricted replicability in VHCN during the first years of an investment should be allowed[272].

[270] A comment during the NRA workshop.
[271] A comment during the NRA workshop.
[272] Deutsche Telekom response to the Targeted Consultation, Q10.

Moreover, Deutsche Telekom points to the following elements which it considers as having merit for consideration[273]:

- Relevant downstream costs:
    a) Economies of scale are a key factor for efficient downstream costs. When adapting the parameter of the EEO, the ERT should consider at most the downstream costs of an operator with a sufficiently large scale[274].
    b) Economies of scope: give NRAs the flexibility to exclude common costs from relevant costs within the ERT[275].
- Relevant Wholesale inputs and the relevant reference prices: Risk and demand sharing commercial models as well as co-investment models should be fully incorporated in and actively promoted by the ERT. These are crucial to enable the spread of VHCN in particular.
- Relevant Retail products: Any new guidance on the ERT should maintain and enhance the focus on flagship products[276]. The focus on flagship products helps to maintain the feasibility of the ERT. Ideally the ERT focuses on one flagship product which can serve as an anchor for the market.
- Relevant time period[277]: VHCN investments mean a considerable capital outlay by the investing operator. Therefore, the multi-period analysis should be expanded to better reflect the investment cycle. Due to long refinancing periods, the average lifetime of customers on a VHCN should be the minimum threshold, with flexibility to exceed this period.

As regards the Regulated wholesale inputs, Telefónica[278] considers that the NRA should consider "all the most relevant regulated inputs used or expected to be used in a forward-looking perspective so that the wholesale input is aligned with the competitive situation and with the geographic analysis. The foreseen updated Recommendation should encourage NRAs to define a wholesale reference input, taking into account the level of competition in the different geographic areas (considering the presence of infrastructure competition in such an assessment), and therefore consistent with the market analysis".

[273] Idem, Q10.
[274] ECTA response to the Targeted Consultation Q10 completely disagrees and advocates using the retail costs of "a generic (alternative) operator which does not (yet) have the scale of the SMP operator".
[275] In the same vein, the Telefonica response to the Targeted Consultation, Q10 advocates that in those countries where infrastructure competition is bearing fruit, ERT should factor this into the cost calculation. Network operators have an overall network cost lower than if they were simply using regulated access i.e. they are well below the regulated VULA price.
[276] Telefonica concurs in its written feeback to the Stakeholders' workshop: "The future Recommendation should clarify that NRAs must not aggregate retail products into baskets that do not represent any specific offer. Such practices have led to significantly inconsistent regulatory standards across Member States".
[277] Telecom Italia response to the Targeted Consultation, Q10 says that the relevant time period should be at least 36 months, as has already done in several European countries.
[278] Written feedback to the Stakeholders' workshop of 9 June 2021.

Dealing with retail product bundles

The issue of difficulties when dealing with bundled offers is also raised by one operator[279]: how to fix the parameters of an ERT in cases where bundles include a mobile component, since the incremental mobile cost is mainly a variable cost. (Similar considerations would presumably apply to other unregulated components of a flagship bundle.) Moreover, the operator considers that using an average ARPU over the customer's lifetime does not reflect a typical business practice, which is to apply discounts at the beginning of the contract.

We note divergent approaches to bundles. For example, the Croatian NRA carried out[280] until 2019 the ERT separately both for each relevant retail product sold in isolation and for bundles (portfolio assessment). Since 2019, only a product-by-product assessment is conducted. When unregulated retail services are included in a bundle and these retail services are also offered as standalone products (e.g. SAT TV, mobile broadband internet access), the retail price of the standalone products is deducted from the revenue of the bundle. For unregulated services that are not offered as standalone products (e.g. IPTV content out of a basic package), the cost is estimated using the LRIC+ method (and adjusted for a 15% market share assumption)[281]. In Luxembourg, where the bundle involves products from other markets which may or may not be available to competitors, the revenues and costs of such additional services are removed from the economic replicability calculation or are simply not included[282].

The NDCM Recommendation does not specify the level of aggregation of retail products to run the ERT for each flagship product individually or for a portfolio of flagship products identified. In 2014, BEREC[283] had identified that a majority of NRAs applied both product-by-product and portfolio approaches (the aggregation of products approach was used in particular by OFCOM at the time[284]). In assessing both approaches, BEREC recognises that there may be efficiency gains that could be achieved through a portfolio approach because it provides more pricing flexibility for the incumbent at the retail level. On the other hand, a product-by-product approach ensures that each retail product is replicable instead of only the portfolio of products as a whole. BEREC does not favour or exclude one or the other approach.

In 2014, the Commission commented on the ERT aspects of Luxembourg NRA's Article 7 submission, expressing the concern that it "would risk overly limiting the flexibility and amount to a de facto *ex ante* price regulation"[285] and could be disproportionate. However, no similar comment was made to Croatia or Slovenia. Conversely, the Commission commented[286] on the initial proposal of the Maltese NRA to apply a fully aggregated test, stating that this approach could disadvantage access seekers that only compete with some flagship products, as well as new entrants or small-scale access seekers.

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[279] Iliad response to the Targeted Consultation, Q10. Telecom Italia in response to the Targeted Consultation Q10 concurs: "the ERT obligation [sh]ould be imposed only in non-competitive areas and where the price control obligation is withdrawn".

[280] MST methodology adopted in July 2014 (Case HR/2014/1624) and modified in November 2016 (HR/2016/1930)

[281] Commission No-Comments Letter of 8.112019 concerning Case HR/2019/2206

[282] The method can be illustrated as follows: if a broadband internet subscription is priced at 40€/month and telephony as standalone is sold at 30€, whereas the bundle price is 63€, a rebate of 7€ is identified. 4/7 of this rebate is allocated to the internet broadband subscription and 3/7 to the telephony. See ILR, Principles and methodology of the margin squeeze testing approach (economic replicability test) in Luxembourg.

[283] BEREC (2014), *Guidance on the regulatory accounting approach to the economic replicability test (i.e. ex ante/sector specific margin squeeze tests),* BoR (14) 190, 5 December 2014, p. 24 and p. 36.

[284] In Malta, the aggregate test is supplemented by specific tests for standalone residential and business broadband products

[285] Commission Decision of 4.04.2012 concerning Case LU/2014/1633.

[286] Commission Decision of 9.12.2015 concerning Case MT/2015/1803.

An NRA also noted that while the product-by-product and portfolio approaches are mainly discussed in light of retail products, it may also be relevant for the wholesale side of ERT, especially if there is differentiation between urban and rural areas in the wholesale but not the flagship product. How to approach such situation is not clear from the guidance.[287]

Which wholesale price should be used when long term and volume discounts are available?

A key parameter to determine the wholesale prices used for the test is the scale adjustments applied by the NRAs when applying the Similarly Efficient Operator (SEO) standard. The lower the level at which the assumed market share is fixed, the more this will decrease the margin of the SMP operator to share investment risks by granting discounts linked to volume and long-term commitments, given that such discounts will always need to leave sufficient economic room for (smaller) alternative operators preferring to order line by line.

According to the Croatian NRA[288], several NRAs tend to apply drastic scale adjustments, as outlined in Table 12.

Table 12. SEO market shares of selected countries

Country	SEO market share
Greece	16%
Norway	20%
Luxembourg	15%
Cyprus	20%
Belgium	15%
Ireland[289]	25%

Source: Commission's no-comments letter of 8 November 2019 in Case HR/2019/2206, p.3

Should a price floor be considered?

Open Fiber[290] argues that current guidance does not take into proper account the need to provide incentives to invest and to guarantee not only a competitive retail market, but also a competitive wholesale market. They see a need for the introduction of a specific wholesale replicability test where alternative operators have already made investments or are about to start them. Such a test should identify an efficient minimum wholesale price on a case-by-case basis. The wholesale replicability test should guarantee a higher remuneration for FTTH services compared to services based on copper or hybrid solutions. They argue that the Commission should set the principles of the wholesale replicability test[291]. However, rather than a wholesale MST, the measure advocated seems rather to be a wholesale price floor.

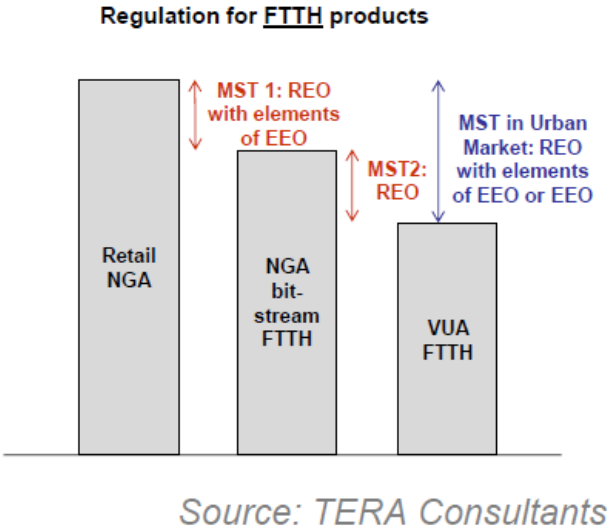
With similar concerns in mind, another operator recalls "that the proper functioning of an ERT has yet to be assessed in the context of co-investment schemes, given its potential detrimental

[287] A comment during the NRA workshop.
[288] Quoted by the Commission in its No-Comments letter of 8.11.2019 concerning Case HR/2019/2206, p.3.
[289] Comreg, Pricing of Eir's Wholesale Fixed Access Services: Response to Consultation Document 15/67 and Final Decision,
[290] Supported by the FTTH Council, response to the Targeted Consultation, Q10.
[291] Open Fiber response to the Targeted Consultation Q10 provides a best practice: the Italian NRAs Del. 348/19/CONS, which encompass "a replicability wholesale test in order to prevent any anticompetitive behaviours in terms of prices /margin squeeze at the wholesale level, ensuring competitiveness on the market and encouraging the wholesale migration from the legacy copper network to fiber network. However, AGCom has not set any specific criteria and methodologies for the application of the wholesale test".

impact on either VHCN roll-out incentives or retail markets' take-up".[292] Oxera[293] concurs that price floors may be justified to avoid the risk of predatory or discriminatory pricing which could affect infrastructure rivals. They say that the UK NRA has adopted an approach based on these principles when it prohibited Open Reach from offering geographic discounts on its superfast broadband wholesale services and required providing at least 90 days' notice of the introduction of certain commercial terms (such as volume discounts) that might prevent retail ISPs from using competing networks, thereby stifling investment and allowing Ofcom to assess those deals before they took effect. According to Eurofiber[294], in this regard price floors are an underused regulatory tool despite their usefulness to promote infrastructure competition.

In Ireland, the NRA imposed[295] a wholesale MST between the FTTH Wholesale Local Access product (VUA) and Wholesale Central Access (FTTH bitstream) products (MST2 in Figure 15 below) in order to encourage investment. The aim is to allow other access seekers to invest with confidence in their own core network facilities and purchase the WLA product without fear that (once their own costs are added) they will be undercut by the WCA product. The SMP operator must notify VUA price decreases to the NRA three months prior to changes and publish them two months in advance, while the NRA must be notified of price increases four months prior to changes and be published two months in advance.

Figure 15. Regulation for FTTH products



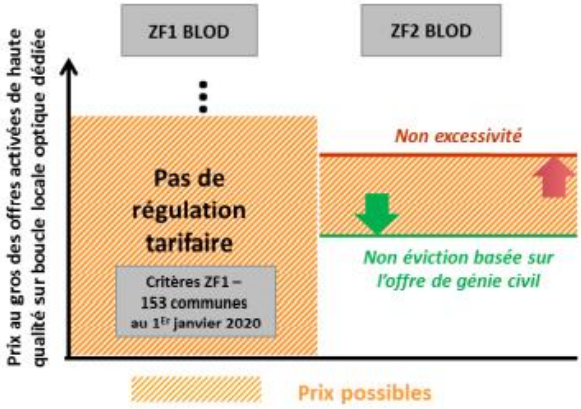
Source: Tera Consultants, Report on the determination of appropriate costing and pricing methodologies for VUA and NGA Bitstream, September 2018, p. 73.

In France, in order to ensure an economic space between CEI access and dedicated fibre access in market 2/2020, a wholesale MST (*obligation de non-éviction*) was mandated in

[292] Orange response to the Targeted Consultation, Q10.
[293] Stakeholders' workshop 9 June 2021.
[294] Ibid.
[295] Comreg Decision D11/18, 19/11/2018, Pricing of wholesale broadband services - Wholesale Local Access (WLA) market and the Wholesale Central Access (WCA) markets, Response to Consultation Document 17/26 and Final Decision, point 5 'Wholesale Margin Squeeze Obligation', p.365 and Commission Decision of 10 October 2018 concerning Case IE/2018/2115

certain areas ('copper areas 2')[296] until the last market review[297] - the green arrow in Figure 16 below.

Figure 16. Wholesale MST in France



Source: ARCEP, Decision no 2020-1448 of 15 December 2020, p.88.

Currently, the French NRA still applies a wholesale MST on high quality access based on FTTH for services provided to business customers between passive access provided by the SMP operator and its wholesale active offers[298]. In France, the NRA distinguishes mass-market products that serve residential customers from mass-market products that serve business customers. For the former, the NRA does not impose additional access obligations on the SMP operator other than the symmetric obligations that apply to all operators (in principle up to the first concentration point). For the latter, the SMP operator (Orange) must, among other obligations, continue to make available a wholesale resale access offer (*Offre de gros en marque blanche*) on its FTTH infrastructure that operators serving only business customers can commercialise at retail level. This obligation is coupled with the aforementioned wholesale MST[299].

In Italy, NRA requested the SMP operator, when seeking to grant discounts on the regulated wholesale prices set in the market review to seek the prior approval from NRA[300], despite doubts expressed by the Italian competition authority[301].

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[296] Areas in which LLU had been implemented less than 7 years before and where at least one of the operators using ULL was offering wholesale bitstream in competition with the SMP operator.
[297] ARCEP, Decision no 2020-1448 of 15 December 2020, p.85.
[298] Idem, p.92.
[299] "obligation de pratiquer des tarifs non évictifs par rapport aux offres activées qu'un opérateur efficace pourrait proposer sur la base des offres passives proposées (…)", Décision n° 2020-1446 of 15 December 2020, p.147.
[300] Art. 49 Delibera N. 348/19/CONS, Approvazione di offerte con riduzione di prezzo wholesale, available at: https://www.agcom.it/documents/10179/15564025/Delibera+348-19-CONS/1fe1fd57-1b27-4755-bfd6-89455e12ce09?version=1.0 However, Open Fiber notes that it "has not set any specific criteria and methodologies for the application of the wholesale test, unlike it did for the retail one" (Targeted Consultation, Q10).
[301] "L'AGCM inoltre rileva che il fondamento normativo di tale test di prezzo non è l'obbligo di non discriminazione, come dimostrano le circostanze relative alla concorrenza tra operatori che si autoproducono l'intera catena impiantistica dei collegamenti FTTH. L'AGCM rileva che in tali circostanze la definizione di una soglia minima di prezzo ex ante potrebbe determinare anche rischi di distorsione della concorrenza, in quanto potrebbe comportare un incremento dei prezzi per i concorrenti e per i consumatori, limitando al contempo la capacità competitiva di un solo operatore. L'AGCM poi evidenzia che le eventuali variazioni in diminuzione dei prezzi dei servizi wholesale liberamente adottate da TIM rispetto all'OR sono rare e, come tali, efficacemente assoggettabili allo scrutinio antitrust" (Delibera N. 348/19/CONS, p. 73).

The Czech NRA[302] applies a wholesale MST, called an 'economic space test', which aims at ensuring an appropriate margin between the wholesale broadband local access price and bitstream prices. The test is disaggregated[303] into two groups (i) NGA local access (FTTx and VULA and (ii) non-NGA services (copper LLU).

Considering that alternative operators are increasingly deploying broadband infrastructures, other NRAs may follow this trend and raise the risk of an emergence of varying methodologies.

Transparency of the process and monitoring

The Italian association AIIP argues that the ERT should be carried out by NRAs in a transparent way[304] and in a procedure open to the incumbent's competitors. Moreover, the full test should be published. ETNO[305] recalls the importance of regulatory stability and certainty: the NRA should not modify its methodology or those parameters employed in the test retroactively[306] while full transparency in the methodology applied by NRA must be a pre-requisite prior to the implementation of the test.

In response to a BEREC consultation, an Italian operator listed[307] elements of the transparency that the consultants from Oxera deemed necessary in order to allow stakeholders "to challenge the methodology and to help the NRA in monitoring its compliance":

- How a reasonable return on capital is accounted for in estimating downstream costs
- How regulatory accounts and the reference offer are used to measure network costs related to the non-regulated component of the test
- What the different levels of aggregation (or "families" in the DCF portfolio test) are
- What revenues and costs are included in the wholesale, non-regulated and retail components in each test
- How the NRA verifies the accuracy of the forecast data provided by the test
- What actions or regulatory remedies are envisaged in case the SMP operator fails one or more parts of the test.

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[302] Following the legal separation between the wholesale arm (CETIN) and retail arm (O2) of the SMP operator, the latter has an interest in maximizing its sales of services with a higher added value by O2 at the expense of the sales of wholesale services by CETIN. The economic space test between pricing on both markets is designed to guarantee appropriate price levels in both markets. Source: ČTÚ Decision REM/3a/05.2018-03 of 15 May 2018.

[303] NRA does not use a portfolio approach because of the low level of use of FTTH deployment of fibre networks and generally NGA networks in the provision of wholesale services. An aggregate assessment of economic replicability would thus be predominantly influenced by the prices of services for access via copper lines and thus could mask the possibility of disproportionately high prices for emerging FTTH based access.

[304] AIIP response to the Targeted Consultation, Q10. Vodafone response to the Targeted Consultation, Q10 also considers that "a more efficient and consistent use of the economic replicability test requires more transparency in the moment of designing the tool". Telefonica response to the Targeted Consultation Q10 agrees: "The calculations applied in the process followed by NRA to determine feasibility of a retail product must be accessible and transparent in order to let SMP operator to double-check calculations while avoiding discretional and unjustified changes in the parametrization. Aligned with this, the SMP operator might have in advance all the information, methodology and parametrization of the ERT in order to perfectly assess how those changes in retail offers might impact in the result and accordingly in variations over the wholesale price".

[305] ETNO response to the Targeted Consultation, Q10.

[306] It is also in line with Telefonica's response to the Targeted Consultation, Q10.

[307] Contribution to the Public Consultation on the Draft BEREC Guidance on the regulatory accounting approach to the economic replicability test (i.e. exante/sector specific margin squeeze tests) [BoR (14) 123], BoR PC05 (14) 07 Annex.

Finding 10. NRA approaches regarding the transparency of the process of designing the ERT/MST vary and transparency is alleged to be unsatisfactory by some operators. Transparency should address a number of key factors imbedded in the methodology, such as verification of forecast data accuracy, measures in case of failure, etc.

Monitoring is another aspect where substantial differences exist across the EU as noted by the Albanian NRA in 2018[308] based on data from Cullen International (provided in Table 13). One can assume that the situation has not evolved substantially since the data were collected for Table 13.

Table 13. Approaches to ERT monitoring

MS	Periodicity	Deadline for NRA decision	What happens if the test fails?
AT	NRA examines compliance once per year. The SMP operator must inform ANOs in advance to allow them to replicate A1TA retail offers: four weeks before introducing new prices (including promotion discounts), in other cases 8, 12 or 16 weeks.	Not applicable	Adjustment of retail and/or wholesale prices. NRA may set wholesale prices and/or order operator to stop charging retail prices that cause price squeeze.
BE	*Ex ante* as part of the approval of wholesale tariffs. *Ex post* after the launch of a new retail product that likely will be considered a flagship product.	Unspecified	Adjustment of retail and/or wholesale prices at the discretion of the operator. (Principle 15 of BIPT PST guidelines)
HR	Before launch of retail offer 8 working days before. Reduced from previously applicable 45 days by HAKOM decision of Dec. 7, 2015.	Tacit approval. No deadline.	Adjustment of retail and/or wholesale prices. The NRA would issue an obligation for the SMP operator to allow for a sufficient margin, by either increasing the retail price or decreasing the wholesale price. If the SMP operator proceeded to launch the offer, HAKOM would revoke it. HAKOM decision of Jan. 18, 2017 required HT to stop offering bundled offers that do not comply with the updated PST test within 8 days from receiving the decision.
DK	After launch of retail offer Every 6 months ERST will identify the flagship products to be covered by the test	Tacit approval	Adjustment of retail prices. The SMP operator is, however, allowed to lower its prices to meet those of its competitors, even if it results in a price squeeze on flagship products. After the competitors have raised their prices, the SMP operator must adjust its retail prices within 2 months to eliminate a price squeeze.
IT	Before launch of retail offer 30 days before.	Tacit approval	Adjustment of retail prices. TIM would need to notify a modified retail offer.

[308] AKEP, Rregullimi i tarifave të sipërmarrësve me FNT në tregun me shumicë të aksesit dhe origjinimit të shërbimeve celulare, 1 October 2018.

MS	Periodicity	Deadline for NRA decision	What happens if the test fails?
	AGCOM can extend the deadline subject to more specific rules.	Within 30 days	
LV	Other: Within 12 months after the PST obligation has been imposed on the SMP operator. Within 3 months after the SMP operator has published its access reference offer or changed its access tariffs. Within 3 months after the SMP operator has announced changes to the flagship product or its tariffs. If SPRK wants to check whether or not the operator's access tariffs are cost oriented.	No deadline. Operator not required to wait for NRA decision	Adjustment of retail and/or wholesale prices at the discretion of the operator
NL	Before launch of retail offer. KPN must do the test before product launch. Every quarter a report has to be sent to ACM. ACM may investigate in cases of doubt or complaints.	Tacit approval. No deadline. Operator not required to wait for NRA decision.	Adjustment of retail and/or wholesale prices at the discretion of the operator.
PT	Before launch of retail offer. Ten days before.	No deadline. Operator not required to wait for NRA decision	Adjustment of retail and/or wholesale prices. The incumbent may choose to adjust retail and/or wholesale prices but in practice adjusted the wholesale price.
SK	After launch of retail offer	Tacit approval. Time limit unspecified .	Adjustment of retail and/or wholesale prices. The NRA can also revise remedies or regulate prices set in the market review.
SI	Before and after launch of retail offer. 14 days before. In addition, every year a report has to be sent to AKOS. AKOS may investigate in cases of doubt or complaints.	Tacit approval. No deadline.	Adjustment of retail and/or wholesale prices. AKOS may demand that an offer is blocked until wholesale prices are adjusted to allow replicability or the offer is modified.

Source: AKEP, Rregullimi i tarifave të sipërmarrësve me FNT në tregun me shumicë të aksesit dhe origjinimit të shërbimeve celulare, 1 October 2018.

Moreover, BEREC highlights the importance of follow-up activities: NRA must monitor "the evolution of existing flagship products (price modifications, temporary discounts, incorporation of new bundled services, etc.) as the mapping of those is complex and subject to change over time. In case relevant changes are detected, NRAs can update their list of flagship products or

revise the result of replicability analysis according to updated information more rapidly"[309]. This aspect is not contemplated in the current NDCM Recommendation[310].

Beyond monitoring, an effective and timely enforcement of compliance is also important. For example, a Lithuanian operator reported that while the SMP operator launched a promotional offer retail early 2020, the prices of wholesale central access were aligned only in the Autumn of 2020, leaving ANOs subject to a margin squeeze for several months[311]. A Spanish operator stated that modification of wholesale prices *ex post* does not compensate for the damage done in terms of customers lost due to aggressive competition and suggested introducing sanctions to SMP operators for unfair competition (excessive wholesale pricing) in cases where the ERT has not passed[312].

Finding 11. The process through which the effectiveness of the ERT is monitored varies strongly and is in some Member States allegedly ineffective. Moreover, the timing of the execution of the tests and of its follow up also diverge substantially.

Comments received pertaining to MST in general

In practical terms, the ERT as defined by the NDCM Recommendation is an MST. Just like any MST, it requires assessment of the relevant:

- Downstream costs
- Cost standard
- Regulated wholesale inputs concerned and the relevant reference prices
- Retail products
- Period for running the test

Therefore, the responses to the online survey relating to the implementation of MSTs in general are also relevant for the ERT.

NRAs report that while implementing an MST is a complex process, the challenges can be overcome. Some NRAs have long experience in applying MSTs, such as the Spanish NRA which has applied an economic replicability test to the SMP operator's broadband products since 2007. The NRA used this accumulated experience to the design and implementation of

[309] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169. Vodafone response to the Targeted Consultation Q10 also flags that "there should be more importance given to monitoring and control of promotions carried out by SMP operators and its effect in the market".
[310] Guidance on 'follow up' is also advocated by Telefonica (response to the Targeted Consultation, Q10), which stresses that "In Spain every 6 months the NRAs carries out a revision of the assessment of the ERT already in place and Telefónica is facing the NRA is willing to modify the criteria and parameters applied to those products 6 months before such update and then leading to an unbearable degree of uncertainty regarding the suitability of the retail offers already in place. Once a retail offer has successfully passed the ERT it could not be entitled to fail such test later on or at least it could not be assessed having not passed the test retroactively".
[311] Case study interviews.
[312] Case study interviews.

the current ERT[313]. An NRA[314] (supported by BEREC[315]) nevertheless advocates that the power of NRAs to request information about non-regulated products when they are included in a broadband bundle should be explicitly stated in the Recommendation.

Diverging comments received from NRAs in response to the online survey reflect the different execution of MSTs across Member States[316]. BEREC reports confirm a wide variation among NRAs' MSTs. For example, this is the case on how NRAs apply their ERT to bundles and/or promotions. Another major point of divergence is whether an ERT should be performed on a product-by-product basis or on a portfolio approach[317]. The portfolio approach is often used by the competition authorities, whereas a product-by-product approach is better suited for stimulating access by alternative operators.

Should regulated access products subject to cost orientation be exempt from MST?

An operator[318] argues that when an economic replicability test covers wholesale products subject to cost-orientation this boils down to imposing retail obligations through the back door. The operator advocates guidance that ERT may not be applied in parallel with cost orientation remedies[319].

In Belgium, an operator expressed concern that the application of MST on top of the current 'fair pricing' regulation is cumbersome, as both processes are very heavy in terms of operational follow up and could lead to adverse effects on the market. In their view, these are measures unnecessary doubling the regulatory burden[320].

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[313] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q9: "CNMC approved its methodology for the ERT in March 2018. This methodology is highly comprehensive and considers issues such as wholesale volume discounts, long-term access agreements, the determination of flagship products, the regulatory treatment of bundles or the consideration of temporary discounts. It also sets clear procedural mechanisms to be applied in case a flagship product does not meet the replicability condition. Together with other regulatory instruments, the ERT has enhanced the incentives to roll out NGA infrastructures".

[314] An NRA response to the online survey.

[315] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q10 states that the revised recommendation should provide "explicit support for the gathering of information (especially the information related to the costs of the non-regulated components) in these cases, as this is essential to carry out the replicability analysis of broadband bundles".

[316] Telefonica comes to the same conclusion in its response to the Targeted Consultation, Q10: "Though flexibility to adapt the application of the ERT to national or regional circumstances should be up to the NRA choice, it is also true that current heterogeneity when applying these general recommendations might create imbalances among Member States". The Luxembourg NRA has a document "Principles and methodology of the margin squeeze testing approach (economic replicability test) in Luxembourg" describing how the ERT was implemented in Luxembourg as a possible best practice that could be used to increase consistency among varying national approaches. https://assets.ilr.lu/telecom/Documents/ILRLU-1461723625-790.pdf

[317] ETNO response to the Targeted Consultation, Q10 also advocates for guidance of the Commission on whether an alternative operator should be able to replicate every retail product or an economic approach to replicability based on a broad product portfolio. ETNO requests the more flexible option. ECTA response to the Targeted Consultation requests the opposite: "Apply to all SMP operator access products (rather than only flagship products), giving specific attention to full and reliable coverage of B2B and B2B2C scenarios (in addition to B2C scenarios). This is necessary in order to protect and promote effective competition for services to businesses and to public administrations in addition to the residential market".

[318] EIR response to the Targeted Consultation, Q10.

[319] Orange and ETNO in response to the Targeted Consultation Q10 support the criticism and also advocate that in the presence of price-regulated NGA wholesale products, an additional *ex ante* replicability test (ERT or other) should not be imposed. *Ex ante* replicability tests (ERT or other) should only be implemented if no price regulation for wholesale products is imposed.

[320] Case study interviews.

However, BEREC acknowledges that several NRAs currently apply MST on top of cost orientation, rather than as a substitute[321].

Table 14. Use of MST as a complement to cost orientation

Methodology	ULL	VULA FTTC	VULA FTTH	Fibre unbundling	Dark fibre in the access segment	Duct in the access segment	Bitstream FTTC	Bitstream FTTH
Ex ante MST	CZ, DE, EL, IT	CZ, DE, EL, EI, IT	CZ, EI, IT	CZ, DE	DE, EL	DE, EL	AT, DE, EL, IT, LT, PL	AT, IE, IT, LT, PL
Ex post MST	DK, EE, LT	LT	LT	LT, EE, DK	LT	LT, EE	EE	EE

Source: BEREC RA report 2020 (BoR (20) 210)

h. Guidance on the *copper anchor*

Provisions concerned

- Recital 193 EECC refers to "a demonstrable retail price constraint resulting from infrastructure competition or a price anchor stemming from other regulated access products, or both".
- Pursuant to Point 6.c of the NDCM Recommendation, the copper anchor is a cost-oriented copper wholesale access product, which constrains NGA prices in such a way that NGA services will be priced in accordance with the consumers' willingness to pay for the additional capacity and functionalities an NGA based retail product can provide in comparison with a copper-based retail product.
- Recital 56 of the NDCM Recommendation indicates that: "If the product offered by the SMP operator on the legacy access network is no longer able to exercise a demonstrable retail price constraint on the NGA product (e. g. in the event of a copper switch-off), it could in principle be replaced by an NGA-based product that is tailored to have the same product features. However, it is not envisaged that such an NGA-based anchor will be required in the immediate future or before 2020."

Follow up by NRAs

The *copper anchor* is relevant for some but not all NRAs. Under the NDCM Recommendation, a demonstrable retail price constraint on NGA-products stemming from cost-oriented access to the legacy copper access network (copper anchor) is only one of the alternative conditions under which no cost-orientation for NGA wholesale access products should be imposed[322]. Such a retail price constraint may also stem from other infrastructures (such as cable, mobile or alternative FTTH). Indeed, some of the responses to the online survey indicate that constraints from other infrastructures may be more relevant. The other conditions which all need to be fulfilled are that the following non-discrimination obligations should be in place: (i)

[321] See BoR (20) 210, Figure 6, p. 8.

[322] In Italy, e. g., price flexibility was based on the presence of infrastructure competition in specific areas (presence of (at least) two alternative access networks (FTTC or FTTH) ready to service, each of which covers 60% of customers' premises. The total coverage (of both alternative networks) must not be less than 75%, while the SMPs retail NGA market share (by connections) must be less or equal to 40% and wholesale NGA active services (VULA and bitstream) share must be less than 80%). See Commission Decision of 11.07.2019 concerning case IT/2019/2181-2182, p.6 and Delibera N. 348/19/CONS, Documento V, point 102.

Equivalence of inputs (EoI) or obligations relating to technical replicability when EoI is not yet fully implemented and (ii) obligations relating to the economic replicability (economic replicability test – see above). Therefore, for NRAs which do not apply the ERT approach recommended by the NDCM Recommendation, the concept of the copper anchor is not directly relevant[323]. As a consequence, guidance on the *copper anchor* currently concerns only a limited number of NRAs[324]. Among them, two NRAs which consider the regulated local loop unbundling as the 'copper anchor' in their market, even if, in those countries the share of unbundled lines compared to the total number of fixed active connections on the network of the SMP operator is rather limited[325]. These figures hide marked geographical variations in one Member State, where the usage of ULL was much lower in competitive areas[326]. However, the decisive factor is not necessarily the relative market share of the anchor product, but rather the degree to which the anchor product constrains the retail prices of the SMP operator.

To constrain the pricing of fibre-based wholesale products, copper- and fibre-based products must be substitutes and therefore be parts of the same market. Although this is likely to change in the future, this is still the case in most countries in which the NRA deems pure copper-based products (ADSL products), FTTC products, and pure fibre-based products as substitutes because end users consider them to be interchangeable. The fact that products are substitutable means that respective end user prices influence each other. In some countries, as the wholesale prices for ADSL products are subject to cost-based regulation, there is a copper anchor in place limiting the possibilities for setting excessive prices for relevant NGA products. Although copper has limitations in terms of speed and quality, end-users were overall satisfied with services provided over copper loops and would not consent paying a substantial premium for fibre-based services.

NGA-based product that is tailored to have the same product features as the copper anchor

Responses to the Commission's targeted consultation revealed that "most stakeholders agree that the copper anchor continues to be relevant in many Member States"[327]. However, the competitive pressure stemming from this regulated anchor can be expected to diminish in the years to come.

According to BEREC, whether a copper anchor exercises a demonstrable price constraint on an NGA- or a VHCN-based retail product "depends on factors such as the level of investment

[323] Even where still considered relevant, there may be other retail market competitive constraints. E. g. in the Czech republic where the NRA found that strong presence of alternative infrastructure operators (CATV, fixed LTE and to some degree also WiFi operators) exerted a constraint on the retail prices (ČTÚ market analysis ČTÚ-79 197/2015-611).

[324] In total, 8 NRAs indicated that they use copper unbundling when deciding to subject other wholesale access products to pricing flexibility, 4 NRAs indicated that they use virtual or active products provided over the copper network (upgraded or not), while 7 NRAs indicated other. NRAs could indicate more than one type of product.

[325] However, to constrain the pricing of access to VHCN products, copper LLU must belong to the same market as fibre. For example, in Sweden no such constraint exists despite the large reported share of ULL because there is, according to the Swedish NRA, a break in the chain of substitution between copper and fibre-based products. However this finding was questioned by the Commission, which stated that: "it is not obvious that Telia, despite its monopoly position, is able to continue to behave independently of its competitors and ultimately consumers. The consumers show a strong preference for higher performing products and have to a large extent the ability to switch. Moreover, where no fixed alternative is available, consumers may in the future be able to substitute a copper broadband subscription with mobile broadband" (Commission Comments of 6.12.2019 concerning Case SE/2019/2216, p.15).

[326] An NRA response to the online survey.

[327] Access Recommendations: Factual summary report of the targeted consultation on the proposed revision, 8 December 2020, available at https://ec.europa.eu/digital-single-market/en/news/access-recommendations-factual-summary-report-targeted-consultation-proposed-revision

in new networks which act as a network competitor to the existing copper network and the price and demand patterns observed in the market (…) and possibly additional considerations. For example, in cases where a chain of substitution leads to a market definition encompassing legacy copper, a copper anchor might still be sufficient. This may be because, for example, with non-VHCN NGA-networks (e.g. FTTC-Vectoring) and FTTB/H-products similar retail offers are provided based on all of these networks"[328].

However, an NRA already found that copper networks no longer provide competitive pressure on coaxial and fibre networks[329] as well as the Swedish NRA in its market review that was withdrawn in 2020[330]. According to another NRA, copper unbundling is becoming less important following migration to VULA and the main pricing constraints stem from cable networks and mobile broadband[331]. Yet another NRA also found that local copper access and non-NGA bitstream are not able to constrain NGA prices (FTTC, FTTH, HFC) due to volumes being too low, while a different NRA says that rather than from copper technology, the competitive constraint is arising from alternative infrastructures[332]. An NRA reports that the copper anchor has declined in importance for an access seeker given that fibre unbundling is available almost everywhere. Fibre unbundling is easier to implement than VDSL from a street cabinet. So, having these considerations in mind, the NRA doubts that the copper anchor will remain a serious constraint for the NGA price[333].

Ireland is another Member State where the pricing of access to the copper local loop (mainly for the provision of ADSL broadband at a retail level) no longer constrains that of FTTC or FTTH wholesale access. Consequently, the Irish NRA decided to subject FTTC access (FTTC VUA) to cost orientation where it was previously only subject to an MST[334]. The NRA justified the move on among other grounds as follows[335]:

- The constraint posed by copper-based broadband is likely to have diminished as evidenced by the reduction in LLU volumes and the switch from copper to fibre-based services in the NGA footprint.
- The SMP operator increased its NGA wholesale prices twice since the launch of NGA services in 2013. In July 2015, Eircom increased the VUA monthly rental price by €2, from €17.50 to €19.50. From 1 September 2016, Eircom increased the rental price for FTTC based VUA by €3.50, from €19.50 to €23 and the monthly rental price for FTTH based VUA by €3.
- Similarly, at a retail level, Eircom increased its retail broadband prices for standalone NGA products by about €5 (incl. VAT). These pricing developments demonstrate that Eircom's prices do not appear to be effectively constrained at a retail or wholesale level in the presence of the existing form of price regulation.

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[328] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q12.
[329] An NRA response to the online survey.
[330] Commission Decision of 7.02.2020 concerning case SE/2019/2216, p.2.
[331] An NRA response to the online survey.
[332] An NRA response to the online survey.
[333] An NRA response to the online survey.
[334] Referred to by Vodafone as a best practice in its response to the Targeted Consultation, Q9: "ComReg's assessment of the FTTC market in 2018 noted that 'the absence of direct and indirect pricing constraints indicates that economic replicability on its own has not been sufficient to address competition problems in the WLA market, and that is why ComReg has now decided to impose cost orientation on FTTC-based VUA in the WLA Market".
[335] ComReg 18/95, Decision D11/18.

The Irish case illustrates that when an NRA finds that copper no longer constrains fibre, it can 'move up' the anchor from legacy to FTTC NGA access. However, contrary to what was advocated by an expert[336], the Irish NRA did not in parallel remove legacy product access pricing obligations[337]. At the same time, the Irish NRA maintained price flexibility for VUA based on FTTH, but mainly because of the difficulty in modelling the access in order to set cost-oriented prices.

The UK NRA came to similar conclusions and changed its previous approach regarding the SMP operator's lower bandwidth VULA services (VULA 40/10) by introducing a charge control. The NRA justified this change (among other grounds) by the apparent fact that the pricing constraint previously exercised by LLU access ('the copper anchor') was no longer sufficiently strong to constrain the VULA 40/10 pricing in a way that would avoid a negative knock-on effect for retail superfast broadband prices[338]. As in Ireland, the UK NRA maintained cost orientation for LLU (except shared use) on grounds that access seekers need MPF access in addition to a VULA product to provide end-users with a retail high-speed broadband package.

In cases where copper-based products are already being phased out and largely replaced by FTTC-Vectoring based products, the latter might thus become the focal product for exercising retail price constraints on VHCN-based products. However, where "copper is being phased out and replaced by new and enhanced networks, especially FTTH/B, a chain of substitution might be absent. This might lead to situations, where no retail price constraint is observed at all"[339].

Finding 12. The *copper anchor* continues to be relevant in many Member States. However, given the diverging market evolution in the various Member States, different 'anchor products' may be appropriate across the EU in the future.

Given varying levels of take up of virtual local access products and of fibre deployment from Member State to Member State, different 'anchor products' are likely to be used across the EU in the future. For example, an NRA considers that in its market, coax could possibly be an anchor for fibre (replace copper) under the right circumstances[340], while another NRA reports that FTTC bitstream could theoretically be used as an anchor product, although it is already an NGA product[341]. Two NRAs could envisage differentiating remedies geographically and maintaining the copper anchor in some areas, while using another anchor in other areas. Other respondents did not consider such differentiation appropriate.

[336] Brian Williamson (2017), *Supporting fibre rollout and infrastructure competition in Ireland via continued pricing flexibility*, June 2017 Communications Chambers, p.34,
[337] The prices for LLU continue to be set by a combination of BU-LRAIC+ costing methodology and a Top-down HCA costing methodology (the revised copper access model - CAM). See Commission Decision of 10.10.2018 concerning Case IE/2018/2115, p.3.
[338] Commission No-Comments Letter of 22.03.2018 concerning Case UK/2018/2062, p.8.
[339] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q12.
[340] An NRA response to the online survey.
[341] An NRA response to the online survey.

i. Guidance on other circumstances in which pricing remedies are not appropriate

Provisions concerned

- Point 58 NDCM Recommendation says that the demonstrable retail price constraint, ERT and strict non-discrimination scenario "should not be seen as the only circumstances under which NRAs can decide not to impose regulated access prices for NGA wholesale inputs. Depending on the demonstration of effective equivalence of access and on competitive conditions, in particular effective infrastructure-based competition, there may be additional scenarios where the imposition of regulated wholesale access prices is not warranted under the Regulatory Framework"
- Recital 193 EECC states that beyond the case of demonstrable retail price constraint, ERT and strict non-discrimination, NRAs may identify "circumstances under which it would be appropriate not to impose regulated access prices for certain wholesale inputs, such as where high price elasticity of end-user demand makes it unprofitable for the undertaking designated as having significant market power to charge prices appreciably above the competitive level or where lower population density reduces incentives for the development of very high capacity networks and the national regulatory authority establishes that effective and non-discriminatory access is ensured through obligations imposed in accordance with this Directive".
- Art.68.2 EECC provides that where an undertaking is designated as having significant market power (SMP) on a specific market, NRAs shall, as appropriate, impose *ex ante* regulatory obligations. In accordance with the principle of proportionality, NRAs must choose the least intrusive way of addressing problems identified in the market analysis.
- Art.74.1 EECC states that "(…) In determining whether price control obligations would be appropriate, NRAs shall take into account the need to promote competition and long-term end-user interests related to the deployment and take-up of next-generation networks and in particular of very high-capacity networks. In particular, to encourage investments by the undertaking, including in next-generation networks, NRAs shall take into account the investment made by the undertaking (…)".

Some examples

Neither of the Access Recommendations provides guidance as to specific circumstances in which pricing obligations are not required beyond the specific scenario of ERT, effective non-discrimination and pricing constraints from the retail market. To date only a very limited number of NRAs that have found SMP on the wholesale local access market decided not to impose any pricing obligation on the SMP operator.

The Portuguese NRA goes the furthest. The SMP operator is under no obligations as regards the provision of physical or virtual fibre unbundling at a certain price. It is not even mandated to provide such access in areas where no alternative infrastructure has yet been deployed. The NRA only imposes access to LLU and to ducts and poles, waiving regulated access to fibre in areas without infrastructure competition on proportionality grounds given that the SMP's fibre coverage in these non-competitive areas was also limited and that the NGA access

regulation could constitute a disincentive to further NGA deployment. NRA also referred to a wholesale commercial access offer to fibre published by the SMP operator[342].

Similarly, but with a much more limited geographic scope, the Belgian NRA decided to refrain from regulation for five years after an infrastructure becomes operational. All pricing obligations on wholesale access to any new NGA infrastructure (including upgrades of non-NGA infrastructures) rolled out in 'white' areas have been lifted. Only the following obligations are then imposed:

- An obligation to negotiate access in good faith
- Access to civil engineering or failing this, dark fibre
- Access intended to serve non-residential multi-site customers
- Transparency measures related to the evolution of the network

The 'white areas' cover 299,000 households or 6.2% of Belgian households. The areas are defined as areas currently served only by a single NGA infrastructure. The Belgian NRA so aims to improve the service quality and/or a user's choice in these areas by stimulating investments. An operator would not consider the regime foreseen for 'white areas' as a 'regulatory holiday', as you would get a softer regulatory regime, but as still some level of a regulatory access regime (obligation to negotiate on fair and reasonable terms), rather than full deregulation. The regulatory tool covers a minor territory, as there are not too many formal white areas in Belgium[343].

In addition, the Belgian NRA decided to phase out, after a transition period, all pricing remedies in certain geographical areas - defined on the basis of a statistical unit at a level below the boundaries of municipalities – (See chapter on geographic segmentation) as soon as they are served by three independent NGA operators. Being independent covers:

- Completely independent passive infrastructure, or
- regulated duct access or wavelength unbundling from SMP operator, or
- a passive commercial agreement with the SMP operator compliant with some requirements defined in a market analysis.

The market analysis encourages lighter regulation in the presence of a third independent operator. A co-investment agreement of a structural nature is one of the requirements to achieve that. This is a lighter regime, but not full deregulation. An operator states that one could argue whether there is still a case for *ex ante* regulation altogether in an environment with three independent NGA operators (or three independent passive infrastructures). They state that as the sunk costs of deploying fibre in fact are high, all networks are conceived as open networks, trying to capture as much market demand as possible. A different operator also considers the requirement of three competing infrastructure operators to be excessive, and that two competing infrastructures where at least one of those provide (active) access on

[342] The Commission challenged the measure and recommended that the NRA to impose a wholesale obligation to provide access to the unbundled fibre line as well as to bitstream over fibre. In doing so, ANACOM should consider whether to grant MEO a degree of pricing flexibility for the fibre access product in line with the Commission Recommendation on Non-discrimination and Costing. The Portuguese NRA nevertheless disregarded the recommendation of 29.11.2016 C(2016) 7674 final in Cases PT/2016/1888 and PT/2016/1889: Wholesale local access provided at a fixed location and wholesale central access provided at a fixed location for mass-market products.

[343] Case study interviews.

a commercial basis ('2.5 infrastructures') should already be sufficient to create a competitive environment to lift SMP remedies in the geographic areas concerned[344].

As in the case of the white zones, the only remedies that will continue to apply are:

- The obligation to negotiate access in good faith
- Access to civil engineering or failing this, dark fibre
- Access intended to serve non-residential multi-site customers
- Transparency measures related to the evolution of the network

The Belgian NRA considers that in these areas, investment in VDSL networks is barely profitable and consequently seeks to avoid imposing any measure that would carry a substantial risk of stifling investment incentives.

Also worthwhile mentioning that in another Member State, the NRA is currently in the process of negotiating commitments with several operators who do not wish to be regulated by classical price regulation (LRAIC)[345].

ETNO[346] advocates that in the presence of retail competitive constraints resulting from increasing infrastructure-based competition, *ex ante* remedies that affect retail pricing of the regulated operator, such as the *ex ante* economic replicability test (ERT), should not be imposed where price controls remain on one or more wholesale products in the market (which may provide some anchor product constraints), *a fortiori* if EoI/EoO is imposed and already ensures effective non-discrimination.

Telefonica[347] also argues that if certain conditions are met, price control in VHCN would be disproportionate particularly in markets where in a forward-looking perspective, effective access to civil engineering infrastructure is leading to effective infrastructure-based competition (as it is the case in Spain) and where effective non-discrimination obligations are in place ensuring the technical replicability of the retail products or EoO and an appropriate definition and monitoring of KPIs.

Access seekers do not show much support for such approaches. According to Iliad, "Any tariff control flexibility on wholesale offers should be strictly limited to resale products only and in a context of effective competition by at least 3 or 4 operators representing a significant market share (e.g. > to 60%)"[348].

A study (meta-analysis of previous empirical research) conducted by PTS[349] highlights the empirical evidence from prominent academic research showing that incumbent investments are increasing in response to alternative operators' investments, but the reasoning is not valid for the reverse ratio, i.e. incumbent investments do not trigger investments in the same way from alternative operators. PTS then highlights that in Sweden, ANOs were the first to invest in their fibre infrastructure, which, if the above reasoning is true, would explain Sweden's

[344] Case study interviews.
[345] An NRA response to the online survey.
[346] ETNO response to the Targeted Consultation, Q10.
[347] Written feedback to the Stakeholders' workshop of 9 June 2021.
[348] Iliad response to the Targeted Consultation, Q19.
[349] PTS (2019). *Så påverkas investeringar i ny infrastruktur av tillträdesregleringens utformning [How investments in new infrastructure are affected by the design of access regulation].* Report number PTS-ER-2019:6.

success in achieving high fibre coverage despite the relatively large area and sparse population density. PTS also mentions the NGA Recommendation directly, questioning whether access regulation is the key measure to bringing about infrastructure competition: "The [NGA] recommendation [Points 39 and 40] can be interpreted as that future regulation of new infrastructures is still expected to start from an access perspective, i.e. to create conditions for service-based competition in the incumbent network in order to ultimately encourage service providers to invest in their own infrastructure. This goes partly against what research has shown regarding the causal relationship between infrastructure investments from incumbent and alternative operators. A new framework directive with accompanying recommendations is under development (2018) and it remains to be seen how this issue is dealt with there."[350]

Finding 13. Only a few NRAs that have designated an operator as having SMP on the market for wholesale local access have decided to waive pricing obligations, other than in the scenario of ERT, effective non-discrimination remedies, and retail price constraints as envisioned in the NDCM.

j. Guidance on pricing remedies other than cost orientation

Provisions concerned

- Recital 192 EECC provides: "Price control may be necessary when market analysis in a particular market reveals inefficient competition (…) The method of cost recovery should be appropriate to the circumstances taking account of the need to promote efficiency, sustainable competition and deployment of very high capacity networks and thereby maximise end-user benefits (…)"
- A national regulatory authority may, in accordance with Article 68, impose obligations relating to cost recovery and price control, including obligations for a cost-orientation of prices and obligations concerning cost-accounting systems, for the provision of specific types of interconnection or access, in situations where a market analysis indicates that a lack of effective competition means that the undertaking concerned may sustain prices at an excessively high level, or may apply a price squeeze to the detriment of end-users.
- Art.74.1 EECC: "A national regulatory authority may, in accordance with Article 68, impose **obligations relating to cost recovery and price control**, including obligations for cost orientation of prices and obligations concerning cost-accounting systems, for the provision of specific types of interconnection or access, in situations where a market analysis indicates that a lack of effective competition means that the undertaking concerned may sustain prices at an excessively high level, or may apply a price squeeze, to the detriment of end-users" (emphasis added).
- In addition, the EECC foresees several circumstances in which access should be provided on "fair and reasonable" terms:

[350] Ibid. Original quote in Swedish: "[NGA r]ekommendationen kan tolkas som att framtida reglering på ny infrastruktur fortfarande förväntas utgå ifrån ett tillträdesperspektiv, dvs. skapa förutsättningar för tjänstebaserad konkurrens i inkumbentens nät för att i förlängningen uppmuntra tjänsteleverantörerna att investera i egen infrastruktur. Detta går delvis emot vad forskningen visat gällande det kausala förhållandet mellan infrastrukturinvesteringar från inkumbent respektive alternativa operatörer. Ett nytt ramdirektiv med tillhörande rekommendationer är under framtagande (2018) och det återstår att se hur denna fråga behandlas där."

a) In the context of symmetrical obligations beyond the first concentration or distribution point (Article 61.3 second subparagraph of the Code).

b) Where the SMP operator enters into a co-investment agreement (Art.76.1 (b)(i)) or

c) when the SMP operator is a wholesale only operator (Article 80 of the Code).

- In its guidance on the implementation of Art.76.1 (b)(i), BEREC states that for the assessment of financial terms of co-investment agreements, "NRAs could make use in particular of information that forms the basis for the network deployment's business case. For example, information about anticipated costs, expected evolution of demand and revenues, as well as the resulting economic risk associated with the deployment might be of interest to the NRAs and could be evaluated. If possible, NRAs could also use information gathered from benchmarks of comparable co-investment agreements that are already in place or other agreements between market participants. However, the amount of agreements already in place as well as the comparability between different existing agreements and thus different deployment projects might be very limited. This especially seems relevant for the comparison of projects across different countries. Furthermore, NRAs should look at undertakings actually operating in the market and their ability to compete effectively and sustainably in the long term based on the given terms and conditions. This assessment should take into particular consideration the results of the market test conducted in accordance with Article 79 (2). In case the NRA concludes that an efficient undertaking cannot compete effectively and sustainably when accepting the proposed terms of the co-investment offer, these terms usually cannot be considered being fair, reasonable and non-discriminatory and thus do not comply with the conditions of Article 76 (1) (b) (i). Alternatively, NRAs could potentially evaluate the terms of the co-investment offer by assuming a hypothetical efficient provider of electronic communications networks and/or services. If there are different business models present in the market, NRAs could also make use of several different hypothetical providers of electronic communications networks and/or services for this type of assessment."[351]

- The Broadband Cost Reduction Directive (hereafter BCRD) refers to "fair and reasonable terms and conditions, including prices" in Recital 18 and Article 3(2). Such pricing must take into account the impact of the requested access on the business plan of the access provider (Article 3(5) subparagraph 2 BCRD). In this respect, the dispute settlement body (DSB) should also take "into account national conditions and any tariff structures put in place to provide a fair opportunity for cost recovery taking into account any previous imposition of remedies by a national regulatory authority" (Recital 19 BCRD).

Cases of application of 'fair pricing' instead of 'cost orientation'

Neither the NGA nor the NDCM Recommendation refers to the notion of "fair and reasonable" pricing, but this silence does not prevent NRAs from applying such a pricing remedy. In May 2020, the Belgian NRA published[352] its decisions regarding wholesale tariffs for access to cable networks. The Belgian NRA decided that a strict cost-orientation would not be proportionate

[351] BoR (20) 113, p.20.

[352] There are several decisions following the same approach. A representative decision can be found at: https://www.bipt.be/operators/publication/decision-of-the-crc-of-26-may-2020-on-the-monthly-prices-for-wholesale-access-to-the-cable-operators-networks-for-television-broadcasting-on-the-territory-of-the-bilingual-brussels-capital-region-and-broadband.

and defined a 'fair' access price, creating possibilities for competition on the retail market to the benefit of the end-users, whilst remunerating the network operators fairly for access. A similar pricing obligation applies for VULA FTTH[353].

Fair prices mean ensuring that prices maintain a link to costs, while including a potentially reasonable margin between costs and prices so as to encourage FTTH deployments. These margins were set as follows for bitstream on cable networks:

Table 15. Additional margins by speed category for bitstream over cable

Category	2019-2021	From 2022 onwards
Standard = no margin	Up to 200 Mbps included	Up to 400 Mbps included
High = 2.5 % margin	More than 200 Mbps up to 600 Mbps included	More than 400 Mbps up to 900 Mbps included
Top = 5 % margin	More than 600 Mbps	More than 900 Mbps

Source: Draft BIPT decision *[Projet de décision du Conseil de l'IBPT concernant les tarifs mensuels pour l'accès de gros au réseau FTTH de Proximus. Version publique destinée à la Commission européenne].*

The reason why the Belgian NRA did not allow a mark-up for speeds up to 200 Mbps is that such speeds were available even before the latest modernisation investments undertaken by the operators. Moreover, the 200 Mbps speed product is taken up by a significant proportion of customers, which also points towards a product that does not entail exceptional risks. The 100 Mbps threshold for FTTH[354] is based on similar findings.

To determine its mark-up, the Belgian NRA drew on the experience of Dutch and German NRAs:

- the Dutch NRA granted a risk premium of 3.5 % for ODF access
- The German NRA uses a mark-up of 15 % above LRIC+ costs already including WACC to compute its non-abuse test. The value is based on German case law, but the Commission commented that a mark-up in the range of 5-10 % would be more appropriate[355].

Regarding FTTH[356], the Belgian NRA allowed additional margins, on top of the WACC as follows[357]:

[353] Décision du Conseil de l'IBPT du 9 mars 2021 concernant les tarifs mensuels pour l'accès de gros au réseau FTTH de Proximus. See in particular p.10 : "Par 'équitable', la CRC entend un prix qui peut être supérieur aux coûts mais qui conserve un lien avec les coûts. En d'autres termes, une marge raisonnable peut exister entre les coûts et le prix. Cette obligation sera vérifiée à l'aide d'un modèle de coûts LRIC bottom-up qui reflète les coûts d'un opérateur efficace. L'IBPT tiendra compte autant que possible de la méthode de comptabilisation des coûts recommandée par la Commission européenne". The document is available at : https://www.bipt.be/file/cc73d96153bbd5448a56f19d925d05b1379c7f21/24f86c5f77046d35dece4aaf4cf2a2499666135b/Decision_tarifs_mensuels_acces_gros_reseau_FTTH_Proximus_2021-03-09.pdf

[354] Draft BIPT decision *[Projet de décision du Conseil de l'IBPT concernant les tarifs mensuels pour l'accès de gros au réseau FTTH de Proximus. Version publique destinée à la Commission européenne].*

[355] Commission Decision of 16.12.2016 concerning Case DE/2016/1954

[356] Commission Comments of 25.022021 concerning Case BE/2021/2301.Final decision adopted on 9 March 2021.

[357] Initially, a higher margin was envisaged but the draft was amended following the Commission's comments.

Table 16. Additional margins by speed category for VULA FTTH and bitstream over FTTH

Category	2019-2021	From 2022 onwards
Standard = no margin	Up to 100 Mbps included	Up to 400 Mbps included
High = 2.5 % margin	More than 100 Mbps up to 600 Mbps included	More than 400 Mbps up to 900 Mbps included
Top = 5 % margin	More than 600 Mbps	More than 900 Mbps

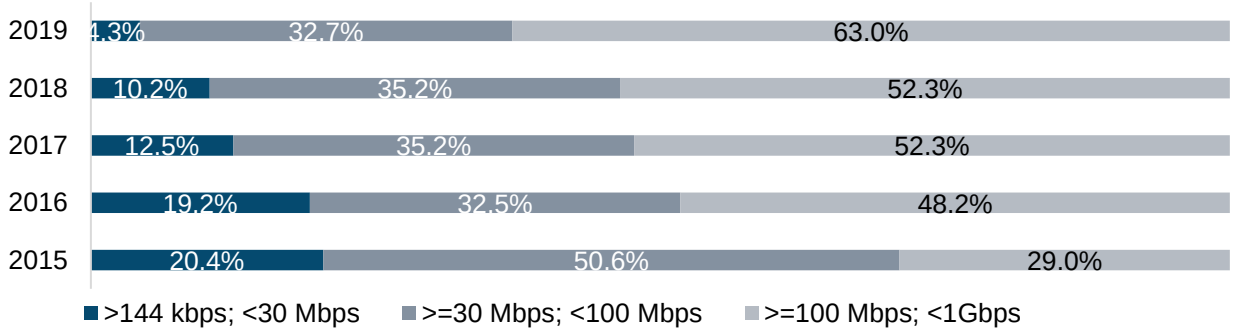
Source: NRA decision of 26 May 2020 *[Décision de la CRC du 26 mai 2020 concernant les tarifs mensuels pour l'accès de gros aux réseaux des câblo-opérateurs pour la radiodiffusion télévisuelle sur le territoire de la région bilingue de Bruxelles-Capitale et la large bande].*

Operators agree that Proximus faces competitive pressure from cable operators (especially since cable operators have the possibility to offer 1Gbps products over their HFC networks), as well as potentially being overbuilt by newly-constructed FTTH networks (e.g. Fluvius in Flanders)[358]. A stakeholder also sees uncertainties related to the demand as being particularly relevant, noting that in the past few years, Proximus FTTC market shares were subject to the constraints of upgraded HFC networks. In their view, this may increase the uncertainty related to the take-up that can be reached on the FTTH network that Proximus had started to build[359], i.e. making it difficult for FTTH network operators to compete with the cable incumbent offering very high speed products.

A stakeholder indicates that the effect of new pricing on FTTH deployment is not fully clear (although some extension of FTTH deployment ambitions can be observed, but the number of lines captured by alternative operators up to now may be considered as limited)[360]. For cable access, the new pricing is also too recent to draw conclusions. A stakeholder is of the opinion that at this stage, it is too early to say whether the 'inventive' regulation in the form of extra margins of 2.5 or 5% above the cost-oriented tariffs for higher speed tiers is effective, given that some of the speed tiers concerned are not taken up in the market[361]. Data in Figure 17 shows that in 2019 some 37% of subscriptions were still below 100 Mbps. Unfortunately, data breakdowns by speeds above 100 Mbps are not available in BIPT's data.

[358] Case study interviews.
[359] Case study interviews.
[360] Case study interviews.
[361] Case study interviews.

Figure 17. Distribution of (active) fixed broadband lines by transmission speed (2015-2019)



Source: BIPT Economic situation of the telecoms sector 2019: data of 30 June 2020
Note: since 2019, there are 261 lines capable of speeds of 1Gbps or more; this number is not represented in the graph before since it comprises a negligible percentage (0.006%) of the total lines.

Proximus is of the opinion that 'fair pricing' appears to be working out, as it endorses, at this point in time, Proximus' proposed wholesale prices. Proximus views 'fair pricing' methodology as 'escaping' the 'binary' system of the Recommendations (which advocate either strict cost-orientation or pricing flexibility with ERT). However, there are still points for discussion: VDSL is not regulated under fair pricing, although it is also an NGA network. Tiering in particular is helpful for investment. However, they are of the view that investments in general deserve to be allowed to have a better margin. ERT allows for that in a context where competition is safeguarded, but at the same time allows operators to maximize revenues on a network, which is especially important in the context of huge sunk costs (where they need to get any margin they can). Customers are also safeguarded by the fact that in VHCN economies, there is no other way to make the network profitable other than by getting many customers onto the network. There is no economic incentive to increase prices beyond a competitive level[362].

Prior to the decisions by the Belgian NRA, OFCOM in the UK was imposing *fair and reasonable* access prices (e.g. for the LLU Shared Metallic Path Facility (SMPF) and the wholesale copper input for basic broadband services[363]). The UK NRA interprets the fair and reasonable obligation to mean that the SMP operator should not set prices that would equate to a margin squeeze-under *ex post* competition law for existing and new forms of network access[364].

The French NRA is also using fair and reasonable prices[365] for the pricing of access to their in-house segment and to connections enabling the provision of electronic communications services to end-users[366] in the context of the symmetric framework.

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[362] Case study interviews
[363] Commission No-Comments Letter of 22.03.2018 concerning Case UK/2018/2062, p.8.
[364] OFCOM, consultation document 'Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26', Volume 4: Pricing remedies, 8 January 2020, p.1, footnote 1.
[365] See Decision no. 2009-1106 which states that " la tarification mise en œuvre par l'opérateur d'immeuble doit répondre à plusieurs objectifs : « […] - encourager l'investissement des opérateurs, notamment à travers les schémas de cofinancement prévoyant un **partage équitable des coûts** entre opérateurs. Afin de répondre à ces objectifs, il convient, pour établir la tarification des offres d'accès, de prendre en compte les principes suivants (…)- le principe de non-discrimination […], le principe d'objectivité […], le principe de pertinence [… et] le principe d'efficacité des investissements […], conformes aux objectifs fixés dans le II de l'article L. 32-1 ». The pricing obligation thus links 'fair' pricing with the deployment cost of the in-house cabling.
[366] Art. L. 34-8-3 of the Post and Electronic Communications Law. NRA decisions taken under this article, i.e. Decisions 2009-1106 and 2010-1312 specify the tariff conditions for access to the point of mutualisation. Article 3 of Decision 2009-1106, quoted above, and Article 9 of Decision 2010-1312 stipulate that the tariff conditions for

Under the BCRD, ten Member States have not defined the term "fair and reasonable" pricing, while in 14 Member States the law includes further guidance on pricing[367] or foresees publication of rules regarding pricing methodologies[368]. "Reference to recovery of cost leads some DSBs to explicitly interpret "fair and reasonable" as "cost orientation", both in general (5 Member States) and within the framework of a case-specific approach (2 Member States). However, other NRAs have specified a more general approach, where reference is made to the impact of pricing on the business model and investments and/or to the opportunity cost of providing access (5 Member States). For example, the German NRA, based on principles under BCRD and the DigiNetz Law, calculate fair and reasonable prices on a case-by-case basis taking into account the state of the network infrastructure used and the effect of network sharing on the owner's profitability"[369]. Some NRAs also place the focus on existing market prices, (mainly regulated prices), as a relevant element to be considered (4 Member States)"[370].

Finding 14. Only a few NRAs have imposed 'fair and reasonable' pricing obligations on SMP operators for wholesale broadband access products. The meaning attached to the term by each of them is different. BCRD uses a similar terminology for access to civil engineering and in-house cabling. However, national implementation reveals substantial differences of interpretation.

Impact

According to the French operator Iliad in France, "the notion of fair and reasonable conditions has been applied in the context of fibre deployment as described above (i.e. based on costs + rate of return on capital employed taking into account the specific risk attached to fibre deployment). We consider that this has indeed contributed to encouraging deployments and promoting competition on fibre, as shown by the figures (deployment of 20 million sockets; almost 10 million subscribers)"[371].

In the case of Belgium, Proximus views 'fair pricing' based on tiering particularly helpful as an investment incentive. However, they are of the general view that investments deserve to be allowed to have a better margin.[372]. However, both the NRA and the company Telenet warn that the new pricing approach is too recent to draw conclusions[373].

Other feedback from the stakeholders

BEREC argues that the concept of fair and reasonable can rather be seen as context dependent. "(…) "Fair and reasonable" has to be seen in the context of the regulatory objectives which need to be balanced out, e.g. with respect to the objective to "promote competition" (Art. 3(2)(b) and (d) EECC) or to "promote connectivity" (Article 3(2)(a) and (d) EECC) and to "promote efficient investment and innovation" (Article 3(4)(d) EECC). Therefore,

access must be reasonable and comply with the principles of non-discrimination, objectivity, relevance and efficiency.

[367] E. g., in Portugal where the law transposing BCRD foresees that access prices should be cost-oriented.

[368] BoR (19) 23.

[369] Vodafone response to the Targeted Consultation, Q12.

[370] BoR (19) 23.

[371] Iliad response to the Targeted Consultation, Q12.

[372] Case study interviews.

[373] Case study interviews.

in re the need for further guidance on the concept of "fair and reasonable" terms and conditions in the revised access recommendation(s), the conclusions are as follows. BEREC deems it of the utmost importance to regard the notion of "fair and reasonable terms and conditions" as a broad concept, which needs to be applied context-dependent and thus cannot be directly linked to a specific pricing methodology. Because of this, BEREC is of the opinion that there is no need for further specific guidance that would limit the required flexibility for the application of the concept of "fair and reasonable"[374].

According to Telecom Italia, "the right of access to existing infrastructures according to the principles established by the BCRD - and in particular the obligation to apply "fair and reasonable" terms and conditions - can effectively contribute to the development of [very high capacity] networks and promote competition"[375]. Deutsche Telekom adds that "guidance concerning the notion of fair and reasonable would be appreciated if such guidance clarifies the relationship between prices which are subject to cost-based *ex ante* price control and negotiated prices. As a general rule, a regulatory pricing decision concerning a dispute on "fair and reasonable" prices between providers of electronic communication networks should lead to higher prices than a regulatory pricing decision because of a cost-based price control and should have a strong reference to market prices"[376]. On the other hand, ECTA warns that "the concept of "fair and reasonable terms and conditions" contained in BCRD was intended to be more favourable to the access provider than a standard of cost-orientation because the target of the BCRD was not SMP operators in the electronic communications sector, which were understood to be subject to separate specific SMP-based *ex ante* regulation"[377].

Cases of application of price controls in the form of price caps based on a predetermined policy premium instead of cost-orientation

In the Netherlands, access to the Optical Distribution Frame (ODF-access) of a joint-venture[378] between the SMP operator and Reggefiber has been subject to price caps based on a discounted cashflow (DCF) model which takes into account the business case of KPN/Reggefiber[379]. The price caps on monthly maximum fees (initially a monthly rental €14.5-€17.5 per FTTH fibre pair depending on the underlying construction costs in the respective areas) were defined using as a basis the business model of the investors (not an NRA cost model) and the investors' internal rate of return (IRR) of 7% to 10%. The cap was indexed every year based on the consumer price index (CPI) during the review period. In order to provide a predictable framework for the investors, NRA determined how caps would be reviewed at the next market review. If IRR was above the 'all-risk WACC' (i.e. 'excessive return'), NRA would adjust the price cap downwards (a situation of 'over performance'). Conversely, if IRR was close to the 'all-risk WACC', the investors would be allowed to choose to be price-regulated (capped) on wholesale fibre unbundling going forward, to offer greater volume discounts for wholesale fibre unbundling, or to extend the network to areas that are less profitable to avoid being regulated (the goal being to stimulate deployment). In cases where the further deployment option would not be chosen, the cap would be reduced for the next 3-year period, but again allow for annual CPI-related increases. The 'all-risk WACC'

[374] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q18.
[375] Telecom Italia response to the Targeted Consultation, Q12.
[376] Deutsche Telekom response to the Targeted Consultation, Q12.
[377] ECTA response to the Targeted Consultation, Q12.
[378] Although KPN had at the time only a 41% stake in JV, NRA included it in the KPN designation as the operator with Significant Market Power (SMP) on Market 4 (wholesale (physical) network access at a fixed location).
[379] OPTA encourages investments in fiber networks and stimulates competition, 24 November 2008, https://www.acm.nl/en/publications/publication/9671/OPTA-encourages-investments-in-fiber-networks-and-stimulates-competition

included a risk premium of 3.5% on top of the WACC applicable to the legacy copper network (i.e. 7.6%-10.5% after taxes) addressing: (i) fibre-project specific risk on demand/take-up of fibre access, and (ii) asymmetric risks[380] (e.g. risk of future regulation of the fibre investor)[381]. Volume discounts per city concentration point (hierarchical level above the actual ODF-access locations) were allowed ("penetration sharing") under certain conditions, in particular based on the common volume achieved i.e. not on a taker-by-taker basis.

The price cap was continued in the subsequent market review. In response to RFI from the Commission, NRA assumed that Reggefiber was not over-performing and did not make any excessive returns. Considering the inflation level of 2.2%, the NRA accepted an increase of the maximum tariff per line for ODF FTTH access in the different areas from €14.86-€17.94 per month in 2011 to EUR €15.19-€18.33 per month in 2012[382]. However, in 2018, the Commission asked the Dutch NRA to reconsider its pricing remedy and to impose instead an economic replicability test (ERT). The ERT could apply either from the start or as a fall-back in case commercial negotiations failed[383].

Since 2015, the French NRA uses a DCF model to settle disputes related to the pricing of access to the terminating segment of FTTH in the *less dense areas*[384], mandated in the framework of symmetric access obligations imposed according to the predecessor of Art.61 EECC.

In the UK, the NRA recently mandated the SMP operator to apply fair and reasonable charges for higher-speed products[385] (in 'area 2'[386]) . Fair and reasonable pricing implies for OFCOM that "BT should not set prices that would equate to a margin squeeze under ex post competition law for existing and new forms of network access." At the same time, the fair and reasonable pricing remedy means in practice that no *ex ante* price control is imposed for the review period nor anticipated for the subsequent review period (2026-31). It would appear that even if no competition emerges beyond 2031, remedies that could be imposed by the NRA will still have to comply with the principles set forth in the 2021 market review, and in particular with the Fair Bet principle. The NRA understands *Fair Bet*[387] as Oxera, i.e. reflecting the notion "that investments will be undertaken only if investors believe that they will make a reasonable return. On this basis, a 'fair bet' is one where the firm making an investment should, in expectation,

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[380] "The logic is that Reggefiber should to some extent be compensated for the risk of a negative scenario, which it would not be able to off-set by raising its ODF-access rates as a result of the price cap". Jaap Doeleman (2009), "Digging for gold? Incentivising NGAs in the Netherlands". IBA Legal Practice Division Communications Law Committee Newsletter May 2009, p.12.

[381] Commission Comments letter of 18.02.2009 did not criticise the remedy.

[382] Commission Decision of 21.12.2011 concerning Case NL/2011/1278: market for wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location in the Netherlands, p.5.

[383] Commission Decision of 30.08.2018 concerning Cases NL/2018/2099 and NL/2018/2100: Wholesale fixed access market, 30.8.2018, p.14.

[384] Model available at: https://www.arcep.fr/uploads/tx_gspublication/doc-model-tarif-acces-ftth-oct2015.pdf

[385] Bandwidths higher than 40/10 Mbps.

[386] Where there is already some material commercial deployment by rival networks to the SMP operator or where this could be economic.

[387] OFCOM, Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26, Volume 4: Pricing remedies, 18 March 2021, p.22: "An investment is a 'fair bet if, at the time of investment, the expected return is equal to the cost of capital (…)However, we accept that some risk remains, and that BT should be allowed the opportunity to earn and keep a higher return than normal if it is successful (…) should we need to regulate in future, we would check to ensure that BT had a fair bet. Our guiding principle in assessing this would be to consider whether, at the time BT took the decision to invest, it would have gone ahead with the investment if it had understood the regulation we were proposing to adopt. (…) In setting any future charge control, our policy would be to ensure that BT could keep the upside it had earned up to that point and ensure that it has the ability to earn its cost of capital going forward (…) ".

be allowed to earn a return equal to the investment's cost of capital. That is, for an investment to be a fair bet, the firm should be allowed to enjoy some of the upside benefit when demand turns out to be high or costs low (i.e. be allowed returns higher than the cost of capital) in order to balance the probability that it will earn returns below the cost of capital if demand turns out to be low or costs high."[388] In its consultation document, the UK NRA already anticipated that "ensuring that the fair bet is satisfied may entail BT earning returns above the cost of capital to compensate for the additional downside risks that were faced when the investment was made".[389]

The underlying rationale is to maintain regulatory credibility and to keep commitments even at times when the regulated SMP operator is making large profits. Ratcheting the regulated profitability down too quickly or too frequently in response to the success of a network operator, for instance, can undermine incentives to invest in the first place.[390]

Feedback from the stakeholders

The Irish operator EIR says that "price caps rolling incentive schemes between regulatory review periods can be an effective way to ensure that incentives for the undertaking to develop efficiencies remain constant over the life of the price control period"[391]. There are trade-offs involved in determining the optimal duration of a price cap. If the price-cap period is too short it undermines the cap's intended incentive properties, too long and consumers realise a much smaller share of potential savings. A firm will have the strongest incentive to achieve greater efficiency towards the beginning of the regulatory period as it can retain the value of efficiency for the longest period. A system of rolling incentives (i.e. where caps are not lowered at the end of the initial market review when the SMP operator can perform better than expected, but where profitability is considered over the lifetime of the investment) may remedy this distortion to efficiency incentives.

ETNO asks for the "fair bet and risk premium approach to be taken into account on all the pricing obligations imposed by regulation, with a potential variation over the lifetime of the project. However, this should be transparent and clear from the beginning of the project and price control obligations should not vary over time in such a manner that they *de facto* put at risk the expected return on investment already realised. Thus, potential variation in such a parameter should only apply to new investments"[392]. BEREC disagrees[393], stating that, "Starting from the efficiency of capital markets as the objective, a risk assessing method leaves no room for the application of an alternative approach such as the "fair bet" principle as all risks are priced-in already". Vodafone likewise does not support a rate of return based pricing remedy, but advocates ERT instead: "If economic replicability is applied instead of cost-oriented prices, there is no need for such predictability nor for a risk premium nor the application of the "fair bet" principle. The SMP operator will adjust retail and wholesale prices in order to cope with market dynamics"[394].

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[388] Oxera (2017), *Does Ofcom's approach in the WLA market review honour the fair bet principle?*
[389] Ofcom (2017), 'Wholesale Local Access Market Review – Volume 1 Consultation on the proposed market, market power determinations and remedies', at https://www.ofcom.org.uk/__data/assets/pdf_file/0033/99636/Vol1-Market-review.pdf.
[390] Jean-Jacques Laffont and Jean Tirole (2000), *Competition in Telecommunications*, MIT Press, page 5.
[391] EIR response to the Targeted Consultation, Q19
[392] ETNO response to the Targeted Consultation, Q19.
[393] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q19. However, BEREC does not discard discounted cash-flows approaches, involving a comparison of expenditures and revenues not year by year but over a longer period (as it is for instance the case in France for FTTH networks).
[394] Vodafone response to the Targeted Consultation, Q19.

Finding 15. The Dutch NRA's experiment with a rate of return regulation was not emulated by other EU NRAs. However, the UK NRA's 'fair and reasonable' concept relies on the same regulatory philosophy.

6. The recommended non-discrimination obligations

a. Summary of findings

There is substantial variation between the non-discrimination obligations (EoI and EoO) imposed by NRAs. When deciding on whether to impose EoI or EoO for specific access products, NRAs seldom proceed to a quantitative cost/benefit analysis, but rather rely on a qualitative estimation of the need to ensure 'stricter' non-discrimination for the wholesale access products at stake.

Several comments received from stakeholders acknowledge that any requirement to set up EoI will have a cost. Calls from operators to move from EoO to EoI are sometimes motivated by (potential) information sharing between wholesale and retail arms of the SMP operator. Beyond that specific issue, these calls seem to reflect problems related to the enforcement or the functioning of EoO rather than to the current guidance. Similar monitoring and enforcement problems are in some cases raised even when EoI is imposed.

According to the findings, very few NRAs perceive causal links between strict non-discrimination and incentives to invest in VHCN deployment. In fact, no NRA acknowledged that such obligations may decrease access providers' incentives to invest in VHCN deployment.

The analysis shows that all NRAs foresee a TRT or at least mandate KPIs ensuring non-discriminatory replicability of the retail services of the SMP operator by alternative operators. However, comments received suggest there is some room for improvement. The manner in which KPIs are monitored varies substantially across the EU. Several comments by access seekers relate to alleged weaknesses in the monitoring and enforcement. In some Member States, there appears to be a lack of transparency as to how the NRA monitors KPIs, and what happens if they are not adhered to. In fact, comments received sometimes go beyond the non-discrimination issue. Operators seem concerned with QoS issues, stressing that KPIs set by NRAs are sometimes not ambitious enough.

Finally, the study found that SLAs and in many cases also SLGs on the provision of wholesale broadband access products are provided by SMP operators across the EU. However, access seekers' comments suggest that in some cases the billing procedure and the level of the SLG payments foreseen would not be sufficiently dissuasive to ensure that the SMP operator complies with its delivery obligations.

b. Introduction

Context

The EECC mentions different gradations of non-discrimination safeguards:

- Wholesale only operators in the sense of Art.80 EECC.
- Other operators characterised by a degree of vertical separation, i.e. legal separation, but cross-shareholding, in the sense of Art. 78.
- Functional separation in the sense of Art. 78, i.e. "establishment of a separate business entity in order to provide all retail providers, including its own retail divisions, with fully equivalent access products".

- ‘Equivalence of Input (EoI)’: the provision of services and information to internal and third-party access seekers on the same terms and conditions, including price and quality of service levels, within the same time scales using the same systems and processes, and with the same degree of reliability and performance. Some products – e.g. collocation – are access seeker specific and not ‘equivalent’.
- ‘Equivalence of Output (EoO)’: provision to access seekers of wholesale inputs comparable, in terms of functionality and price, to those that the SMP operator provides internally to its own downstream businesses albeit using potentially different systems and processes.

Provisions of the EECC relating to EoI and EoO

- Recital 185 EECC: “In order to address and prevent non-price related discriminatory behaviour, equivalence of inputs (EoI) is in principle the surest way of achieving effective protection from discrimination. On the other hand, providing regulated wholesale inputs on an EoI basis is likely to trigger higher compliance costs than other forms of non-discrimination obligations. Those higher compliance costs should be measured against the benefits of a more vigorous competition downstream, and of the relevance of non-discrimination guarantees in circumstances where the undertaking designated as having SMP is not subject to direct price controls. In particular, national regulatory authorities might consider that the provision of wholesale inputs over new systems on an EoI basis is more likely to create sufficient net benefits and thus be proportionate, given the comparatively lower incremental compliance costs to ensure that newly built systems are EoI-compliant. On the other hand, NRAs should also consider whether obligations are proportionate for affected undertakings, for example, by taking into account implementation costs and weighing possible disincentives to the deployment of new systems, relative to more incremental upgrades, if the former would be subject to more restrictive regulatory obligations. In MS with a high number of small-scale undertakings designated as having significant market power, the imposition of EoI on each of those undertakings can be disproportionate.”
- Art.60.2 EECC “Without prejudice to Article 21, Member States shall require that undertakings which acquire information from another undertaking before, during or after the process of negotiating access or interconnection arrangements use that information solely for the purpose for which it was supplied and respect at all times the confidentiality of information transmitted or stored. Such undertakings shall not pass on the received information to any other party, in particular other departments, subsidiaries or partners, for whom such information could provide a competitive advantage”.
- Art.69.4 EECC “(…) where an undertaking has obligations [to meet reasonable requests for] wholesale access to network infrastructure, NRAs shall ensure the publication of a reference offer taking utmost account of the BEREC guidelines on the minimum criteria for a reference offer, shall ensure that key performance indicators are specified, where relevant, as well as corresponding service levels, and closely monitor and ensure compliance with them.”
- Art.70(2) EECC “NRAs shall consider not imposing or maintaining [price control obligations], where they establish that a demonstrable retail price constraint is present and that any obligations imposed (…), including, in particular, any economic replicability test imposed in accordance with Article 70, ensures effective and non-discriminatory access.”

- Art.74.1, third paragraph EECC "National regulatory authorities shall consider not imposing or maintaining obligations pursuant to this Article, where they establish that a demonstrable retail price constraint is present and that any obligations imposed in accordance with Articles 69 to 73, including, in particular, any economic replicability test imposed in accordance with Article 70, ensures effective and non-discriminatory access."

Elements reviewed

The implementation of the guidance to strengthen non-discriminatory access is reviewed in this chapter. This review examines successively the implementation of the following four recommended practices:

1. Guidance relating to imposing EoI or EoO
2. Guidance relating to the technical replicability test
3. Guidance on the monitoring of non-discrimination obligations
4. Guidance relating to SLAs

c. Guidance relating to EoI and EoO obligations

Provisions concerned (NDCM Recommendation)

- Recital 23: "(…) KPIs are the most appropriate tools to detect potential discriminatory behaviour and enhance transparency with respect to the delivery and quality of the SMP operator's regulated wholesale access products in the relevant markets. In order to enhance transparency and foster market confidence, NRAs may facilitate through appropriate industry forums the agreement between the SMP operator and third-party access seekers on the detailed KPIs and ensure that such KPIs are audited and published in a manner that allows for the early detection of potential discriminatory behaviour. The KPIs should be related to the key activities in the provisioning cycle, covering all its stages, i.e. the ordering process, the delivery or provision of the service, the quality of service including faults and fault repair times, and migration by access seekers between different regulated wholesale inputs."
- Point 6(j): "Key Performance Indicators (KPIs)' are indicators that measure the level of performance in the provision of the relevant wholesale services."
- Point 7: "The surest way to achieve effective non-discrimination is by the application of 'equivalence of input' (EoI), which ensures a level playing field between the SMP operator's downstream businesses, for example, its retail arm, and third-party access seekers, and promotes competition. Where NRAs consider that the imposition of a non-discrimination obligation on SMP operators (…) is appropriate, proportionate and justified (…), they should examine whether it would be proportionate to require SMP operators to provide relevant wholesale inputs on an EoI basis. In doing so, NRAs should consider, among other things, whether the compliance costs, for example due to the redesign of existing systems, are outweighed by the envisaged competition benefits. In doing so, the NRA should take into account in the proportionality assessment, inter alia, the following considerations:
    - (i) incremental costs of compliance with EoI are likely to be low when new systems are being designed;

(ii) the potentially linked non-imposition of regulated wholesale access prices on NGA networks as recommended in points 48 and 49;

(iii) the potentially positive effect the application of EoI might have on innovation and competition;

(iv) any voluntary commitment by the SMP operator to provide wholesale inputs to access seekers on an EoI basis, as long as such a voluntary offer meets the conditions set out in this Recommendation; and

(v) the number and size of the SMP operator(s)."

- Point 8: "Where proportionate, EoI should be applied at the most appropriate level(s) in the value chain to those wholesale inputs which the SMP operator provides to its own downstream businesses, for example its retail arm, unless it can be demonstrated to the NRA, having sought the views of third-party access seekers, that there is no reasonable demand for the wholesale input in question."
- Point 9: "Where EoI is disproportionate, NRAs should ensure that the SMP operator provides the wholesale inputs to access seekers on an 'equivalence of output' (EoO) basis."
- Point 10: "NRAs should ensure that when a non-discrimination obligation is imposed, access seekers can use the relevant systems and processes with the same degree of reliability and performance as the SMP operators' own downstream retail arm."

Provisions concerned (NGA Recommendation)

Annex II: Application of the principle of equivalence for access to the civil engineering infrastructure of the SMP operator for the purpose of rolling out NGA networks.

Annex II (NGA Recommendation)

1. PRINCIPLE OF EQUIVALENCE

(…) it is important that [access to civil engineering infrastructure] is provided on a strictly equivalent basis. NRAs should require the SMP operator to provide access to its civil engineering infrastructure under the same conditions to internal and to third-party access seekers. In particular the SMP operator should share all necessary information pertaining to infrastructure characteristics and apply the same procedures for access ordering and provisioning. Reference offers and service level agreements are instrumental to ensuring a proper application of the principle of equivalence. Conversely, it is important that any asymmetric knowledge the SMP operator possesses of the rollout plans of third-party access seekers is not used by the SMP operator to gain undue commercial advantage.

2. INFORMATION ON THE CIVIL ENGINEERING INFRASTRUCTURE AND THE DISTRIBUTION POINTS

The SMP operator should provide third-party access seekers with the same level of information on its civil engineering infrastructure and distribution points as is available internally. This information should cover the organisation of the civil engineering infrastructure as well as the technical characteristics of the different elements of which the infrastructure consists. Where available, the geographical location of these elements, including ducts, poles and other physical assets (e.g. maintenance chambers) should be provided, as well as the available space in ducts. The geographical location of distribution points and a list of connected buildings should also be provided.

The SMP operator should specify all intervention rules and technical conditions relating to access and use of its civil engineering infrastructure and distribution points, and of the different elements the infrastructure consists of. The same rules and conditions should apply to third-party access seekers as to internal access seekers. (…)

3. ORDERING AND PROVISIONING OF ACCESS

The SMP operator should implement the procedures and tools necessary for ensuring efficient access and use of its civil engineering infrastructure and distribution points, and the different elements the infrastructure consists of. In particular, the SMP operator should provide third-party access seekers with end-to-end ordering, provisioning and fault management systems equivalent to those provided to internal access seekers. This should include measures aimed at de-congestioning currently used ducts.

Requests for information, access and use of the civil engineering infrastructure, the distribution points and the different elements the infrastructure consists of by third-party access seekers should be processed within the same delays as equivalent requests by internal access seekers. The same level of visibility on the progress of the requests should also be provided, and negative answers should be objectively justified. (…)

7. ASYMMETRY OF INFORMATION

The incumbent has prior knowledge of third-party access seekers' deployment plans. To prevent such information from being used to gain undue competitive advantage, the SMP operator in charge of operating the civil engineering infrastructure should not share such information with its downstream retail arm.

NRAs at a minimum should ensure that those persons involved in the retail arm activities of the SMP operator may not participate in company structures of the SMP operator responsible, directly or indirectly, for managing access to civil engineering infrastructure

Did the guidance bring about consistent execution of non-discrimination remedies across the EU?

In 2016, BEREC carried out a monitoring exercise on how NRAs have been implementing broadband common positions (CPs) relating to, among other, wholesale local and central access[395]. BEREC found that, at the time, all NRAs except one[396] had imposed equivalence obligations to some degree in the wholesale local access market. However, only a minority are imposing EoI. Some approaches are also difficult to classify. For example, the Latvian NRA imposes KPIs, SLAs and SLGs on wholesale access products and requires the provision of access services and information to other undertakings under the same conditions and with the same quality as the SMP operator provides to itself. This includes access to online information, online service ordering and maintenance and fault repair systems, but it was considered that full EoI would be disproportionate[397]. Instead, access seekers use an online tool (a web page called SPRINTT)[398].

At the time of BEREC's research (2016) in the WCA market, although all NRAs had imposed some form of equivalence obligation, only the Spanish and the Czech NRAs had imposed EoI (for next generation products), while some NRAs relied on EoI at the upstream/WLA level[399]. Conversely, in the Netherlands, non-discriminatory access is no longer provided under a regulated wholesale access offer but in a commercial offer published in February 2018, commercial offer that was extended after the annulment on 17 March 2020 of the market analysis decision on a wholesale fixed access market that combined Markets 3a and 3b[400].

The equivalence regime in place for different products in the WLA and WCA markets, as reported by NRAs in the online survey and BEREC Regulatory Accounting 2020 report, are presented in Table 17.

Table 17. Non-discrimination obligations

Country	Equivalence regime	Coverage
ES	EoI	EoI for NEBA local and NEBA fibra
LU	EoI	EoI for all regulated products in markets 3a and 3b
PT	EoI	EoI for duct access (no other NGA access products)
SI	EoI	EoI for all access products
SK	EoI[401]	EoI for VULA and bitstream products, however, for processes where costs are high, EoO can be justified

[395] BEREC (2016), *Monitoring implementation of the BEREC Common Positions on Wholesale Local Access (WLA), Wholesale Central Access (WCA) and Wholesale High Quality Access at a Fixed Location (WHQAFL) Phase 3*, BoR (16) 219

[396] Bulgaria. In Romania no operator was found to have SMP and in the Netherlands, the market review was annulled in Court.

[397] Commission Decision of 19.07.2018 concerning Case LV/2018/2097-2098; Notification of a Draft Measure pursuant to Article 7, para.3, of the Framework Directive 2002/21/EC, Summary of SPRK Draft Decision concerning Markets 3a and 3b.

[398] See: https://sprintt.tet.lv/

[399] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q1.

[400] KPN response to the Targeted Consultation, Q1. KPN is "committed to provide non-discriminatory access to services and information products at non-discriminatory rates. KPN has an economic incentive to provide wholesale access , without which a certain part of end customers would switch to another (cable or fibre) provider with its own access network, and KPN would no longer generate any income. In other words, we encourage effective competition through the provisioning of non-discriminatory wholesale access to our network for actual or potential alternative providers".

[401] RU Reg. číslo: 63/OER/2018-434, Case SK/2016/1906-1908

Country	Equivalence regime	Coverage
CY	EoI and EoO[402]	EoI imposed for "products via GPON optical fibre topology network and Vectoring technique in the copper network". Other products subject to EoO
FR	EoI and EoO[403]	EoI is imposed on wholesale access to ducts and civil engineering, EoO is imposed for access to FTTH
IE	EoI and EoO	Market 3a: VULA FTTC & FTTH - EoI; Civil Engineering Infrastructure (Duct & Pole Access) - EoI; Other legacy products - EoO. Market 3b: Next Generation Bitstream FTTC & FTTH - EoI; Current Generation Bitstream - EoI.
IT	EoI and EoO	EoI for LLU, SLU and VULA FTTH/B, Enhanced EoO for other access services (VULA FTTC and bitstream services).
SE	EoI and EoO	EoI is used on local access to fibre-based infrastructure. EoO is used on backhaul and co-location (and before the deregulation on civil engineering).
AT	EoO	EoO for all access products
BE	EoO	EoO for all forms of NGA access
DE	EoO	EoO for all access products
EE	EoO	EoO for all products
EL	EoO	EoO for all wholesale products.
FI	EoO	EoO for LLU and bitstream
HU	EoO	EoO for all access products
MT	EoO	EoO on VULA FTTH (the only regulated access product)
PL	EoO	EoO for all access products
HR	EoO[404]	EoO for all access products
NL	None	Decision currently annulled
RO	None	Deregulated
BG	None	Deregulated
CZ	Other	Obligation was not imposed in last market review (due to the voluntary structural separation of the SMP operator).
DK	Other	EoO imposed on all access products (legacy and fibre), but voluntary legal separation of the incumbent will effectively comply with EoI
LT	Other	Effectively EoO for all access products, although there are no references to either EoO or EoI in the decisions.
LV	Other[405]	KPIs, SLAs and SLGs have been imposed on wholesale access products, and NRA requires the provision of access services and information to other undertakings under the same conditions and with the same quality as the SMP operator provides to itself. This includes access to online information, online service ordering and maintenance and fault repair systems, but it was considered that full EoI would be disproportionate, access seekers use an online tool (a web page called SPRINTT).

Source: NRA responses to the online survey and BEREC Regulatory Accounting 2020 Report, unless stated otherwise in footnotes.

Equivalence of Input (EoI) is imposed by several NRAs on SMP operators but the number of regulated access products subject to EoI varies among Member States. NRAs that decided

[402] Market 3a Decision 91/2017 stipulates that "[CYTA must provide] in the context of access equivalence, products via GPON optical fibre topology network and Vectoring technique in the copper network, based on the input equivalence principle (EOI)."
[403] Commission Comments of 25.11.2020 concerning Cases FR/2020/2277-2278-2279-2280.
[404] Case HR/2019/2164-2165; HAKOM market analyses Tržište veleprodajnog lokalnog pristupa koji se pruža na fiksnoj lokaciji lipanj 2019; Tržište veleprodajnog središnjeg pristupa koji se pruža na fiksnoj lokaciji za proizvode za masovno tržište
lipanj 2019
[405] Commission Decision of 19.07.2018 concerning Case LV/2018/20197-2098; Notification of a Draft Measure pursuant to Article 7, para.3, of the Framework Directive 2002/21/EC, Summary of SPRK Draft Decision concerning Markets 3a and 3b

not to impose EoI but instead to implement strict non-discrimination in the form of Equivalence of Output (EoO) generally did so after a proportionality assessment. However, this assessment was in most cases not based on precise estimates of the costs that EoI and/or EoO imposes (or would prospectively impose) on the SMP operators and on access seekers. Six NRAs[406] have proceeded to such cost estimation for one or more access products. The justifications given for imposing EoO instead of EoI are therefore in most cases based primarily on qualitative justifications (see Box 7 for some examples where quantitative estimations were performed).

Box 7. Sample of quantitative estimations of implementing EoI

Ireland

In the 2018 Decision, following the results of the so-called "Cartesian Report"[407], the CEI access standard was changed from EoO to EoI. NRA mentions[408] that the costs of development and implementation of EoI were estimated at being between €465,000 and €543,000, including enhancement of the current EoO service delivery model (€365,000 to €425,000 plus license costs) and the transition to an EoI delivery model (€100,000 to €118,000 including an estimate for training).

Lithuania

According to the operator Cgates, the SMP operator estimated that EoI for access to CEI would cost them approx. €100,000-€150,000 to develop and wanted access seekers to contribute to the costs of developing this system. Eventually, no EoI common interface was developed.

Source: Case studies of Ireland and Lithuania.

Based on the cost estimates, two NRAs – Polish and Danish – abstained from imposing obligations of EoI so far. However, in these two countries, different degrees of separation were voluntarily implemented by the SMP operator. In Poland, the SMP operator established a wholesale department that provides regulated wholesale services both to its own retail arm and to access seekers[409]. In Denmark, the SMP operator completed in June 2019 its legal separation into two independent companies encompassing services and infrastructure. On the one hand, Nuuday that provides retail services and comprises the SMP operator's retail brands such as YouSee, TDC Business, Fullrate, Telmore, Hiper, Blockbuster and Firmafon. On the other hand, TDC Net that develops and manages the SMP operator's fixed and mobile network infrastructures[410].

Lack of demand for duct access is sometimes invoked as a reason not to impose access to EoI[411].

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[406] Online survey data and desk research.
[407] Cartesian (2016). *CEI Service Delivery Process Equivalence Options: Analysis of alternative service delivery approaches.*
[408] ComReg Consultation and Draft Decision 16/96 of 11 November 2016, p.341.
[409] Cullen International (2019), *Models of separation, equivalence of treatment and the role of the supervisory committee*, December 2019, p.22.
[410] Idem, p.10.
[411] Case study interviews indicate this is the case in Ireland and Cyprus.

While no NRA has imposed functional separation under the market review process, a few have accepted undertakings proposed by SMP operators consisting in different degrees of separation[412]. Beyond the Polish and Danish NRAs, this is also the case in Ireland, Italy, and the Czech Republic:

- In Ireland, the SMP operator implemented a form of functional separation in accordance with a settlement with the NRA concerning alleged discriminatory behaviour. The SMP operator established a wholesale unit providing access services both to its retail arm and to access seekers. Wholesale staff are separated from staff working in the retail arm. There is also a separation, for the most part, between wholesale and retail systems and processes, although there is shared but controlled access to certain "low risk" IT systems from both parts of the SMP operator's business[413].
- In Italy, the SMP operator has set up a wholesale division department to provide access services both to its own retail arm and to access seekers. The wholesale division function has its own staff, information systems, investment budget, and a separate incentive scheme for wholesale staff and management. In addition, the Italian approach to separation includes a supervisory committee, Organo di Vigilanza (OdV), which is responsible for monitoring the SMP operator's compliance with the principles of non-discrimination[414].
- In the Czech Republic[415], beginning in 2015, the SMP operator (O2) undertook a voluntary division (without being forced to do so by a regulator) of its business into two legally distinct companies, by means of a split-off, with the establishment of a new company called Česká telekomunikační infrastruktura a.s. (CETIN). CETIN is legally independent of O2[416] and offers wholesale services to all market players, while investing in next-generation networks. In parallel, O2 as an operator has freed itself from regulation by NRA, "which gives the operator an opportunity for rapid development in many respects, such as O2 TV and other services with attractive content"[417]. As regards CETIN, NRA withdrew the obligation to ensure economic replicability between wholesale NGA inputs provided on market 3a and retail offers and removed the obligation to publish KPIs[418].

[412] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q1.
[413] Cullen International (2019), *Models of separation, equivalence of treatment and the role of the supervisory committee*, December 2019, p.16.
[414] Idem, p.19.
[415] More information available at : https://www.ppf.eu/en/case-studies/telefonica-o2-czech-republic-and-its-uniquevoluntary-division
[416] This is the case even though both companies are controlled by the same shareholder : the PPF-group. The PPF Telecom Group is a leading telecom player in Central and Eastern Europe. Through acquisition and consolidation, the Group portfolio comprises of five mobile operators, a convergent telco operator and 4 infrastructure operators. CETIN Bulgaria, CETIN in the Czech Republic, CETIN Hungary, CETIN Serbia, O2 Czech Republic, O2 Slovakia, Telenor Bulgaria, Telenor Hungary, Telenor Montenegro, and Telenor Serbia all fall within the PPF Telecom Group portfolio. The group structure is available on https://www.ppftelecom.eu/group-structure
[417] More information available at : https://www.ppf.eu/en/case-studies/telefonica-o2-czech-republic-and-its-uniquevoluntary-division
[418] See Commission Decision of 27.04.2018 concerning Cases CZ/2018/2067 and CZ/2018/2068, p.5.

Finding 16. Historically, EoI was perceived by some as a way to ensure strict non-discrimination without losing the benefit of vertical integration. It can in any case be considered a more proportionate approach than the imposition of functional separation, which is a last resort remedy. At the same time, where functional or structural separation is in place, certain non-discrimination requirements may no longer be warranted as suggested by the Czech NRA's approach.

In Hungary, EoI is not imposed because:

- The application of the EoI obligation on copper networks would require a major restructuring of the existing systems of SMP operators because of declining technology. Accordingly, the imposition of an EoI obligation for access services provided over traditional copper networks cannot be considered a proportionate obligation.
    a) Competition in the Hungarian market is basically infrastructure-based. The proportion of services provided using regulated wholesale services is smaller. In the case of lower take-up, positive market effects resulting from the introduction of the obligation are also smaller and disproportionate to the significant regulatory burdens that would have been associated with the application of the obligation.
- In Hungary, three separate markets are defined and there are three different SMPs with significant size differences. As the EoI requirement for small providers is disproportionate, in practice this would mean imposing different obligations on each SMP, which is not justified by differences in market power, as the market analysis did not identify differences that would support differentiated obligations.
    a) For each of the three SMP operators, *ex ante* obligations are imposed only on part of their respective service areas. Accordingly, in the case of EoI, the obligation would only affect part of their service area or access network. This would mean that SMP operators would have to operate either two systems or, if SMP operators decide to have a single system, procedures, etc., they should implement the service of their own retail arm even in the non-regulated area with the systems and processes established on the basis of the obligations imposed in the regulated area. In the first case, there is the significant additional burden of maintaining two types of systems and in the second case, there is the restrictive effect of an imposed obligation on services in a non-regulated area, which may cause market problems due to regulation. (…) Although it can be stated that the information asymmetry is very high regarding the SMP operator's civil engineering infrastructure between the SMP and the access seekers, thus imposition EoI for access civil engineering infrastructure is worth considering[419].

An NRA observes that the imposition of EoI would have led to significant adaptations to IT systems of the SMP operators, which would in turn have led to significant adaptations to IT systems of the alternative operators[420]. However, the SMP operator claims the only difference

[419] Hungarian NRA response to the Targeted Consultation, Q5.
[420] An NRA's response to the online survey.

between the EoO system in place and EoI, would be "the different interface through which retail and wholesale is being accessed"[421].

A different NRA invokes the importance of regulatory stability in addition to the implementation cost of EoI to justify maintaining its EoO approach[422].

In Germany, all wholesale products are subject to the EoO standard[423].

Finding 17. When deciding on whether to impose EoI or EoO for specific access products, NRAs seldom proceed to a quantitative cost/benefit analysis, but rather rely on a qualitative estimation of the need to ensure 'stricter' non-discrimination for the wholesale access products at stake.

EoO does not cover the same set of obligations in all countries where NRAs have imposed it. For example, in France the NRA imposed a so-called "reinforced EoO", detailed in several subsequent decisions relating to both SMP remedies as well as under symmetrical regulation (in particular Decision no. 2015-0776 of 2 July 2015 on the technical and operational processes for the mutualisation of very high-speed fibre optic electronic communications networks)[424]. The French Competition Authority has also been involved in the implementation of this principle (see the ADLC's opinion 15-A-04 of 6 February 2015[425]). In Italy, NRA also developed an enhanced EoO regime[426].

Examples of countries in which NRA imposed EoI include:

- France, where EoI is imposed on wholesale access to ducts and civil engineering (the "GC BLO" access offer in France). EoI was discussed and imposed before the beginning of fibre deployment[427]. EoI is even applied in a symmetric way. The NRA requires operators who have deployed FTTH networks to put in place "common tools"

[421] Operator's response to the online survey. The operator says that according to the NRA, access provided cannot qualify as EoI as long as the same interface is not used for internal as for external ordering even though the ordering system and associated Operational Support Systems (OSS) underlying the applicable retail and wholesale interfaces are the same already. In a similar vein, Deutsche Telekom in response to the Targeted Consultation, Q4 advocates that "the definition of EoI should be relaxed so that wholesale and retail do not necessarily have to obtain their wholesale products via identical interfaces. The decisive factor for EoI should be that the processes following an interface are identical".

[422] An NRA's response to the online survey.

[423] Deutsche Telekom in response to the Targeted Consultation Q4 argues that a complete conversion of the underlying IT systems which were predominantly built at a time when the telecommunications markets had not yet been liberalized, "to a level that would meet EoI would involve disproportionate costs".

[424] Iliad response to the Targeted Consultation, Q1. However, the operator stresses the shortcomings of EoO for FTTH because the operational processes implemented in FTTH deployment are very much interlinked together (with the commercial operator responsible for the connection of the end-user), "which makes it very difficult to compare operational processes from end-to-end".

[425] The opinion is available at: https://www.autoritedelaconcurrence.fr/sites/default/files/commitments//15a04.pdf

[426] Telecom Italia response to the Targeted Consultation, Q1. However, the operator stresses that "Italy is the only country among the EU Big 5 where both the cost orientation obligation on the main wholesale access services (LLU, SLU e VULA) and the economic replicability obligation on all retail access offers are applied throughout the whole national territory, despite the EoI, the processes' disaggregation obligation (very exceptional in the EU) and the high degree of competition reached in several geographical areas of Italy".

[427] An operator's response to the online survey. Likewise, Orange in the Targeted Consultation, Q8 adds that when "not imposed from the beginning (both for SMP's own provision and wholesale provision), EoI is generally burdensome, costly and long to implement. This can lead to be a remedy less efficient than other less intrusive possible organizations in order to guarantee non-discrimination while not impeding the deployment of new networks".

to offer access to any operator, including their possible downstream branch at the mutualization point[428]. According to the same operator, EoO is imposed for access to the FTTH from the SMP operator and works relatively well, mainly because the regulator is attentive to its implementation and the context on the FTTH retail market is characterized by strong competition[429].

- In Spain[430], EoI is imposed for fibre-based access in regulated areas. EoO in the form of the KPI's obligation is applicable both to copper and to fibre in the rest of the territory.
- In Portugal, EoI has been imposed in the 2017 Market 3a review regarding ducts and poles[431].
- In Ireland, EoI was imposed on WLA/WCA requiring the SMP operator to provide access to pre-ordering, ordering, provisioning fault reporting and repair for VUA based WLA and CEI. EOI also applies in the regional WCA market. The EoI standard was introduced for the initial rollout of NGA services in 2013. This enabled the development of an effective industry agreed-upon process for the launch of NGA[432]. The EoI obligations carried over in WLA VUA, CEI and WCA regional bitstreams in 2018. It was also extended to WCA CGA in 2018 within prescribed timelines up to 12 months from the date of the 2018 decision.
- In the Czech Republic, EoI was brought about by the voluntary legal separation of the SMP operator in the wholesale only company CETIN and a service operator O2[433].
- In Italy, the SMP operator implemented an equivalence model on a voluntarily basis. It is based on EoI for copper unbundling and FTTH VULA services[434].

The NRAs concerned report having followed elements of the guidance of the NDCM Recommendation for designing the EoI regime they have implemented and in particular the guidance on the following aspects (see Table 18).

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[428] An operator's response to the online survey. NRA Decision Nr 2020-1432 of 8 December 2020 nonetheless foresees a possible exemption where the implementation of common tools would be disproportionate.
[429] Iliad response to the Targeted Consultation, Q6.
[430] An operator's response to the online survey.
[431] In this latter case of duct and pole access offers EoO proved insufficient to address severe differences in
(1) access to mapping and occupation information,
(2) network availability criteria (that is, the alternative providers have had much more restrictions with being granted availability to specific sections of the network than the SMP provider) and
(3) procedures to access the civil infrastructure and deploying network and solving access bottlenecks (e.g. duct blockage).
With the implementation of additional EoI obligations in late 2019, an operator reports having witnessed an important reduction of these asymmetries, but effective impact cannot yet be assessed (response to the online survey). Another operator mentions in its response to the online survey that access seekers still experience significant costs associated with some of the measures and process in place (e.g. large annual fee to the duct and pole database).
[432] An operator's response to the online survey.
[433] However, CETIN not qualifying as a 'wholesale only operator' within the meaning of Article 80 EECC because of common shareholdership. This raises the question on how to deal with 'wholesale only' SMP operators. For example, recitals 13, 26, 33, 37, 39 as well as in Annex I and Annex II of the NGA recommendation mention "the downstream retail arm of the SMP operator". The same holds true for points 10 through 13 of the 2013 Recommendation on non-discrimination and costing methodologies, which all assume that the SMP operator has its own retail arm. See TDC response to the Targeted Consultation, Q1.
[434] ETNO response to the Targeted Consultation, Q1. ETNO alleges a proportionality issue in this regard: "as the NRA imposed on top of this multiple additional layers of equivalence and non-discrimination guarantees (in addition to the EoI/EoO and to the economic replicability test obligation, also subject an obligation of disaggregating delivery & assurance activities for copper activities)".

Table 18. Elements of guidance in the current Recommendations deemed useful by NRAs when designing their EoI regime

Elements of guidance	No.
Process of monitoring the conditions to ensure compliance by reference to systems and processes	7
The ordering procedures themselves for both SMP operators' downstream operations and alternative operators	6
Appropriate controls that should be performed regularly over time	2
Penalties	3
Other	1
None of the above	1

Source: Online survey of NRAs. N = 8.

Practices among NRAs are diverse. Observing the substantial variation between the non-discrimination obligations imposed by NRAs[435], BEREC concluded that the best practices listed in the Broadband Common Position (BoR (18) 24) could be updated to "further highlight the availability of a range of remedies (including different degrees of functional separation, EoI, EoO and non-discrimination)".

Finding 18. Notwithstanding the best practices listed in the Broadband Common Position (BoR (18) 24), substantial variation between the non-discrimination obligations imposed by NRAs remains.

Reported impact

Two NRAs strongly disagree with the statement that EoO obligation decreases access providers' incentives to invest in VHCN deployment while one NRA is of the opinion that EoO may increase access seekers' incentives to invest in VHCN deployment.

Finding 19. Very few NRAs perceive causal links between strict non-discrimination and incentives to invest in VHCN deployment. No NRA acknowledges that such obligations may decrease access providers' incentives to invest in VHCN deployment.

The impact of the introduction of EoI on the frequency and importance of alleged discrimination cases compared to the period before it was implemented is also not clear. Only one NRA observed an impact, while six say that they have found no impact.

An NRA reports[436] that the benefit of the EoI model being applied to the above-mentioned basic services (LLU, SLU, VULA FTTH/B) was the fact that the SMP operator's retail division and infrastructure competitors were placed in identical positions enjoying an identical chain of delivery for such services. Thus, a true level playing field was assured. Where EoO is applied, it is ensured that the SMP operator will provide its regulated access services with methods comparable to the ones used towards the SMP operator's retail division in terms of functionality and price. Furthermore, the EoO enhanced model approved by the NRA benefits from the

[435] Including the different definitions used by EoI, such as highlighted by Proximus response to the online survey, which says that contrary to the Belgian NRA, the Spanish NRA qualified as EoI an operational access obligation by which the access interface used by alternative operators was different from the one used by the SMP operator to provide wholesale inputs to its retail services. Proximus asks for a more consistent interpretation of EoI. The issue is also flagged by ETNO in its response to the Targeted Consultation, Q1.
[436] An NRA's response to the online survey.

unification of the supply processes of basic service components processed according to the Full Equivalence regime. Regarding access to civil infrastructure and in-building infrastructure, which is not subject to EoI, an operator reports to have experienced a significant number of cases in which internal branches or subsidiaries of the incumbent receive access to these infrastructures on economic, technical and process conditions that are different from those applied to other market players[437].

A Swedish operator claims that EoI for wholesale local fibre access had a very positive impact on the build-out of fibre networks and on competition because it resulted in lifting the previously imposed pricing obligations on fibre unbundling by the SMP operator. The price regulation on the incumbent/SMP operator had a negative and withholding effect on investments in fibre networks in general and on investment in wholesale-only fibre networks. As the roll out of fibre networks increased in Sweden (many operated by municipal networks as "open" networks), competition in the market increased both at the infrastructure level and at the service level. In conclusion, it was consequently not the imposition of EoI on the incumbent/SMP operator as such that led to an increased fibre roll out and competition, but the fact that the imposition meant that the previously imposed price regulation had been lifted[438].

An NRA firmly believes that the entry of an additional wholesale operator in the market shows that EoO has been effective.[439]

In Germany, an operator[440] flags a need for the German NRA to impose EoI in the context of access to the incumbent's fibre network since current regulatory discussions show that future regulation concerning reference offers and prices may be less intrusive when compared to copper based products. In the past, access seekers in Germany have experienced problems with the incumbent's activation procedures[441]. This operator therefore advocates that activation and fault clearance of Deutsche Telekom's wholesale customers and retail customers should be processed via identical IT systems and interfaces (in particular in view of the upcoming access regime for fibre).

Another NRA considers[442] EoI to have been was one of the main contributing elements to the current success of fibre unbundling in the country. Given that fibre unbundling requires a large upfront investment from the operators, as colocation needs to be implemented at many local POPs, EoI allowed these operators to have a higher level of confidence in the regulated products. Especially the increased transparency (KPI, annual EoI implementation report) and clearly defined procedures provided operators with the necessary assurance that they could compete with the retail branch of the SMP operator. The SMP operator also benefitted from the implementation of EoI as it was able to restructure and implement new processes within the company. The EoI obligation helped the internal decision-making processes and "convinced" the staff that EoI is necessary and beneficial to the company. The EoI process was also very helpful for the NRA, allowing it to gain a better view of entire supply chain. During the first regulatory period with EoI, the NRA received a lot of information and insights from the SMP operator. However, the incumbent was not forced to share this information with the alternative operators. Therefore, the NRA implemented a stronger transparency measure

[437] An operator's response to the Targeted Consultation, Q4.
[438] Stokab response to the online survey.
[439] An NRA's response to the online survey
[440] An operator's response to the online survey.
[441] An operator's response to the Targeted Consultation, Q1 refers to the procedure BK2-19/032 concerning „zahlreichen Wettbewerbern umfänglich diskriminierende Praktiken u.a. der Telekom wie verzögerte Bereitstellung oder unterschiedliche Vertragsbedingungen geschildert."
[442] An NRA's response to the online survey.

during the course of the 2nd regulatory period with EoI in the form of an annual report which has to be shared by the incumbent with alternative operators.

According to a different NRA[443], the advantages of imposing EoI in access to ducts and poles of the SMP operator are associated with the creation of incentives to investment in alternative networks and the increase of competition in infrastructures.

Implementation difficulties[444]

***a) EoI can more easily be applied to specific inputs than to products*:** the boundary between EoI and EoO at a product level will not be clear-cut because wholesale products are built up from various inputs, such as assets, IT processes, etc. Consequently, the proportionality testing on a product-by-product basis is likely to conclude that some inputs to a specific product can reasonably be delivered on an EoI basis, but that other inputs to the product are not so easily susceptible to EoI[445]. However, access seekers claim that applying EoI only on a subset of access may be ineffective in ensuring the effective replicability of all flagship products[446].

b) Monitoring costs should be taken into account: According to the Polish NRA, the implementation of EoI requires some form of functional separation and significant implementation costs[447]. However, EoI implemented through structural measures is easier to audit than EoO[448]. In the absence of EoI, constant and transparent monitoring of measurable KPI is required, which is difficult in practice[449]. While EoI may have high implementation costs, the monitoring costs of EoO will generally be higher than those of EoI. The NRAs should take into account both types of costs when proceeding to their proportionality assessment. Moreover, comparing KPIs of the SMP operator to those of alternative operators is not possible if the number of connections used by the latter is large enough. If not, deviations are statistically not relevant[450].

c) Implementation of EoI can lead to wholesale price increases: an operator would like the Greek NRA to impose EoI on local loop unbundling in NGA networks but is concerned that this may lead to an increase in pricing due to the higher costs of redesigning existing provisioning and operational support systems to make them EoI compliant[451].

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[443] An NRA's response to the online survey.
[444] The section summarizes data reported by the NRAs and operators via the Targeted Consultation, online survey and case study interviews, unless otherwise indicated.
[445] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q1.
[446] For example, an operator in response to the online survey reports that "The absence of EoI for VULA - the main wholesale services adopted by the alternative operators - makes the current EoI implementation in the Italian market completely ineffective (…)". AIIP response to the Targeted Consultation Q4 notes that "AIIP believes that when the EoI model is adopted, it must necessarily be extended to all regulated wholesale products on the SMP network. Any limitation is prelaminar to discriminatory practices in the supply of the remaining inputs on the SMP network".
[447] UKE response to the Targeted Consultation, Q4.
[448] An operator's response to the online survey.
[449] During the Stakeholders' workshop of 9 June 2021, Bouygues Telecom stressed that the implementation of EoO is often ineffective because it requires continued NRA monitoring that is often insufficient in practice. However, also in the case of EoI monitoring it is of utmost importance (an operator's response to the online survey: "an audit to the incumbent processes could be beneficial and shed light on the need for additional measures to ensure effective non-discriminatory access/EoI [to civil engineering in Portugal]").
[450] CETIN, Stakeholders' workshop 9 June 2021.
[451] An operator's response to the online survey.

In Italy, the implementation of EoI has been extremely long, difficult and costly for alternative operators even "for the few basic services" as they had to bear most of the costs. Compared to the benefits of the system, one operator claims that the costs were even higher[452].

In Lithuania, when estimating the potential costs of implementing EoI (in particular, a system that would ensure equivalent processes for providing and processing access requests), an alternative operator recalls that the SMP operator claimed that the costs would amount to approx. €100.000-€150.000, and wanted access seekers to contribute to the development of this system. No such common interface was developed since access seekers were not willing to contribute[453].

Finding 20. Several comments acknowledge that any requirement to set up EoI will have a cost. However, access seekers did not express an inclination to pay for or share the costs of the implementation of EoI either in the online survey or during interviews.

d) Need to deal with allocation of workforce by the SMP operator: an operator highlights that it would be important to ensure EoI in Spain regarding the use of the same human work force for wholesale and retail services. The operator had noticed that the SMP operator keeps its own retail services better resourced than its wholesale services[454]. EoI will not necessarily be more effective than EoO, if such underlying issues which are common to both are not addressed first.

e) Need to differentiate between KPIs for business and residential users: an operator[455] flags that in Spain this is of particular importance in the case of KPIs applicable both to residential and business segments. It hopes that this will be changed in the on-going market review, because in business markets discriminatory behaviours have a much higher impact on each customer (e.g. in terms of breakdowns, repair times, etc.).

f) EoI is more easily implemented if an SMP operator is modernising its business. Some operators reported that in some circumstances implementation of EoI would not create excessive additional costs. For example, in Ireland, EIR says it did not face any excessive burden to implement EoI for NGA networks, as it was a new service and it was easier to implement (compared to the costs of implementing EoI on legacy products).[456] In Sweden, Telia reports having already planned a deep internal transformation and therefore could accommodate the (otherwise significant) EoI compliance costs within the budget earmarked for their transformation (but indicates that implementation of EoI as a self-standing operation would have been tremendously costly)[457].

e) Other issues reported: In France, an operator[458] points to various problems:

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[452] Italian operator's response to the Targeted Consultation, Q1. However, a different operator's response to the online survey notes that "In Ireland, while wholesale prices remain high, there has not been substantial incremental implementation costs arising as a result of the imposition of EoI obligations". For this reason, G. Sorensen of GOS Consulting advocated a transition to EoI over time (Stakeholders' workshop of 9 June 2021).
[453] Case study interviews.
[454] An operator's response to the online survey.
[455] An operator's response to the online survey.
[456] Case study interviews.
[457] Case study interviews.
[458] An operator's response to the online survey.

- Absence of an effective 'Chinese Wall' between SMP operators' wholesale divisions and their retail divisions
- Non-availability of prior information on deployment (or not with the same conditions)
- Pre-offering of services prior to deployment by an infrastructure operator (confusion of roles between a commercial operator and an infrastructure operator)
- Based on the French experience, they consider EoI to be more effective than EoO, especially in the context of fibre deployment, for the following reasons:
    a) The EoO principle implies regular and detailed monitoring by NRA, which may not feasible on a long term basis (in case *ex ante* regulation ceases to exist in a given market
    b) In France the operational processes implemented in FTTH deployment are very much interlinked (the commercial operator is responsible for the connection of the end-user), which makes it very difficult to compare operational process from end-to-end.

Finding 21. Calls from operators to move from EoO to EoI often concern (potential) information sharing between wholesale and retail arms of the SMP operator. Beyond that specific issue, these calls seem to reflect problems related to the enforcement or the functioning of EoO rather than to the current guidance. Similar monitoring and enforcement problems are in some cases raised even when EoI is imposed.

Sustainability

Telefónica[459] considers the preference for EoI to be increasingly out of pace with the current evolution towards a more granular geographic definition of markets. When, as a result of the market analysis, the operator is found as an SMP only in certain geographical areas, the costs of implementing different ordering and provisioning systems according to geographic regions will become increasingly high as there will be less and less potential for economies of scale.

d. Guidance relating to the technical replicability test (TRT)

Provisions concerned (NDCM Recommendation)

- "(11) NRAs should require SMP operators subject to a non-discrimination obligation to provide access seekers with regulated wholesale inputs that allow the access seeker to effectively replicate technically new retail offers of the downstream retail arm of the SMP operator, in particular where EoI is not fully implemented.
- (12) To that end, and in order to guarantee a level playing field between the SMP operator's downstream retail arm and third-party access seekers, NRAs should ensure that internal and third-party access seekers have access to the same technical and commercial information regarding the relevant regulated wholesale input, without prejudice to applicable rules regarding business confidentiality. The relevant information includes information on newly regulated wholesale inputs or on changes to already existing regulated wholesale inputs to be provided in accordance with lead-times defined on a case-by-case basis.

[459] Written feedback to Stakeholders' workshop of 9 June 2021, p.3.

- (13) When assessing the technical replicability of the SMP operator's new retail offer, the NRA should take into account: (i) whether the corresponding wholesale input(s) for ordering, delivery and repair necessary for an efficient operator to develop or adapt its own systems and processes in order to offer competitive new retail services are made available at a reasonable period before the SMP operator or its downstream retail arm launches its own corresponding retail service taking into account the factors set out in Annex I and (ii) the availability of corresponding SLAs and KPIs.
- (14) The required technical replicability test can be carried out by either the SMP operator or the NRA."
- Annex I: Specification of Lead time and provisions of information
- "When assessing the reasonable length of the required lead time, NRAs should take into account the following factors:
  1. if the product is a new product or is an update of an existing product;
  2. the time necessary to consult and agree on the wholesale processes for the provision of the relevant services;
  3. the time necessary to produce a reference offer and sign contracts;
  4. the time necessary to modify or update relevant IT systems;
  5. the time necessary to market the new retail offer."

Did the guidance bring about consistent technical replicability tests (TRTs) across the EU?

α) The technical replicability test (TRT)

Technical replicability is not only applicable in EoO situations, but generally to a non-discrimination obligation. A sample of NRA approaches is provided hereunder. When a strict EoI obligation has been imposed and fully implemented by the SMP operator, the relevance of a separate technical replicability obligation will normally be smaller, which explains some of the differences in the TRTs imposed across the EU.

- The Hungarian NRA says[460] that it required the SMP operator to apply technical replicability tests[461] as follows:
  a) Before launching any new retail product based on a new technology or type of network, the SMP operator must test whether the new retail product can be replicated using the wholesale services offered in the reference offer.
     i. If the outcome of the TRT is that the new retail product can be replicated using existing wholesale services, the SMP operator has to provide NRA with the results, including the details of the new retail product and all of the information needed to demonstrate that technical replicability is ensured at least 90 days before the planned retail market introduction.

[460] Hungarian NRA response to the Targeted Consultation, Q7.
[461] See also an operator's response to the online survey: "In Hungary, a technical replicability obligation is imposed on the SMP operator, which is working well."

ii. If the outcome of the TRT is that the new retail product cannot be replicated using existing wholesale services, the SMP operator has to complement its reference offer with a new wholesale service which ensures replicability. New retail products can be introduced 45 days after the new reference offer approved by the NRA enters into force.

b) If the SMP operator introduces a new retail service with a new bandwidth and that bandwidth is not available in case of L2 WAP or bitstream access (BSA) services, the SMP operator must provide the new bandwidth in case of L2 WAP and BSA as well, not later than the retail launch of the retail service with the new bandwidth. The SMP operator does not have to notify the new bandwidth to NRA or modify the reference offer but must publish the information about the new bandwidth 60 days before its retail market introduction. (The process of termination of retail and wholesale offers with a certain bandwidth is also regulated.)

c) If the SMP operator modifies the quality (KPI level) of its retail products in such a way that they cannot be replicated by the actual KPI level of wholesale products, the SMP operator has to provide the new KPI level in wholesale as well, not later than by the retail launch of the new KPI level. The SMP operator does not have to notify the new KPI to NRA or modify the reference offer but does have to publish the new KPI level 60 days before its retail market introduction. Evaluation of obligations: So far there have been no examples of application of the TRT due to a new technology or network type[462].

- In Italy, the SMP operator must also ensure replicability of the retail products from a technical point of view. However, according to some operators[463], the replicability test discipline does not appear to consider all relevant aspects, and in particular does not include coverage of the specific retail SMP service, technical parameters of the retail SMP offer (e.g. download and upload minimum rates) and time to market information, etc.
- In Germany[464], the SMP operator is not obliged to demonstrate technical replicability before the launch of new retail products, but must be able to do so on request[465].

The online survey confirmed that NRAs have different approaches on the timing of the TRT. (See Table 19).

[462] Hungarian NRA response to the Targeted Consultation, Q7.
[463] AIIP response to the Targeted Consultation, Q6.
[464] Deutsche Telekom response to the Targeted Consultation, Q6.
[465] Online survey responses, as well as anonymous operator's response to the Targeted Consultation, Q6: Eine technische Replizierbarkeit ist im deutschen TKG nicht ausdrücklich vorgeschrieben. Sie ist aber Bestandteil des Missbrauchsmaßstabs des § 42 TKG, d.h. wenn es an einer technischen Replizierbarkeit fehlt, kann dies ein missbräuchliches Verhalten begründen.

Table 19. Approaches to implementing the TRT

Approaches	No.
The SMP operator must submit a report before the launch of any new resale offers	9
The SMP operator must be able to demonstrate technical replicability upon request	9
Other[466]	8
Not applicable (because not regulated, or no obligation)	6

Source: Online survey of NRAs. N = 23

- In Greece[467], within the context of non-discrimination obligations, NRA have imposed specific rules on the SMP operator to ensure the technical replicability of all of its retail offers. More precisely, prior to the launch of a new retail product, the SMP operator must perform a technical replicability test. The NRA should be notified of the results of the test and all relevant information as regards the wholesale inputs that ensure technical replicability. If the NRA considers the new retail offer to be technically non-replicable, it may prohibit its provision of the product. Moreover, it is required that the SMP operator make wholesale broadband access products available six months before launching its corresponding NGA retail services. The six-month period starts from the approval of wholesale prices by EETT. In cases of technical upgrades of existing retail products (e.g. upgrades from VDSL to VDSL Vectoring) a two-month period is considered sufficient.
- In Slovakia, the SMP operator has an SMP obligation of non-discrimination on Markets 3a and 3b, including the obligation to ensure technical replicability[468].
- In Croatia, the SMP operator is subject to an obligation of technical replicability: it is prohibited from launching new retail services unless an adequate wholesale solution is offered well in advance to enable other operators to replicate its retail offer thus preventing the first mover advantage of the SMP operator[469].
- In Poland[470], the SMP operator is obliged to ensure the technical availability of its wholesale product 5 months in advance of the commercial launch of a retail product (at least 2 months in advance for vectoring related products as these are considered to be upgrades to existing VDSL services).
- In Greece[471], a period of 6 months is foreseen.
- In Italy, a period of 3 months is foreseen[472].

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[466] The category 'other' also encompasses variations of the previous two categories. For example, in one country, the SMP operator must send a test documenting the technical replicability of the retail product to the NRA before the launch of a new or significantly changed retail product. However, the test requirement is triggered only if the replication of the retail product in question necessitates adjustments in the underlying wholesale process - e.g. as a result of new or changed network access products or as a result of changes in the way of ordering and assembling the relevant network access products.
[467] Deutsche Telekom response to the Targeted Consultation, Q6
[468] Ibid.
[469] Ibid.
[470] Orange response to the Targeted Consultation, Q6.
[471] Deutsche Telekom response to the Targeted Consultation, Q6.
[472] Article 9(8) Decision 348/19/CONS provides that:
- Any change in the technical conditions of the services included in the reference offer is published on the website (after AGCom's approval) at least 3 months prior to the date of entry into force
- The offer should be technically available at least 1 month prior to the date of entry into force
- TIM can use any new access profiles or services for the provision of its services in the downstream markets only after 3 months have passed since their publication on its website.

- In Spain, the wholesale product for local access over fibre (VULA) must be at the alternative operator's disposal one month before is launched at the retail level[473]. For instance, the introduction of a 600 Mbps speed in Telefónica's retail broadband products[474] in 2018 was launched only after NGA wholesale Reference Offers (*NEBA local* and *NEBA fibra*) were effectively available for alternative operators.
- In Sweden, the SMP operator on the WLA market is to apply a technical replicability test to prove that all retail services provided by Telia can be replicated using the fibre wholesale products offered to alternative operators[475].
- In the Czech Republic, technical replicability is not imposed on any services because the SMP operator is a structurally separated wholesale only operator and does not have a retail product[476].

b) KPIs

In 2016, BEREC carried out a monitoring exercise on how NRAs have been implementing broadband common positions (CPs) covering among other wholesale local and central access. Under the Common Positions, NRA must require SMP operators to adhere to reasonable service levels and must set of KPIs which allow monitoring compliance with non-discrimination obligations. BEREC found that, at the time, all but a few NRAs imposed:

- A generic KPI requirement (best practice 34);
- KPIs to cover specific areas (best practice 34a);
- KPIs available to all operators (best practice 34*b*);
- NRA should take oversight of the process of setting KPIs (best practice 34c).[477]

Table 20. Best practices related to KPIs

MS	*BP33d: SLGs available to all wholesale operators*	*BP34: Generic KPI requirement*	*BP34a: KPIs to cover specific areas*	*BP34b: KPIs available to all operators*	*BP34c: NRAs should take oversight for the process of setting KPIs*
AT	√	√	√	√	√
BG		√	√	√	√
HR	√	√	√	√	√
CY	√	√	√	√	√
CZ	√	√	√		√
DK	√	√	√	√	(√)
EE					(√)
FR	√	√	√	√	√
DE	√	√	√	√	√
IE	√	√	√	√	√
IT	√	√	√	√	√

In Spain, Telefonica has to guarantee the technical replicability of the whole set of wholesale products (Telefonica response to the Targeted Consultation, Q6).

[473] Orange response to the Targeted Consultation, Q6. Telefonica response to the Targeted Consultation, Q6 considers this obligation disproportionate and not hospitable to a favourable climate for incentivising investments in VHCN networks.

[474] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q6.

[475] Ibid.

[476] An operator's response to the online survey.

[477] BoR (16) 219.

MS	*BP33d: SLGs available to all wholesale operators*	*BP34: Generic KPI requirement*	*BP34a: KPIs to cover specific areas*	*BP34b: KPIs available to all operators*	*BP34c: NRAs should take oversight for the process of setting KPIs*
LV	√	√	√	√	√
LT	√	√	√		
LU	√	√	√	√	√
MT		(√)			
NL	√	√	√	√	√
RO	N/a	N/a	N/a	N/a	N/a
ES	√	√	√	√	√
SE	√	√	√	√	√

Source: BEREC, BoR (16) 219.

In Germany and Spain, KPIs are included in the Reference Offer (RO) and consequently are subject to approval from their NRAs. In Germany, there is a two-step procedure that begins with the publication of a draft Reference Offer by the SMP operator, and a request that access seekers provide comments. The NRA's ruling chamber (Beschlusskammer 3) examines the draft Reference Offer, holds a public hearing and may make comments. In the second round, a revised Reference Offer is published, further comments are solicited, and the second hearing is held. The process culminates with the publication of an approved Reference Offer that includes service specifications, price lists, the ordering process, and procedures for fault repair and monitoring.

In Italy, KPIs and KPOs (key performance objectives) are set by the incumbent together with the NRA[478] in a multi-stakeholder process. The NRA is of the view that the process avoids placing needless restrictions on the SMP operator, fully engages alternative operators, and generates a degree of market consensus. The Polish NRA confirms that it provided the tools for testing the technical replicability with respect to LLU and BSA services in its decisions[479]. In Greece, as regards wholesale regulated products, the NRA has imposed an obligation on the SMP operator to publish KPIs on a quarterly basis and at the NRAs' request in order to ensure that the SMP operator does not discriminate between its retail arm and wholesale operators or between wholesale operators. These KPIs are defined in the Reference Offers concerned and are publicly available through the Wholesale Customer Relationship Management system (W-CRM). Moreover, they are being constantly monitored by the NRA[480]. In Slovakia, the SMP operator has the obligation to monitor and publish KPIs altogether as part of its obligations on Markets 3a and 3b. They are published online on a quarterly basis[481]. In Croatia, KPIs are used in relation to wholesale regulated products and are defined by the market analysis. Detailed calculation rules are approved and audited by the NRA; KPI results are available to all operators and the NRA[482].

In Hungary, the KPIs are:

(i) Supply time for access service

[478] BoR (16) 219, p.40.
[479] UKE response to the Targeted Consultation, Q6.
[480] Deutsche Telekom response to the Targeted Consultation, Q7.
[481] Ibid.
[482] Ibid.

(ii) Ratio of fault repair time within 24 and 72 hours

(iii) Supply time for change of service provider

(iv) Supply time for change of wholesale service

(v) Supply time for relocation of access service

The Hungarian NRA imposes these KPIs and they are applied for the following access products: ULL, VULA and central access to broadband services[483].

In practice[484], whether NRAs impose a TRT or not, the KPIs imposed by NRAs generally cover the key elements in the provision of regulated wholesale services that are listed in Point 20 of the NDCM Recommendation that are aimed at monitoring a non-discrimination obligation (see Table 21).

Table 21. Elements of the regulated wholesale services that are covered by KPIs aiming at monitoring a non-discrimination obligation

Elements covered by KPIs	No.
Ordering process	21
Provision of service	22
Quality of service, including faults	22
Fault repair times	22
Migration between different regulated wholesale inputs (excluding one-off bulk migrations)	12
Other key elements	8

Source: Online survey of NRAs. N = 23.

Impact of TRT and KPIs

In Greece, the TRT obligation imposed under the "vectoring regulation" entails prior notifications on technical/design information of the wholesale product and provides access to information about the development of wholesale products. There was limited transparency regarding the flow of the activation process before the vectoring regulation[485]. According to one operator in Hungary, the measurement of KPIs does not have a sufficient deterrent effect[486].

Finding 22. TRTs, or at least KPIs, that ensure non-discriminatory replicability are available throughout the EU. However, comments received suggest that there is some room for improvement.

Implementation difficulties[487]

How to avoid disproportionate TRT requirements? For example, in Croatia the TRT obliges the SMP operator to include in its wholesale offer numerous wholesale services and solutions (wide set of available speeds, technologies, private virtual circuits, levels of access etc.), many

[483] An operator's response to the online survey.
[484] According to NRA responses to the online survey
[485] Vodafone response to the Targeted Consultation, Q6.
[486] An operator's response to the online survey.
[487] The section summarizes data reported by the NRAs and operators via the Targeted Consultation, online survey and case study interviews, unless otherwise indicated.

of which have never been used by access seekers, leading the SMP operator to claim that the TRT applied in that Member State would lead to an inefficient use of resources. An example of such overly inefficient use of resources is, according to the operator[488], the obligation to offer a wholesale hybrid modem service (a technological solution which simultaneously uses fixed and mobile broadband access to improve available bandwidth at the customer's location), disregarding the fact that the SMP operator's competitors would be able to replicate this retail solution by using their own mobile networks. As the SMP operator expected, it has not received a single request for it[489]. The question is raised by the SMP operator as to whether NRA should not limit the constraints on the technical availability of wholesale products to the most critical level of access[490]. Using KPIs generates costs to update, upgrade, and maintain them in parallel to the information system and operating system's costs. Using KPIs also puts under constraints the access seeker which must properly manage the mirroring processes: a fluid ordering system, a good and reliable diagnosis of the defaults incurred, and order qualification[491]. Another operator is of the opinion that there should only be a few/key EoI and quality KPIs and SLAs rather than a long list, but that these should be monitored carefully and that any minimum deviation from such should be subject to significant sanctions. Dissuasive sanctions are required to make sure that the provision and assurance of the quality level target are met. Otherwise, the SMP operator may opt for paying the penalties instead of reviewing its internal processes[492].

How to ensure non-discrimination between infrastructure based and access-based retail competitors? Vodafone illustrates the problem with an example of next generation leased line products ("CFV 2.0") in Germany which were not designed as a wholesale product and therefore does not allow the SMP operator's competitors that have their own infrastructure, such as Vodafone, to take advantage of using their own (backbone) infrastructure compared to pure resellers. Vodafone and other competitors have therefore advocated an alternative product design to avoid the SMP operator's discrimination against competitors that have their own infrastructure when compared to resellers[493].

How to deal with 'small' access seekers? KPIs work for 'large' (i.e. statistically significant) numbers. Divergences arise when comparing KPIs for small access seekers who may only have 10-20 monthly instances of service installations, single digit repair orders, etc. Such divergences may have nothing to do with any discriminatory practice but instead are a reflection that some orders are more difficult to fill than others and a statistical approach does

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[488] Deutsche Telekom response to the Targeted Consultation, Q6.

[489] The German NRA did not impose a similar wholesale service, which a German alternative operator considers to be problematic: "Da die Telekom Deutschland GmbH Wettbewerbern ein Hybrid- Vorleistungsprodukt vorenthält und die zur Nachbildung der Hybrid-Produkte erforderlichen (depriorisierten) LTE-Kapazitäten am Markt nicht verfügbar sind, können Wettbewerber, die über kein eigenes Mobilfunknetz verfügen, ihren Endkunden (bis heute) keine Hybrid- Anschlüsse anbieten. In diesem Zusammenhang hat die Bundesnetzagentur eine teilweise Nachbildbarkeit aufgrund anderer bandbreitensteigernder Produkte (Kabelnetze oder LTENetze) für städtische Gebiete angenommen (Beschluss BK 2b-15/006, S. 29). Aber auch für den ländlichen Raum, in dem die mangelnde Nachbildbarkeit des Hybrid-Produkts nicht durch andere Anschlüsse mit einer vergleichbaren Bandbreite substituiert werden kann, hat die Bundesnetzagentur einen Missbrauch von Marktmacht durch die Telekom Deutschland GmbH abgelehnt".

[490] Orange response to the Targeted Consultation, Q6.

[491] ETNO response to the Targeted Consultation, Q7.

[492] Iliad response to the Targeted Consultation, Q1. ECTA in response to the Targeted Consultation, Q1 also stresses that "There is a real question on effectiveness and dissuasiveness of sanctions for non-compliance with non-discrimination obligations. This is underscored by the fact that cases keep occurring, involving the same SMP operators over and over again. This indicates that the SMP operators' breaches of non-discrimination obligations are not sufficiently sanctioned so as to root out non-compliance because the benefits of breaching the obligation appear to outweigh the occasional and relatively limited sanctions."

[493] Vodafone response to the Targeted Consultation, Q6.

not work well for small numbers. Moreover, small access seekers can specialize in a niche market segment (for instance small business customers only), which sometimes means specific problems with installation, repair etc. This blends in when comparing KPIs for large access seekers but stands out for niche market operators[494].

For example, NRAs could require the introduction of specific KPIs for B2B provisioning. When NRAs allow SMP operators to calculate KPIs as an average across operators, this practice allows hiding discriminatory treatment of alternative operators among their customers[495].

***How to ensure that KPIs are up to date*?** An operator stresses that performance results must be regularly updated and KPIs must be assessed from time to time in order to take into account the evolution of access products and the reality of the market. It is definitely important to focus KPIs on processes that are effectively used by managers in the field. Regular meetings with all of the stakeholders, under the supervision of NRA, could be used in order to fine tune each item and adapt it, if necessary, to the environment and the technical or marketing evolution, as well as to explaining the perimeter, the differences and evolution of the KPIs under comparison. This method has often proven to bring progress and the right level of transparency. It is important that, when appropriate, real and comparable KPIs are established, including provision effectiveness and failure ratios, as well as overall and partial provision and repair times. KPIs depend on SMP operator criteria regarding their responsibility as to the cause of failure or of delay. In this regard, a comparison with data provided by the operators could be used by NRA to better understand the differences between the wholesale process and self-provision by a SMP[496]. In Denmark, the SMP operator has an obligation to take an active part in meetings with alternative operators so that alternative operators can affect on-going issues including SLAs, SLGs and KPIs which must be included in the SMP operator's reference offer. These meetings are supervised by the NRA[497].

e. Guidance on monitoring of non-discrimination obligations

Provisions concerned (NDCM Recommendation)

- Point 19: "(…) NRAs should impose on the SMP operator the use of KPIs in order to monitor effectively compliance with the non-discrimination obligation."
- Point 20: "The KPIs should measure performance at least in relation to the following key elements in the provision of regulated wholesale services:
    - Ordering process
    - Provision of service
    - Quality of service, including faults
    - Fault repair times and
    - migration between different regulated wholesale inputs (excluding one-off bulk migrations)."
- Point 21: "NRAs should impose KPIs for each of the abovementioned key elements in the provision of regulated wholesale services. KPIs should allow for comparison

[494] An operator's response to the online survey.
[495] ECTA response to the Targeted Consultation, Q8. ECTA adds that this is currently the case in, e. g., Spain.
[496] An operator's response to the online survey. Another operator similarly argues that updating performance results and KPIs is needed; also to account for the actual data instead of commitments.
[497] Vodafone response to the Targeted Consultation, Q6.

between services provided internally to the downstream retail arm of the SMP operator and those provided externally to third- party access seekers."

- Point 22: "The specific details of KPIs imposed by the NRA pursuant to point 21 could be agreed between the SMP operator and third-party access seekers and should be updated on a regular basis as necessary."
- Point 23: "In imposing the KPIs, the NRA should take account of already existing performance measurements, even when only used for internal purposes of the SMP operator."
- Point 24: "In order to ensure early discovery of potential discriminatory behaviour and transparency with regard to the provision of regulated wholesale services, the NRAs should ensure that KPIs are published at least on a quarterly basis, in an appropriate form either on the NRAs website or on the website of an independent third party designated by the NRA."
- Point 25: "NRAs should ensure that the KPIs are regularly audited by the NRA or, alternatively, by an independent auditor."
- Point 26: "Where the results of the KPIs indicate that the SMP operator may not comply with its non-discrimination obligation, the NRA should intervene by investigating the matter in more detail, and where necessary enforce compliance. NRAs should make public, for example on their website, their decision to remedy non-compliance."

Provisions concerned (NGA Recommendation)

- Annex II: Application of the principle of equivalence for access to the civil engineering infrastructure of the SMP operator for the purpose of rolling out NGA networks

  "(…) NRAs should ensure that the principle of equivalence is effectively applied. For this purpose they should make sure that upon request, a reference offer for access to civil engineering infrastructure is provided to third party access seekers in due time. Also in addition to service level reports, NRAs should ensure that SMP operators keep track of all elements necessary to monitor compliance with the equivalence of access requirement. This information should allow NRAs to run regular controls, verifying that the required level of information is provided to third-party access seekers by the SMP operator and that the procedures for access ordering and provisioning are correctly applied.

  In addition, NRAs should ensure that a fast-track *ex post* procedure is available to settle disputes."

Did the guidance bring about consistent enforcement across the EU?

The monitoring of KPIs varies across the EU. For example, as regards who monitors *ex post* compliance of the SMP operator with technical replicability tests and/or key performance indicators, the situation is the following:

Table 22. Who monitors, ex-post, the compliance of the SMP operator with technical replicability tests and/or key performance indicators?

Monitoring of compliance with TRT	No.
NRA in case of complaint	14
NRA monitors reports published by the SMP operator	10
Regular audits are undertaken by the NRA or independent auditor	1
Other	6

Source: Online survey of NRAs. N = 22.

- In Germany, the regulator constantly monitors compliance of the KPIs. The existing mechanism has been effectively applied and was used by the NRA in a recent decision regarding the abusive behaviour of the SMP operator in the leased line segment[498].
- In France, there is a monthly publication and presentation in multilateral meetings with wholesale access seekers and the NRA, which is considered efficient. The NRA must be given sufficient information on the way the KPIs are elaborated on for EoO supervision[499].
- In Italy, KPIs are reported monthly by the SMP operator. The NRA monitor KPIs with the support of the Organo di Vigilanza[500], which acts as an independent auditor within the SMP operator.
- In Spain, the SMP operator must publish and report KPIs to the NRA for all wholesale services and comparable retail services on a monthly basis[501].
- In Poland, KPIs (which cover service activation, functioning and repair time) were audited by an independent audit company during their adoption and about a year after their adoption. All of the auditor's comments were introduced by the SMP operator. Currently, the system is audited by an internal auditor. The list of indicators in the New KPI System (NSKPI) was implemented by the SMP operator in close cooperation with the NRA. NSKPI covers all Regulated Offers. The system distinguishes 36 tactical indicators and 30 additional indicators, grouped by services to which they relate: WLR, BSA, LLU, LL, ROI, etc. Additional indicators were introduced for selected tactical indicators to be more specific in the area of events, measurements and more precise monitoring[502]. The quarterly publication is assessed by the regulator and each of the wholesale customers receives the results of the KPI and the average value for the sake of comparison[503].
- In Belgium, there is a bi-monthly KPI publication and no audit but there is an obligation to provide - upon BIPT's request - the raw data linked to the KPI calculation[504].
- In Slovakia, the SMP operator reports not having seen any in-depth check of its KPI reporting to the NRA, except for a few questions in the initial stages shortly after their implementation. There is no requirement for an external audit[505].
- In the Czech Republic, the NRA sets the basic principles for SLAs/SLGs and KPIs and verify compliance with these basic principles. In relation to BP34b (KPIs available to all operators) other than in the Czech Republic, all NRAs mandate KPIs to be available to

[498] Vodafone response to the Targeted Consultation, Q7
[499] An operator's response to online survey.
[500] See more at: https://organodivigilanza.gruppotim.it
[501] An operator's response to online survey.
[502] UKE response to the Targeted Consultation, Q7.
[503] An operator's response to the online survey.
[504] Proximus response to the online survey.
[505] Deutsche Telekom response to the Targeted Consultation, Q7.

all authorised operators (systematically or on request). In the Czech Republic, only aggregated values are made available and operators can compare KPIs to the industry average[506]

- In Hungary, the values of KPIs were set by the SMP operators, but the values were examined (and in some cases) modified by the NRA in the process of approval of the Reference Offers. The KPIs are not audited (neither by the NRA nor by an independent auditor)[507].
- In Ireland, the SMP operator is required to generate a quarterly equivalence KPI report, which is provided to the NRA and is published on their wholesale website. The KPI metrics for each market are split between Supply and Repair of Service.

  (i) Supply of service: % connections in x working days, average connection time and quality of supply.

  (ii) Repair of service: % repairs in x working days, average repair time and quality of repair.

  The SMP operator is obliged to publish the final KPI report within two months of quarter end. While the KPIs are not audited *per se*, the report is issued to the NRA prior to publication to facilitate review[508].

  Moreover, following a dispute, ComReg and Eir came to a settlement agreement at the end of 2018 and established an independent oversight board (IOB)[509].

Impact and best practices

An operator[510] says that regular multi-operators' meetings under the supervision of the NRA to deal with operational questions are a very useful means of ensuring the transparent monitoring and review of KPIs, as proven in France and Poland. The operator stresses that KPIs must be based on accurately designed processes in order to make any EoO system credible, such as:

- Definitions and metrics of KPIs
- Reference levels, which need to take into consideration accidents and seasonal events
- The minimum number of events

Publishing the results of the KPIs for EoO ensures transparency and credibility that are further complemented by commentaries in order to clarify the comparisons and the analysis, as well as to make them understandable and easy to interpret by access seekers.

In Poland, the SMP operator proposed to publish KPIs on a voluntary basis to allow for the detection of non-financial forms of discrimination in 2009. A definition of the criteria for different indicators was the subject of a long discussion with the NRA and other market players, and it was finally audited by an external consultant. Since then, each of the SMP operator's wholesale customers receives a detailed report and comparison of the provisioning of services

[506] Vodafone response to the Targeted Consultation, Q6.
[507] Hungarian NRA response to the Targeted Consultation, Q7.
[508] EIR response to the Targeted Consultation, Q7.
[509] ComReg Information Notice ComReg 18/110.
[510] An operator's response to the online survey.

in comparison to the retail part of the SMP operator. The report is also submitted to the NRA on a regular basis[511].

Implementation difficulties[512]

The Czech NRA lifted the obligation of the wholesale company of the SMP operator to publish its KPIs after its voluntary legal separation from the retail provider. Vodafone has criticized the decision because in the absence of KPI indicators, non-discriminatory behaviour by the party cannot be monitored[513]. Vodafone notes the common ownership of the wholesale and retail arms (PPF Group) [514], hinting that there may still be an economic incentive to discriminate.

Vodafone[515] has stressed that in some markets KPIs alone are not enough to ensure the non-discriminatory behaviour by SMP operators (e.g. Greece and Spain). Hence, NRAs should further strengthen their audits proactively and not only after a complaint by access seekers. Conversely, in Germany the regulator is constantly monitoring the compliance of the KPIs. In Portugal, the NRA has mandated KPIs for duct and pole access, yet neither NRA nor an independent auditor audit such KPIs. The incumbent must put together a monthly report on KPI performance, which the operators may challenge. ECTA asks[516] for a more systematic use of KPIs and advocates to establish and measure KPIs in terms of:

(i) Each step of the provisioning process individually (to reveal possible bottlenecks and differential treatment, including extra steps that apply for supply to alternative operators).

(ii) End-to-end performance, systematically comparing the effective outcome for end-users. Where differences are identified that are detrimental to competition, NRA need to take measures to ensure that discrimination is remedied and to monitor and report on process improvement.

An operator claims that in Lithuania, a quantitative audit of KPIs does not suffice if it is not complemented with a qualitative assessment of non-discrimination or other parameters of effective access[517].

According to an operator[518] in Portugal, the NRA has traditionally adopted a reactive stance by waiting for alternative providers' complaints or intervention requests, while a more proactive monitoring and auditing of SMP obligations would be desirable in a context where the SMP provider has no incentives to be fully compliant[519].

In Cyprus, the NRA does not specify KPIs in order to follow-up on the implementation of decisions – this is left up to the negotiating parties to decide upon (e.g. defining SLAs and SLGs.) An operator, however, remarks that while they can define the desired level of service where they have experience with the access product, this is not the case with access to poles

[511] Orange response to the Targeted Consultation, Q11.
[512] The section summarizes data reported by NRA and operators via the Targeted Consultation, online survey and case study interviews, unless otherwise indicated.
[513] ČTÚ Decision REM/3a/05.2018-03 of 15 May 2018
[514] Vodafone response to the Targeted Consultation, Q2
[515] Idem, Q8
[516] ECTA response to the Targeted Consultation.
[517] Case study interviews.
[518] An operator's response to the online survey.
[519] Vodafone response to the Targeted Consultation, Q1 highlights (regarding Spain) that "the efficiency of the non-discrimination obligation depends on the will (and capacity) of the NRA to inspect the incumbents performance ex officio".

in the absence of prior experience. This may render effective enforcement of the non-discrimination obligation in case of dispute resolution procedures difficult[520].

Finally, according to an operator active in several EU markets, "there are, in our footprint, often problems of enforcement either due to the fact that the data is not available or due to difficulties in making proof of the impact and economic consequences of the discrimination"[521].

Finding 23. The manner in which KPIs are monitored varies substantially across the EU. Several comments by access seekers relate to alleged weaknesses in monitoring and enforcement. In some Member States, there appears to be a lack of transparency as to how NRA monitor KPIs, and what happens if they do not adhere to the rules.

f. Guidance relating to SLAs

Provisions concerned (NDCM Recommendation)

- Recital 24: "(…) KPIs should be complemented by SLAs and SLGs. Imposing SLAs ensures that access seekers are provided with an agreed quality of service, whereas the use of corresponding SLGs acts as a deterrent against discriminatory behaviour. NRAs should be closely involved in the development of SLAs, for instance, by approving the SLAs developed by the SMP operator as part of a regulatory reference offer."
- Point 6: "(s) 'Service Level Agreements (SLAs)' means commercial agreements under which the SMP operator is obliged to provide access to wholesale services with a specified level of quality.
- (t) 'Service Level Guarantees (SLGs)' form an integral part of SLAs and specify the level of compensation payable by the SMP operator if it provides wholesale services with a quality inferior to that specified in the SLA."
- Point 27: "NRAs should require the SMP operator to implement corresponding SLAs alongside KPIs. "
- Point 28: "NRAs should require the SMP operator to provide corresponding SLGs in case of a breach of the SLAs. "
- Point 29: "NRAs should ensure that SLG payments are, in principle, made among the operators without undue delay and through a pre-established process for payment and billing. The level of such penalties should be sufficiently dissuasive to ensure that the SMP operator complies with its delivery obligations."

Provisions concerned (NGA Recommendation)

- Annex II: Application of the principle of equivalence for access to the civil engineering infrastructure of the SMP operator for the purpose of rolling out NGA networks:

  "4. SERVICE LEVEL INDICATORS

[520] Case study interviews.
[521] Vodafone response to the Targeted Consultation, Q1.

In order to ensure that access and use of the civil engineering infrastructure of the SMP operator is provided on an equivalent basis, service level indicators should be defined and calculated for both internal and third-party access seekers. Service level indicators should measure the responsiveness of the SMP operator to perform those actions necessary to provide access to its civil engineering infrastructure. Target service levels should be agreed with access seekers.

Service level indicators should include delays for replying to requests for information on availability of elements of infrastructure, including ducts, poles, other physical assets (e.g. manholes), or distribution points; delays for replying to a request for feasibility to use elements of infrastructure; a measure of responsiveness to handle requests for access and use of elements of infrastructure; a measure of responsiveness for fault resolution processes. The calculation of the service level indicators should be performed at regular, fixed intervals and submitted to third-party access seekers. The NRA should control that service levels delivered to third-party access seekers are equivalent to those delivered internally by the SMP operator. The SMP operator should commit to adequate compensation in case of failure to comply with target service levels agreed with third-party access seekers."

Relevant provisions of the BEREC Guidelines[522] on the minimum criteria for a reference offer

"Section 3. Minimum criteria for a reference offer:

A reference offer shall contain a description of the relevant offerings for access, broken down into components according to market needs (…)

3.3. Service supply and quality conditions:

- *service level agreements (SLAs) for ordering, delivery, service (availability) and maintenance (repair), including specific time scales for the acceptance or refusal of a request for supply and for completion, testing and hand-over or delivery of services and facilities, for provision of support services (such as fault handling and repair);*
- *the quality standards that each party must meet when performing its contractual obligations including the specification of key performance indicators (KPIs) with respect to SLAs, where relevant;*
- *service level guarantees (SLGs) for ordering, delivery, service (availability) and maintenance (repair), including the amount of compensation payable by one party to another for failure to perform contractual commitments as well as the conditions for eligibility for compensation"*

[522] BoR (19) 238 of 5 December, 2019.

Did the guidance bring about consistent SLAs across the EU?

Table 23. Best practices relating to SLAs and SLGs

MS	*BP32: reasonable QoS*	*BP32a: SLAs for specific areas*	*BP32a: SLAs for specific areas*	*BP32b: SLAs available to wholesale operators*	*BP32c: NRA SLA oversight*	*BP32d: SLAs to reflect customer differences*	*BP33: SLG requirement*	*BP33a: SLGs to cover specific areas*	*BP33b: SLG payments without delay*	*BP33c: NRA oversight of SLGs*	*BP33d: SLGs available to all wholesale operators*
AT	√	√	√	√	√	√	√	√	√	√	√
BG			√								
HR	√	√	√	√	√	√	√	√	√	√	√
CY	√	√	√	√	√		√	√	√	√	√
CZ	√	√	√	√	√	√	√	√	√	√	√
DK	√	√	√	√	(√)		√	√	√	√	√
EE	√	√	√	√	√						
FR	√	√	√	√	√	√	√	√		√	√
DE	√	√	√	√	√		(√)	√	√	√	√
IE	√	√	√	√		√	√	√	√	√	√
IT	√	√	√	√	√	√	√	√	√	√	√
LV	√		√	√	√	√	√	√	√	√	√
LT	√	√	√		√	√	√	√		√	√
LU	√	√	√	√	√		√	√	√		√
MT	√	√	√	√	√						
NL	√	√	√	√	√	√	√	√	√		√
Ro	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
ES	√	√	√	√	√	√	√	√	√	√	√
SE	√	√	√	√		√		N/a	N/a	N/a	√

Source BEREC BoR (16) 219, Annex 3, p.81.
Notes: √ - Impose obligations pertaining to best practice, empty cell – Does not impose obligations pertaining to best practice, (√) – Does not impose obligations, but conforms to best practice, n/a – Best practice is not applicable. For example, in cases where specific technology relevant to BP is not deployed and therefore BP is not required; or where the market is deregulated.

SLAs/SLG are used notably in France, Poland, Slovakia, Belgium, Italy[523]:

- In Poland, SLAs are understood as time limits for the removal of failures, provision of services, service availability levels, etc. They are a part of a reference offer and any breach of them is subject to contractual penalty in the amount specified in the offer. For exceeding time limits indicated in the reference offer, the SMP operator pays contractual penalties in the amount specified in the reference offer, which makes for an effective preventive measure. UKE has no knowledge as to additional contracts specifying SLAs, including e.g. minimum data transmission value[524].
- In Ireland, the SMP operator is required to "conclude, publish, maintain, and update SLAs for regulated products as well as publish a quarterly SLA performance report. SLAs are required to include a provision for service credits, specify circumstances under which credits would be paid, include the methodology for calculating service credits and worked example(s) and include T&Cs for suspension"[525].

[523] ETNO response to the Targeted Consultation, Q8. The association advocates in this regard that that SLAs/SLGs would be left to commercial agreements between parties. NRA should only intervene in case such commercial agreements are not effective.
[524] Polish NRA response to the Targeted Consultation, Q8.
[525] EIR response to the Targeted Consultation, Q8.

- In Denmark and Germany, there is no demand for differentiated SLAs to reflect customer differences (BEREC Best Practice 32d). In Germany, there are high quality offers and the SLAs reflect the types of offers but all quality levels are available for residential and business customers.

Implementation difficulties[526]

Several comments advocate that EoI should be accompanied by appropriate SLAs on the quality of provisioning and assurance. Low quality provided to all access seekers (both the SMP operator's own retail arm and the competitors) on a non-discrimination basis may otherwise be the outcome[527].

Finding 24. Comments received sometimes go beyond the non-discrimination issue. Operators seemed concerned about QoS issues, stressing that KPIs set by the NRAs are sometimes not ambitious enough.

Eleven (out of 14 responding) NRAs report that they ensure EoO by requiring SMP operators to enter into SLAs and to provide SLGs. This is in line with Point 27 of the NDCM Recommendation which advocates NRAs to require SMP operators to implement corresponding SLAs alongside KPIs. However, several SMP operators argue that the supervision of non-discrimination should not be confused with the definition and supervision of the efficiency (including SLA, SLG) of process at the wholesale level, and thus, NRA should clearly distinguish the two issues[528]. Orange[529] argues that KPIs may not be based on the same perimeter of the wholesale products for which SLAs/SLGs exist, nor be linked to the commercial conditions attached. Thus, SLAs should not be further covered by the future access recommendation, even though the topic of appropriate SLAs/SLGs is a key element of the access provided by the SMP operator, especially for addressing the business segment of the market. Generally, in retail markets, SMP operators do only offer SLAs in the business segment and not to residential users. They therefore view the imposition of SLAs on their wholesale offers, where they are intended for residential end-users, as discriminatory since they do not themselves provide such SLAs. However, mandating reinforced SLAs in the residential segment may nevertheless be justified where VHCN are available and some smaller and medium size businesses are sufficiently served based on mass-market connections.[530]

According to one operator[531], SLAs in several markets have not been effective. The main reasons are lack of empowerment by NRAs to impose penalties, penalties that do not have a sufficient deterrent effect, many subjective justifications to deviate from the agreed SLAs. In Spain, NRA have already confirmed SLA breaches but are not empowered to impose fines for these types of breaches. Only courts are empowered to impose fines for SLA breaches. In

[526] The section summarizes data reported by NRA and operators via the Targeted Consultation, online survey and case study interviews, unless otherwise indicated.
[527] In that sense: Iliad response to the Targeted Consultation, Q1.
[528] An operator's response to the online survey. Liberty Global in response to the Targeted Consultation, Q8 stresses that that any SLAs/SLGs should "recognise commercial realities and do not impose highly onerous obligations on operators that go beyond enabling the access seeker to compete in the market. Similar to KPIs, Liberty Global believes that the type of services should be taken into account – e.g. 'best effort' services require different SLAs".
[529] Stakeholders' workshop 9 June 2021.
[530] Explanatory Note Accompanying The Document Commission Recommendation on relevant product and service markets SWD(2020) 337 final p.47.
[531] Vodafone response to the Targeted Consultation, Q8.

Germany, the SLAs imposed in the reference offer concerning activation and fault clearance procedures should be stricter in order to provide better customer experience. More problematic has been the fact that the penalties imposed by NRAs in cases of breach of SLAs are far too low[532]. In Portugal also, the penalties foreseen in the incumbent's reference offers are still low and therefore not an effective deterrent. In Ireland, the SMP operator is unilaterally able to invoke suspensions in the obligation to make SLA penalty payments with limited scrutiny or objective criteria. These suspensions apply to both provisioning and repair processes. The operator concludes that, to be fully respected, any SLA system must be accompanied by an adequate and effective system of penalties, i.e. by appropriate deterrence measures aimed at guaranteeing the service levels established to protect not only the operators but also, and above all, the final customers[533]. One access seeker alleges that the SMP operator has a broad margin of discretion to play on the "reasons/metrics" of the delay in the provision of the input concerned, as the SMP operator is the one who attributes the responsibility in the event of delays. The operator therefore advocates that future guidelines should ensure predictability and consistency in the calculation and application of SLAs[534].

Vodafone regrets that the Czech NRA removed the obligation for the SMP operator CETIN to monitor and submit KPIs. The reasoning was that CETIN is legally separated from the retail provider O2, even though they are owned by the same owner. However, considering the common ownership of the wholesale and retail arms, there may still be an economic incentive to discriminate[535].

In the same vein, ECTA[536] alleges that the levels of quality offered by SMP operators at a wholesale level in their reference offers are generally very low in terms of provisioning times and especially in terms of repair times. The situation prevailing around the time of the adoption of the NDCM Recommendation would not have, since then, substantially improved: some SMP operators' wholesale access conditions do not guarantee that a line used to serve a B2B (business or public administration) customer's connection will never be down for an entire working day. Similarly, they only guarantee that a limited percentage of B2C connections (often below 80-90%) would be repaired within that timeframe. However, the average tolerance level means that a significant share of customers whose service is based on wholesale access from the SMP operator may be left without service for several days. ECTA moreover complains that:

(i) Breaches of SLAs by SMP operators are frequent and even very low targets are regularly unmet.

(ii) NRAs sanctioning SMP operators for breaches of SLAs/SLGs is not something that occurs regularly; it is rather quasi non-existent. In addition, it has been very rare for an NRA to actively seek meaningfully improvement in the quality on the wholesale products of SMP operators (with exceptions, notably in the UK, after many years of very poor performance).

(iii) It is very rare for SMP operators to effectively pay-out penalties in real monetary terms to alternative operators for breaches of SLGs. The prevalent situation is that penalties

[532] This claim is supported by an anonymous operator in response to the Targeted Consultation, Q8: "Die Vertragsstrafen werden auch regelmäßig fällig. Unseres Erachtens ist wichtig, dass eine Vertragsstrafe eine hinreichende Höhe vorsehen muss, damit auch eine Verhaltensänderung bewirkt werden kann. Dieses sollte von den NRBs eingefordert werden".
[533] Vodafone response to the Targeted Consultation, Q8.
[534] An operator's response to the online survey.
[535] Vodafone response to the Targeted Consultation, Q8.
[536] ECTA response to the Targeted Consultation, Q8.

due by SMP operators are set off or otherwise settled, including by converting them into a credit for future wholesale services purchased by the alternative operator concerned (meaning that *in fine* revenues still accrue to the SMP operators). In sum, whist SLAs/SLGs exist for SMP operators' wholesale access products, the current set of circumstances means that the quality of service (notably including repair time performance) remains basically in the hands of the SMP operators, and that this is a 'manageable problem' for the SMP operators to administer with non-dissuasive penalties being part of SMP operators' day-to-day management. Penalties imposed by NRAs for discrimination in terms of quality on SMP operators are exceedingly rare, and have not dissuaded SMP operators from continuing to provide below SLA/SLG quality at a wholesale level to alternative operators. A recommendation should include a recommendation for the prompt imposition of effectively (rather than 'sufficiently') dissuasive penalties and an explicit referral to the aggravating nature of cases of recidivism on overall penalty levels.

A Hungarian NRA imposed a sanction for a breach of SLA. As a result of a market surveillance procedure, the NRA found that one of the SMP operators did not send in time and with the required content the regular SLA report to the access seekers. Altogether, a 10,000,000 HUF (c.a. €28,500) penalty was imposed on the SMP operator[537].

In France[538], according to an access seeker, contractual SLAs have not proved to be efficient enough and the level of associated penalties is "ridiculous". In addition, operators must claim penalties from Orange, as they are not paid automatically when QoS are not met. The NRA sent a formal notice to the SMP operator after finding deterioration in the quality of service of the wholesale offers two years ago. However, since then the NRA has not yet sanctioned the SMP operator. Another operator doubts that SLAs are the most effective mechanism to enforce the principle of non-discrimination, considering in particular that the level of penalties which are usually set on a contractual basis remain at a relatively low level[539].

As a matter of fact, higher penalties may be difficult to justify because they must be proportional to the rental fee. For example, penalties higher than a one year rental payment might be squashed by a Court for reasons of non-proportionality.

Moreover, even if SLAs are mandated in reference offers, the penalties are part of a commercial contract, reasons for which the customer must claim payment of the penalties in the same way as other contractual obligations. When invoiced, the SMP operator may always invoke an 'act of god' or other circumstances independent from its will (e.g. absence of end-user in cases of a problem in the house) and refuse to pay. The issue of a limited dissuasiveness of penalties may nonetheless be solved by an alternative means. For example, in Belgium, to avoid discussions on possible unjustified delays in case the intervention of a technician is necessary, access seekers can ask a technician directly in the field to intervene, as long as the latter is a 'certified technician'. It is also possible for alternative operators to send their own technicians to be certified. For installation, the system works quite well but SMP operators often refuse such solutions for repairs. Their arguments are relevant because most of the failures in the field concern not only one customer from one alternative operator but a set of customers from retail and several alternative operators.

[537] Hungarian NRA response to the Targeted Consultation, Q8.
[538] An operator's response to the online survey.
[539] An operator's response to the online survey

Finding 25. SLAs and SLGs on the provision of wholesale broadband access products are provided by SMP operators across the EU. However, access seekers' comments suggest that in some cases the billing procedure and the level of the SLG's payments foreseen would not be sufficiently dissuasive to ensure that the SMP operator complies with its delivery obligations, despite Point 29 NDCM Recommendation.

7. Regulation of civil engineering infrastructure and relations between asymmetric SMP regulation and symmetric access

a. Summary of findings

The study findings show that the scope of the physical infrastructure access obligations imposed on SMP operators varies across the EU. For example, several NRAs do not require an SMP operator, when deploying newly-built civil engineering, to design it so as to allow several operators to deploy their fibre lines as advocated by Point 16 of the Recommendation. However, these NRAs often have reasons not to do so based on their specific national situation. On the other hand, the guidance on transparency (availability of a reference offer) and pricing (cost orientation) seems to be followed by nearly all NRAs. Still, there is more variation in the guidance on the equivalence of inputs (EoI) set out in Annex II of the NGA Recommendation which is advocated to ensure effective access. Finally, two NRAs regulate duct access in Market 4/2014, reminding us that access to CEIs can also be indispensable for the establishment of dedicated connections.

The analysis has shown several potential obstacles to the use of civil engineering:

- Pricing. However, it is not clear whether the alleged problem is confined to countries in which access to civil engineering is mandated under national laws transposing the BCRD or whether the guidance of the NDCM Recommendation on cost orientation of access was not duly followed.
- Lack of enforceable QoS and costly ancillary obligations.

At the same time, proper design and enforcement of access obligations seem to be crucial for an effective access remedy.

Generally, NRAs do not differentiate between the pricing of newly built and legacy civil engineering infrastructures. However, NRAs have differing views on whether SMP operators retain sufficient incentives to invest in new civil engineering infrastructures with a sufficient capacity to host alternative operators where necessary when SMP access obligations are imposed.

Looking at the information provision and given that in several Member States the NRA was not entrusted with the SIP task, Point 17 of the current NGA Recommendation retains its relevance. The usefulness of the information made available by SMP operators is an issue in some Member States. Availability of online systems containing up-to-date information on duct location and availability with measures to ensure accuracy of such data is a key requisite.

The analysis also shows that most NRAs consider that in a large majority of cases, the BCRD alone is not sufficient to ensure effective access to relevant civil engineering infrastructures for access seekers. Access seekers share that view. According to some stakeholders, negotiated symmetric access, as under the BCRD, may provider stronger investment incentives than SMP regulated access, at least under specific circumstances.

b. Introduction

Provisions of the EECC

- Recital 172 EECC: (…) before the NRA determines whether any additional (…) remedy should be imposed (…), it should seek to determine whether the retail market concerned would be effectively competitive, also taking into account (…) other types of regulation already in force, such as for example general access obligations to non-replicable assets or obligations imposed pursuant to Directive 2014/61/EU (…).
- Recital 187: Civil engineering assets that can host an electronic communications network are crucial for the successful roll-out of new networks because of the high cost of duplicating them and the significant savings that can be made when they can be reused. Therefore, in addition to the rules on physical infrastructure laid down in Directive 2014/61/EU, a specific remedy is necessary in those circumstances where civil engineering assets are owned by an undertaking designated as having SMP. Where civil engineering assets exist and are reusable, the positive effect of achieving effective access to them on the roll-out of competing infrastructure is very high, and it is therefore necessary to ensure that access to such assets can be used as a self-standing remedy for the improvement of competitive and deployment dynamics in any downstream market, to be considered before assessing the need to impose any other potential remedies, and not just as an ancillary remedy to other wholesale products or services or as a remedy limited to undertakings availing themselves of such other wholesale products or services.
- Recital 189: Mandating access to network infrastructure can be justified as a means of increasing competition, but national regulatory authorities need to balance the rights of an infrastructure owner to exploit its infrastructure for its own benefit, and the rights of other service providers to access facilities that are essential for the provision of competing services.
- Art.72: 1. An NRA may (…) impose obligations on undertakings to meet reasonable requests for access to, and use of, civil engineering including, but not limited to, buildings or entries to buildings, building cables, including wiring, antennae, towers and other supporting constructions, poles, masts, ducts, conduits, inspection chambers, manholes, and cabinets, in situations where, having considered the market analysis, the national regulatory authority concludes that denial of access or access given under unreasonable terms and conditions having a similar effect would hinder the emergence of a sustainable competitive market and would not be in the end-user's interest.

  2. NRAs may impose obligations on an undertaking to provide access (…) irrespective of whether the assets that are affected by the obligation are part of the relevant market in accordance with the market analysis, provided that the obligation is necessary and proportionate (…).
- Art. 73 EECC: 1. NRAs may (….) impose obligations on undertakings to meet reasonable requests for access to, and use of, specific network elements and associated facilities, in situations where the NRAs consider that denial of access or unreasonable terms and conditions having a similar effect would hinder the emergence of a sustainable competitive market at the retail level, and would not be in the end-user's interest.

  NRAs may require undertakings inter alia: (a) to give third parties access to, and use of, specific physical network elements and associated facilities, as appropriate,

including unbundled access to the local loop and sub-loop (…) (g) to provide co-location or other forms of associated facilities sharing (…) NRAs may subject those obligations to conditions covering fairness, reasonableness and timeliness.

Where NRAs consider the appropriateness of imposing any of the possible specific obligations referred to (…), and in particular where they assess, in accordance with the principle of proportionality, whether and how such obligations are to be imposed, they shall analyse whether other forms of access to wholesale inputs, either on the same or on a related wholesale market, would be sufficient to address the identified problem in the end-user's interest. That assessment shall include commercial access offers, regulated [symmetric access], or existing or planned regulated [SMP access obligations].

Terminological issue

The EECC does not define the concept of CEI. However, Art.2(10) EECC defines 'associated facilities' as "associated services, physical infrastructures and other facilities or elements associated with an electronic communications network or an electronic communications service which enables or supports the provision of services via that network or service, or has the potential to do so, and includes buildings or entries to buildings, building wiring, antennae, towers and other supporting constructions, ducts, conduits, masts, manholes, and cabinets". The concept of CEI is defined in Point 11 NGA Recommendation as "physical local loop facilities deployed by an electronic communications operator to host local loop cables such as copper wires, optical fibre and co-axial cables. It typically refers, but is not limited to, subterranean or above-ground assets such as sub-ducts, ducts, manholes and poles". While 'building wiring' is an associated facility, it is, however, not CEI in the sense of the NGA Recommendation. Point 18 of that Recommendation advocates that "Where an SMP operator deploys FTTH, NRAs should, in addition to mandating access to the civil engineering infrastructure, mandate access to the terminating segment of the access network of the SMP operator, including wiring inside buildings". However, Art.72 EECC seems to interpret the concept of civil engineering more broadly since it specifies that mandated access to CEI can include access to "buildings or entries to buildings, building cables, including wiring, antennae, towers and other supporting constructions, poles, masts, ducts, conduits, inspection chambers, manholes, and cabinets". It would appear that the term CEI is used in Art.72 EECC with the same meaning as 'associated facilities'.

Conversely, the definition of 'physical infrastructure' in Art.2(2) BCRD is similar to that of CEI in the NGA Recommendation. The BCRD definition is: "any element of a network which is intended to host other elements of a network without becoming itself an active element of the network, such as pipes, masts, ducts, inspection chambers, manholes, cabinets, buildings or entries to buildings, antenna installations, towers and poles", however "cables, including dark fibre (…) are not physical infrastructure within the meaning of [the BCRD]".

A key issue to address in this review of the Recommendations is whether the current definition of CEI is carried over or whether the definition should be aligned with the scope of the access that can be mandated under Art.72 EECC.

Elements reviewed

The NGA Recommendation invites NRAs to impose access to civil engineering infrastructures "where duct capacity is available" (Point 13) and, in Point 18, to the terminating segment as an ancillary remedy to access obligations (in particular in those cases of wiring inside buildings) imposed on the SMP operator. NRAs must seek information from the SMP operators on

whether and where ducts and other local loop facilities are available for the purpose of deploying NGA networks and ensure that the SMP operator provides access under the same conditions to third-party access seekers as to its own downstream arm. Annex II of the Recommendation sets out in detail what comprises the principle of equivalence. The Recommendation concerns only the design by NRAs of SMP remedies. Mandatory access to civil engineering from utilities other than electronic communications network operators is not covered.

The implementation of the guidance to ensure effective access to civil engineering of the SMP operator is reviewed in this chapter. This review examines successively the implementation of the following three recommended practices:

1. Guidance on the design of the SMP remedy.
2. Guidance on the centralisation of information on available civil engineering.
3. Usage of symmetric access obligations or negotiated access under the BCRD as an alternative.

c. Guidance on the design of the SMP remedy

Provisions concerned (NGA Recommendation)

Reference offer

- Point 13. (…) Mandating the publication by the SMP operator of an adequate reference offer as soon as possible after it has been requested by an access seeker is proportionate to the objective of encouraging efficient investment and infrastructure competition. Such reference offer should specify the conditions and procedures of access to the civil engineering infrastructure, including access prices.
- Annex II, Point 3. ORDERING AND PROVISIONING OF ACCESS:

  The SMP operator should implement the procedures and tools necessary for ensuring efficient access and use of its civil engineering infrastructure and distribution points, and the different elements the infrastructure consists of. In particular, the SMP operator should provide third-party access seekers with end-to-end ordering, provisioning and fault management systems equivalent to those provided to internal access seekers. This should include measures aimed at de-congestioning currently used ducts.

  Requests for information, access and use of the civil engineering infrastructure, the distribution points and the different elements the infrastructure consists of by third-party access seekers should be processed within the same delays as equivalent requests by internal access seekers. The same level of visibility on the progress of the requests should also be provided, and negative answers should be objectively justified.

  The information systems of the SMP operator should keep track records of the handling of requests which should be available to the NRA.
- Point 5. REFERENCE OFFER

  The different items required to provide equivalent access to the civil engineering infrastructure of the SMP operator should be published in a reference offer, if a request for such an offer has been made by an access seeker. At a minimum, the reference offer should contain the relevant procedures and tools for retrieving civil engineering asset information; describe the access and usage conditions to the different elements

which make up the civil engineering infrastructure; describe the procedures and tools for access ordering, provisioning and fault management; and fix target service levels and the penalties for breach of those service levels. The internal access provision should be based on the same terms and conditions as contained in the reference offer provided to third-party access seekers.

Access to the terminating segment

- Point 17. Transparency and non-discrimination obligations are required to ensure the effectiveness of access to the terminating segment. Where so requested, the publication by the SMP operator of an adequate reference offer within a short timeframe is necessary in order to allow access seekers to make investment choices.
- Point 18. In a Fibre to the Home (FTTH) context duplication of the terminating segment of the fibre loop will normally be costly and inefficient. To allow for sustainable infrastructure competition, it is therefore necessary that access be provided to the terminating segment of the fibre infrastructure deployed by the SMP operator. To ensure efficient entry, it is important that access is granted at a level in the network of the SMP operator which enables entrants to achieve minimum efficient scale to support effective and sustainable competition. Where necessary specific interfaces could be required to ensure efficient access.
- Point 21. NRAs should, in accordance with market demand, encourage, or, where legally possible under national law, oblige the SMP operator to deploy multiple fibre lines in the terminating segment.

Did the guidance bring about consistent design of SMP access to civil engineering across the EU?

Access to civil engineering infrastructures is not imposed on the SMP operator in every Member State, as illustrated by the following:

- NRAs that do not impose SMP access to civil engineering: HR, SE, DK, MT, RO, LU, CZ, AU, FI
- NRAs that impose SMP access to civil engineering: EE, IE, IT, LT, CY, EL, PT, BE, HU, ES, SK, SI, PL, DE.

Moreover, the scope of the segments of physical infrastructure assets that are regulated in the context of market analyses varies widely. The 2019 BEREC Report on access to physical infrastructure in the context of market analyses provides an overview (see Table 24).

Table 24. Type of physical infrastructure to which access was[540] imposed in the market analysis in the EU Member States

Physical infrastructure	Number of countries	Countries
Ducts, pipes	19	BE, BG, CY, DE, EL, EE, ES, FR, HR, HU, IE, IT, LT, LU, LV, PL, PT, SE, SI, SK
Chambers, manholes	12	BG, CY, ES, FR, GR, HU, IE, IT, LV, SI, PL, PT
Poles	10	ES, FR, GR, HU, IE, IT, LV, PL, PT, SI

Source: BEREC BoR (19) 94.

Until the 2020 market review, notification by the French NRA and only the UK NRA (when the UK was still a Member State) had defined a product market exclusively for physical infrastructure, such as ducts and chambers[541].

The BEREC report[542] indicates that remedies imposed on SMP operators relating to access to their physical infrastructures applies in most countries to the local access and backhaul segments, while only the Hungarian, Italian, Polish and Slovenian NRAs include in-building wiring[543] within the scope of SMP remedies. In many cases, in-building infrastructure is not controlled by the SMP operator.

The terminating segment may represent a structural barrier for all competitors, incumbent included, insofar as there would be a risk that the (incumbent and/or the) first operator who reaches a building pre-empts this facility, thus preventing its competitors from having access to the end-users in that building. Moreover, multiple in-house wiring deployments could lead to significant annoyance to the building's inhabitants[544]. Therefore, prior to the adoption of the NGA Recommendation, some Member States adopted national legislation to deal with this matter outside of the framework of the national electronic communications law.

Box 8. Member States that impose access to in-house wiring using a different legal basis

Croatia. In December 2009, Croatia adopted the Ordinance on technical conditions of an electronic communications network for business and residential buildings. This ordinance allows the owners of buildings to freely choose between operators and for the operators to access these buildings under equal and non-discriminatory conditions. A building must allow the installation of cables and wires for the provision of broadband access services. Network operators can access and use the installation for the purposes of service provision free of charge, however, access is done under equal conditions. An operator can build new

[540] The situation may have changed in some Member States since the data was collected by BEREC in 2019. For example, in the meantime, the Bulgarian NRA fully deregulated its broadband wholesale access markets.
[541] The UK proceeded with a similar approach in parallel and defined such market on 18 March 2021 : Statement: Promoting investment and competition in fibre networks – Wholesale Fixed Telecoms Market Review 2021-26, available at : https://www.ofcom.org.uk/consultations-and-statements/category-1/2021-26-wholesale-fixed-telecoms-market-review The first NRAs applying such a market definition were the Swiss and Liechtenstein NRAs. The Swiss NRA defined a separate market in 2009 for ducts and found a SMP on that market. Under Swiss law, access to ducts is an explicit obligation (if capacity is available) for operators having SMP in the access market. Similarly, the Liechtenstein NRA defined a specific market for physical access to the infrastructure in the core network (See BoR (19) 94, p.8).
[542] BoR (19) 94.
[543] Within a building, in-house wiring is deployed between e.g. the basement and each flat, normally inside of dedicated cable trays.
[544] BoR (11) 43, p.31.

fibre optic installations but it needs to make sure that other operators will be able to access the installations.

Portugal. A Decree-Law was published in May 2009 that defined the framework for investment and the development of NGA. This law provides a measure to prevent the first operator from monopolizing access to buildings by imposing a sharing of any new (or upgraded) infra-structures within the building. The first operator who deploys in a building must install at least two fibres per apartment. A second operator seeking to connect end-users in that building will then owe the first 50% of the costs incurred in the installation of the shared infrastructure, while the third operator would owe 33% and so on.

Spain. In 2008, Spain imposed symmetrical obligations on electronic communications operators with regard to in-house wiring for the deployment of NGA access pursuant to Article 12 of Directive 2002/21/EC (Case ES/2008/0820). An obligation to meet reasonable requests for access to, and use of, network elements and equipment within buildings is imposed on the first operator to deploy a fibre access solution in a building. The first operator must sign bilateral agreements within four months of the request and must ensure that sharing of the network elements and equipment is available. Moreover, the first operator is obliged to set reasonable prices and provide sufficient information to third parties in order to facilitate the planning and implementation of their requests for access. With regard to access points, the measure foresees access at points which are located further away from the building in certain circumstances. These situations mainly arise in areas with levels of population density which, owing to the criteria of efficiency and economic viability, lead to network designs based on terminal boxes of suitable dimensions to serve several homes located on public property. In these cases, the point of sharing will be transferred to the locations accommodating those elements, whether they be boxes, cabinets, or other infrastructural elements.

Source: Visionary Analytics based on BEREC (2010) Annex to the BEREC Report Next Generation Access – Implementation Issues and Wholesale Products, Document number BoR (10) 08b, European Commission (2015). Implementation of the EU regulatory framework for electronic communication - 2015. Commission staff working document. Brussels, 19.6.2015 SWD(2015) 126 final

The SMP framework is on that point complemented by the BCRD, which requires all newly constructed and substantially renovated buildings to be equipped with a physical infrastructure, such as mini-ducts capable of hosting high-speed networks and an easily accessible access point in the case of multi-dwelling buildings. Providers of public communications networks must have access to the access point and the in-building physical infrastructure under fair and non-discriminatory terms and conditions if duplication is technically impossible or economically inefficient[545].

[545] The BCRD 2018 implementation report nevertheless mentions that "stakeholders have not noticed a significant change since the implementation of the Directive because provisions were already in place or had only recently been transposed. Some improvements were reported in Spain and Italy, in terms of a reduction of cases where the building owner refused access. Nevertheless, operators in some Member States had problems getting permission to access apartment buildings (from building owners) to install and upgrade in-building infrastructures for high-speed broadband". Report from the Commission to the European Parliament and the Council on the implementation of Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks, 27.6.2018 COM(2018) 492 final, p.11.

Finding 26. The scope of the physical infrastructure access obligations imposed on SMP operators varies across the EU.

In the subsequent sections we will distinguish between effective access, transparency and cost oriented pricing, which are respectively pursued by the equivalence requirement (Point 13 NGA Recommendation), price control obligation (Point 14 NGA Recommendation) and mandated reference offer (Point 15 NGA Recommendation). While the NRAs of some Member States imposed detailed duct access obligations, the remedies adopted by a few NRAs appear less strict than those advocated in the NGA Recommendation, as reflected in the overview of countries in Table 25.

Table 25. Overview of adherence to key guidance NGA Recommendation in a sample of Member States relating to the topics of effective access, pricing and transparency

Member State	Case number Art.7 notification	Point 13 NGA Rec. (Equivalence)	Point 14 NGA Rec. (pricing remedy)	15 NGA Rec. (reference offer)
Belgium	BE/ 2018/2073-2075	EoO	Fair pricing set using a BU-LRIC cost model.	Proximus Reference Offer for Duct Access in GPON Underground Deployments[546]
Cyprus	CY/2016/1882	EoO	Cost orientation	Separate SMP RO not published
Estonia	EE/2017/1980	EoO	Cost orientation (TD HC FDC)	Yes[547]
France	FR/2020/2277-2278-2279	EoI	Cost orientation, RAB (HC + indexation)[548]	Offre d'accès aux installations de génie civil et d'appuis aériens d'Orange[549]
Ireland	IE/2018/2089	EoI	Cost orientation (Top-down HCA)[550]	Master licence and SLAs online[551]
Italy	IT/ 2019/2181-2182	EoO	Cost orientation (BU-LR(A)IC+)	RO Servizi di Accesso NGAN[552]

[546] The draft offer – still pending approval by the NRA - does not (i) include a tool for an alternative operator to quickly assess where ducts may be available (although a procedure is foreseen in the reference offer to check actual availability); (ii) access to ducts in the feeder network (i.e. between the LEXs and the OFPs) neither (iii) provide access to the drop fibre. According to the SMP operator, this kind of access would not be possible because there are no free inputs/outputs available on the DTP to make this drop fibre available to a beneficiary operator. The Belgian NRA consulted the other NRAs on the draft via BEREC. The consultation is available at: https://isportal.berec.europa.eu/view-doc/prior-consultation-proximus-reference-offer-proda-duct-access-in-gpon-underground-deployments

[547] Available at: https://www.telia.ee/partnerile/sideettevotjale/vorguressursi-rent

[548] As specified by décision n° 05-0834 of 15 Decembre 2005 modified by Décision n° 2012-0007 of 17 January 2012, available at: https://www.arcep.fr/uploads/tx_gsavis/05-0834.pdf

[549] Available at: https://www.orange.com/sites/orangecom/files/documents/2021-02/Offre_unique_iBLO_4fev2021.pdf

[550] For RAB and BU-LRAIC+ costs) of replacement of ducts for the provision of NGA services. Pricing of Eir's Wholesale Fixed Access Servicesp, final decision, Decision DO3/16, 159.

[551] Available at: https://www.openeir.ie/products/data/pole-and-duct-access/

[552] Available at: https://www.wholesale.telecomitalia.com/it/c/document_library/get_file?uuid=98cb69d6-d1bb-4b59-89ba-0af8576dd9af&groupId=10165.

Member State	Case number Art.7 notification	Point 13 NGA Rec. (Equivalence)	Point 14 NGA Rec. (pricing remedy)	15 NGA Rec. (reference offer)
Lithuania	LT/2019/2183	KPIs[553]	Cost orientation (TD HC FDC)	Yes[554]
Portugal	PT/2019/2193	EoI	Cost orientation (FDHC)	ORAC[555]
Poland	PL 2019/2160[556]	EoO (functional separation)	None[557]	Framework agreements online[558]
Slovakia	SK/2016/1907	Non-discrimination (not specified)	Cost orientation (BU-LRIC)	RO[559]
Slovenia	SI/2017/2004	EoI	Cost orientation (BU-LRIC+)	In the WLA RUO[560]
Spain	ES/2015/1818	KPI but no EoO	BU-LRIC+	Oferta de Acceso a Registros y Conductos (MARCo)[561]

Source: CIRCA database (Article 7 procedure files).

Finding 27. The guidance on transparency (availability of a reference offer[562]) and pricing (cost orientation) seems to be followed by nearly all NRAs. However, there is more variation as regards the guidance on the principle of equivalence as set out in Annex II NGA of the Recommendation.

NRAs regulate access to the ducts and poles of the SMP operator as a remedy in different markets: Market 3a and 3b or – in the case of Cyprus and Poland - Market 4 of the 2014 Markets Recommendation[563]. In France, the NRA defined a separate physical infrastructure

[553] *De facto* principle of EoO: e.g. the NRA carries out periodic checks on the conditions under which the SMP operator provides analogous services to its own customers and compares it with the conditions applied to access seekers. Moreover, the SMP must offer SLAs. A complaint from operators about the application of the SMP's SLA on grounds of breach of the non-discriminatory obligation is currently being assessed (Case study interviews).
[554] Available at: https://www.telia.lt/verslui/reguliuojamos-paslaugos/isankstiniai-pasiulymai/infrastrukturos-prieiga
[555] Available at: https://ptwholesale.pt/pt/Documents/ORAC.zip See also : ANACOM simplifies access to MEO ducts and poles by other operators, available at: https://www.anacom.pt/render.jsp?contentId=1479181
[556] No SMP duct access obligation is imposed. In September 2018, UKE issued 7 decisions (one of them addressed to the SMP operator) by which access to ducts is regulated symmetrically for the 7 largest network operators in Poland, regardless of SMP. The general obligation to provide duct access follows directly from national statutory legislation. In cases of disputes regarding access, the NRA is empowered to resolve these disputes. The symmetrical and statutory obligation to provide duct access for the SMP operator applies nationwide.
[557] Within SMP remedies, UKE does not impose price control on access to ducts. Price of access to ducts is regulated on the basis of a separate decision, and that regulated price is derived from competitive prices. Source: UKE Decision DR.SMP.6040.1.2019.74 of 22 October 2019.
[558] For access to ducts, available at: https://www.hurt-orange.pl/operatorzy-krajowi/uslugi/uslugi-infrastrukturalne/kanalizacja-kablowa/ For access to poles, the terms and conditions are contained in Part VII of the SOR (the Orange Polska Reference Offer), which is available at: https://www.hurt-orange.pl/wp-content/uploads/2021/02/oferta-sor-1.pdf?x32548
[559] Available at: https://www.telekom.sk/dokumenty/referencna-ponuka-na-pristup-ku-kablovodom-a-infrastrukture/
[560] Available at: https://www.telekom.si/operaterji/vzorcne-ponudbe/wla-lokalni-dostop-na-fiksni-lokaciji
[561] Resolución por la cual se aprueba la revisión de los precios de la oferta mayorista marco de telefónica y se acuerda su notificación a la comisión europea y al organismo de reguladores de comunicaciones electrónicas, OFE/DTSA/009/20/PRECIOS MARCO, available at: https://www.cnmc.es/sites/default/files/3559121_5.pdf
[562] More specific guidance on elements to be included in a duct reference offer were provided by BEREC in BoR (10) 08, section D1 and BoR (11) 43, section B5.
[563] BoR(19) 94, p.9.

market. There are other countries where a similar approach might be considered by the NRA in the next market review (e.g. Lithuania, where duct access is the main access product used by ANOs, while there is zero take up of fibre unbundling and the use of copper unbundling is in steady decline)[564].

Finding 28. Two NRAs regulate duct access in market 4/2014. This raises the question of the scope of the access that can be imposed in market 1/2020: only in the local loop and for network deployment, or also for dedicated end-to-end connections, i.e. whether NRAs should impose two parallel, distinct access to CEI obligations.

Space for competitors in new ducts

According to Point 16 of the NGA Recommendation, NRAs should, where possible, work towards ensuring that newly-built facilities of the SMP operator are designed to allow several operators to make use of these facilities. However, the NGA Recommendation does not deal with scarcity in legacy ducts i.e., how to optimise the usage of existing ducts and also does not advocate any obligation to capacity available if ducts are fully used, or impose another type of obligation (like access to dark fibre) in those cases[565].

The French NRA distinguishes between areas where infrastructure-based competition is expected to emerge (i.e. where the SMP operator is normally required to leave at least as much space as it used itself in the civil engineering infrastructure) and the areas where the network is expected to be 'mutualised' (shared on the basis of co-financing offers), where it is not required to leave space[566]. Several other NRAs[567] explicitly confirm that in cases where a civil engineering infrastructure is deployed by the SMP operator for the purpose of VHC network deployment, they require the SMP operator to deploy with sufficient space to host alternative networks, while several NRAs[568] report that this is not the case in their countries, and three NRAs also say that there is no such obligation under the SMP regulation[569] in their respective countries. However, some NRAs provide the following explanations for not requiring the SMP operator to deploy with sufficient space to host alternative networks[570]:

- Operators do not plan to have an overlapping VHCN.
- Demand for duct access is extremely limited.

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[564] Case study interviews and desk research.
[565] BEREC provides some guidance in these situations in BoR (11) 43, p.19-20.
[566] WIK (2017), *Best practice for passive infrastructure access*, 19 April 2017,p.39.
[567] 7 NRAs as per responses to the online survey. For example, in Lithuania, the Rules for Installation, Marking, Supervision and Use of Electronic Communications Infrastructure, approved by Order No. 1V-978 of the Director of the Communications Regulatory Authority of the Republic of Lithuania of 14 October 2011, foresaw that the pipe of a communications cable duct system should be of an outer diameter of 110 mm or more. Space for alternative operators is available if there are technical possibilities to do so. ANOs note that there are very few issues as regards availability of space for competitors in the SMP operator's ducts despite the fact that there is a high demand for access to ducts and there is a high degree of parallel infrastructures in urban areas (case study inteviews).
[568] In Sweden, there is no longer an SMP duct access obligation, but Stokab reports that it has designed its network in such a way - FTTH, multifibre point-to-point – to be able to carry any type of services now and in the future (e.g. 5g) and to also have enough dark fibre to be able to meet all demands. Consequently, Stokab puts down 1,000-fibre cables in its ducts where needed (Stokab response to the online survey). Minimum diameters for ducts are also set in Lithuania and Ireland.
[569] Online survey data.
[570] NRA online survey data.

- FTTH is deployed by the SMP operator as much as possible on the facades of buildings, without ducts.
- There are few FTTH deployments by the SMP operator and access seekers focus on VULA.
- Fibre is mostly deployed in new High Density Polyethylene (HDPE) ducts and any extra HDPE duct is usually deployed as an operational reserve (used in case of repairs or breakdown of the original duct).
- Space for future access by competitors is not always foreseen.
- In Poland, there is also no such requirement, but the structure of the access fees (structure which is specified in the market review concerned) encourages the SMP operator to deploy ducts with extra space for hosting alternative operators. In particular, before the regulation was updated in 2018, fees for access to ducts were set by the percentage use of the ducts (a fixed price for the whole capacity of the duct was set irrespective of the duct's diameter). Therefore, if a duct is 110 mm in diameter and an operator wants to place a cable 11 mm in diameter, they take up 10% of the duct, meaning that they need to pay for 10% of the capacity. However, the NRA noticed that many ducts were in fact smaller than 110 mm and staying with the same methodology meant higher price-per-cable in smaller ducts. In response, they changed the methodology to calculate a stable price-per-cable[571].
- Finnish operators report that they "build and dig trenches for new fibre every day (except during some freezing winter months)"[572] and that additional capacity is always foreseen for their own future needs and for the needs of competitors.
- In France, the existing infrastructure is mainly reused since the civil engineering of the SMP operator covers the quasi-totality of the territory. Instances where new ducts are built or poles erected are marginal[573].

Finding 29. Several NRAs do not require the SMP operator, when deploying newly-built civil engineering, to design it so as to allow several operators to deploy their fibre lines as advocated by Point 15 of the Recommendation. However, these NRAs often have reasons not to do so based on their specific national situations.

Effective access: why is CEI access not used more widely across the EU?

Regulated access to SMP ducts is used by access seekers (e.g. in France, Spain or Portugal[574]). The online survey of NRAs and operators identified a couple of interesting cases:

- In Portugal, the SMP operator's ducts and poles have been widely used by alternative operators and it was one of the main drivers for the deployment of the VHCN by alternative operators. In the specific case of duct infrastructure, the ducts of the SMP operator have been the main choice for alternative operators.

[571] Case study interviews and desk resarch.
[572] Operator's response to the online survey.
[573] Operator's response to the online survey.
[574] Operators' responses to the online survey.

- Conversely, in Greece (since only a single operator is deploying NGA networks in each geographic area) demand for access to civil engineering for NGA deployment is not expected - at least in the short to medium term.
- In Malta, operators use a combination of civil engineering infrastructures including those of non-telecoms (other utility) operators. In general, the SMP operator cannot cover an area with FTTH without a prior upgrading of the civil infrastructure.

Operators provided positive feedback on access to ducts in a number of countries:

- In France, access to civil engineering is widely used because ducts are largely deployed.
- In Spain, "access to civil infrastructure has fostered competition on infrastructure over the last decade, thus favouring the competition of wholesale and retail fixed broadband markets"[575].
- In Italy, an operator notes that "cable ducts and dark fibre are essential elements to ensure infrastructural competition"[576].

BEREC states that it is "difficult to assess the efficiency of [the NGA Recommendation] on an aggregate level given the variety of cases (starting with operational differences, like the ubiquity of duct and pole networks entailing different regulatory approaches)". As most of the VHCN deployments are relatively recent, it would be premature to seek assessing the impact of the measures adopted by NRAs in some countries. Indeed physical deployment takes more time than the provision of other wholesale products like activated accesses, which are likely to show a market impact much faster)[577]. Moreover, BEREC highlights that differences in national circumstances more than in the manner in which the guidance was followed by NRA may explain the contrasting take ups by alternative operators of regulated access to civil engineering in the different Member States, but without naming the countries concerned: "For those operators not using this possibility to deploy VHCN, there are several explanations:

- The characteristics of the SMP operator's ducts do not enable alternative deployments (e.g. ducts that are too small for other users, or already saturated)[578];
- Dark fibre is widely available as a wholesale product and can be seen as a substitute to civil engineering in many cases;
- The SMP operator (if there is one) is not the only provider of an adapted civil engineering infrastructure.

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[575] Telefonica response to the Targeted Consultation, Q23.
[576] Italian operator's response to the Targeted Consultation, Q23.
[577] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q23.
[578] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q23 explains that "aging, damaged or no longer used infrastructures, as well as infrastructures with no longer available space or capacity can impede the deployment of new and enhanced networks, in particular VHCN. The construction of new civil engineering infrastructure elements is usually very costly (often estimated to account for about 80 percent of total deployment costs), both financially and in terms of time (…)When a duct or a sub-duct is damaged or is currently not in use, it can be rehabilitated in order to be useable for the deployment of new and enhanced networks, in particular VHCN. When a duct or sub-duct is saturated, a solution can be the removal of unused cables (e.g. inactive copper cables) or the bundling of active cables. This solution should permit the liberation of more space, and can be coupled with efficient engineering rules to occupy the available space in ducts".

[Moreover] the lack of complementary obligations ensuring access to a physical infrastructure in [effective, efficient and non-discriminatory] conditions can be the first impediment for their use"[579].

The main obstacles to wider usage of civil engineering infrastructures can be grouped into the following categories:

- Limited availability of ducts
- Mismatch with the required specifications of access seekers
- Pricing and other access conditions
- Other mentioned obstacles (not falling into any of the above categories)

a) Limited availability of ducts

As mentioned by BEREC, the availability of legacy ducts differs strongly between Member States, varying between 0 and 100 percentage of households that can be connected using a SMP's civil engineering infrastructure[580].

In Belgium, there was no demand, which, according to the SMP operator, predominantly finds its origin in the absence of a capillary, widely-available legacy civil engineering duct infrastructure. The copper cable distribution network infrastructure was generally buried directly in the ground, without using a sturdy re-usable concrete infrastructure to host such copper cables. As a result, contrary to countries such as Spain, Portugal, and to a certain extent France, no widespread civil-engineering type of passive physical infrastructures (e.g. concrete ducts) exists to be reused as a helpful pre-existing civil engineering asset in view of wide-scale FTTH deployment. Following recent regulatory decisions on broadband (2018) and high quality (2019), a sub-ducts reference offer has been elaborated and submitted to the regulator both for the GPON-type of sub-ducts and P2P fibre type of sub-ducts, but there was no demand[581].

Moreover, some NRAs mention that in their countries the civil engineering infrastructures of the SMP operator are not equally available for deployment of VHCN in rural and urban areas. In addition, the segment between the street cabinet and the end-user is not ducted in some countries[582].

b) Available CEI not meeting the required specifications by access seekers

In Greece, the obligation of access to civil engineering infrastructures is in place but it is not a common practice as operators prefer to deploy their own networks. In most cases, existing infrastructures do not meet the required specifications in order to be used[583]. In the Czech Republic also, the SMP operator reports that they processed several requests, but there was no follow-up from the applicants, who apparently lost interest following their physical inspection of the requested infrastructure. The SMP operator acknowledges that its infrastructure may not always be of an acceptable quality[584].

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[579] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q23.
[580] NRA responses to online survey, N=10.
[581] Proximus response to the online survey.
[582] An NRA response to the online survey.
[583] Deutsche Telekom response to the Targeted Consultation, Q23,
[584] Case study interviews.

An access seeker from Italy alleges that the "Reference Offers concerning access to passive infrastructures nowadays can satisfy only connections of single premises. (…) In particular, the standard acquisition processes are particularly slow, expensive, not optimized and are unsuitable for massive acquisitions due to the supply capacity offered by [the SMP operator], the timing for an availability of infrastructures and the costs"[585].

In Germany, the need for end-to-end provisioning rather than segment-by-segment was raised during some interviews[586].

An NRA reports that it is also important that access is provided to ducts in the curb section (from just outside of the private property to the inside of the private property)[587].

In addition, the findings also show that operators can also prefer to deploy their own ducts for security reasons[588].

c) Pricing and other access conditions

According to the Polish NRA, the main circumstances which can hinder the usage of third party civil engineering are the duration of procedures, pricing and the lack of space to deploy VHC networks[589]. "Situations such as (…) extreme and exaggerated labour security requirements, reluctance to share posts due to security reasons and not enough human resources allocated by the SMP operator to ensure efficient physical infrastructure access are some examples on how an efficient remedy in theory can be practically undermined"[590]. An operator active in several Member States agrees that, in certain countries, pricing could be an explanation i.e. where the proposed price is too high, negotiations will not lead to the take-up of CEI[591]. The size of the access seeker could, according to one operator, also be an issue for the model being sustainable. When the size of the access seeker is too small, the pricing model cannot be suitable due to the lack of scale economies[592]. In the case of Lithuania, some stakeholders indicated that a stable, cost-oriented price is the main variable driving the take-up of the SMP operator's ducts (although ANOs criticise the lack of transparency regarding the actual costing model, see Chapter 5)[593].

Finding 30. Pricing is mentioned as a (potential) obstacle to the usage of existing civil engineering. However, it is not clear whether the alleged problem is confined to the countries in which access to civil engineering is mandated under the national law transposing the BCRD or whether the guidance of the NDCM Recommendation on the cost orientation of the access was not duly followed

[585] An operator's response to the online survey.
[586] Case study interviews.
[587] An NRA response to the online survey.
[588] E.g. Stokab's response to the online survey: in order to be able to operate the network securely and efficiently, including to quickly repair any damages on the cables or ducts, it is necessary for Stokab to deploy its own ducts.
[589] Polish NRA response to the Targeted Consultation Q23.
[590] Vodafone response to the Targeted Consultation Q23.
[591] Case study interviews.
[592] An operator's response to the online survey.
[593] Case study interviews.

In the Czech Republic, there is very little interest in the commercial offer from the SMP operator[594]. Civil engineering from other utilities are used. However, one operator states that access to CETIN's civil engineering "is not used in practice as it is set rather ineffectively. Mostly, the lack of information about existing and or built infrastructures make its use difficult along with wide options for gaining exemption from this obligation based on non-transparent criteria."[595] Even when an SMP access obligation was in force[596] the obligation did not encompass quality of service obligations coupled with an obligation to pay compensations in case of non fulfilment of these QoS requirements. On the contrary, the Portuguese NRA mandated financial compensations *inter alia* for failure to provide operators with timely responses to requests for information such as regarding the (viability of the) installation of cables, and to requests of unblocking of ducts. If the SMP operator should fail to be present in a given location when a specific intervention/installation of cables is to be carried out by an operator, this could also give rise to a compensation obligation. In addition, the SMP operator is under specific transparency obligations including providing information on its duct occupation (dimensions, occupied volume and available space) via an electronic database.

Another issue raised is the allegedly excessive and costly obligations imposed by some SMP operators, such as requiring the presence of the staff of the SMP operator in cases of intervention in ducts and manholes[597], which does not correspond to common practice in other Member States[598].

Finding 31. The lack of enforceable QoS and costly ancillary obligations are mentioned as obstacles to the usage of existing civil engineering.

In Italy, in its latest market review, the NRA differentiated[599] on the pricing of access to 'mini-ducts' depending on the volumes ordered: the higher the number of mini-ducts, the lower the access price per mini-duct. The lack of similar 'volume discounts' in Lithuania or other means to achieve economies of scale was regretted by ANOs where access to ducts is the main access product used by alternative operators to deploy VHCN networks (there is no take-up of fibre unbundling provided by the SMP operator)[600].

d) Other obstacles

An operator reports that, in Hungary, the demand for regulated physical infrastructure access (PIA) is close to zero, while the demand is significant in Portugal and Spain. The operator concludes "that in Member States where it was properly implemented (…) this type of access has been the key factor for NGA deployment"[601].

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[594] An operator's response to the online survey.
[595] Deutsche Telekom response to the Targeted Consultation, Q23.
[596] Repealed by the subsequent market review (Case CZ/2018/2067) in the wake of the transposition of the BCRD. The Commission, in its decision of 27 April 2018, asked the NRA to impose a cost orientation obligation if it appeared that access "cannot be ensured in an appropriate, timely and effective manner".
[597] Case study of Cyprus. This is also the case in Portugal.
[598] "In Spain, France and the UK, access seekers may install cables on poles themselves subject to accreditation (in Spain and the UK) or following engineering rules (France) and after giving notice to the incumbent (e.g. 24 hours in the case of Spain)", WIK (2017), *Best practice for passive infrastructure access*, 19 April 2017, p.48. Similar practices are in place in Lithuania. Note that the Polish NRA also expressed this concern (discussed in this chapter).
[599] Commission Decision of 11.072019 concerning Case IT/2019/2181-2182.
[600] Case study interviews.
[601] An operator's response to the online survey.

In Italy, an operator alleges being discriminated against by the SMP operator "that provides exclusive access to its civil infrastructure to its retail division and to a selected number of operators on conditions that are better than those published in the Reference Offer (lower prices, simpler process and more products)"[602]. In Lithuania, operators allege that the SMP operator concludes contracts with end-customers in areas where access seekers request access to SMP operator's ducts, implying a breach of Chinese walls, however, regretting that this type of behaviour is impossible for the ANOs to prove. An operator also alleges that the time to carry out technical feasibility tests (of whether access can be granted) systematically differs between regions, wondering whether the SMP operator is deliberately delaying the reply in some areas[603].

Finding 32. Proper design and enforcement of the access obligations seem to be crucial for the effectiveness of the access remedy.

Do SMP operators have sufficient investment incentives to deploy civil engineering for third parties?

In 2011, the Italian NRA considered applying a risk premium in case of newly built infrastructure[604], but eventually did not allow it. Other NRAs also do not differentiate pricing access to civil engineering depending on whether it is already existing or newly built[605].

In the UK, the NRA uses its estimates of the SMP operator's Copper WACC, since it considers that this most closely reflects the systematic risk associated with physical infrastructure[606].

Telefónica[607] considers that, in a market with a high degree of infrastructure competition, BU-LRIC cost orientation is neither future-proof nor proportionate and hinders investment incentives.

- A SMP operator will not recover its investment on CEI assets if the modelled network is not based on the SMP operator's network and the wholesale demand on real data. Moreover, if the cost model design is based on a 'fibre-only model' (i.e., a theoretical design for FTTH deployment), then the assets which are fully depreciated according to the net value of the accumulated depreciation at the time of calculation should not be directly excluded because the depreciation period should not start before the beginning of the deployment of the FTTH network.
- The SMP CEI access model will be artificially perpetuated if it continues with cost oriented prices at a lower level than the "fair and reasonable" prices under the transposition of the Broadband Cost Reduction Directive because the difference constitutes a disincentive for other players to adapt or make available their CEIs for fibre deployment. The only solution would be to align pricing rules.

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[602] An operator's response to the online survey.
[603] Case study interviews.
[604] BEREC (2011), *BEREC Report on the Implementation of the NGA-Recommendation*, BoR(11) 43, October 2011, p.89.
[605] Case study interviews.
[606] OFCOM, Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26 Volume 4: Pricing remedies, 18 March 2021, footnote 132, p.78.
[607] Written feedback to Stakeholders' workshop of 9 June 2021.

Finding 33. Generally, NRAs do not differentiate between the pricing of newly-built civil engineering and legacy civil engineering

NRAs have different[608] views on whether and when SMP access obligations should be imposed and on whether SMP operators retain sufficient incentives to invest in new civil engineering infrastructures with sufficient capacity to host alternative operators where necessary. One NRA says that while there is currently no evidence that current SMP access obligations would impede new investments, the question needs nevertheless to be re-evaluated in the future in light of the continual reassessment of access and rate obligations. Another NRA says that while, under the current SMP fair pricing rate regulation, even though the SMP operator is sufficiently remunerated and incentivized for investments in the deployment of new civil engineering infrastructures, there is no real incentive for the SMP operator to provide sufficient capacity to host alternative operators.

In order to reduce the risk of deploying new ducts by the SMP operator, the Italian NRA has approved[609] volume discounts in its tariff scheme for access to ducts. This Decision provides for volume discounts in the tariff scheme for access to ducts. The more mini-ducts inside ducts are ordered, the lower the unit price paid, enticing alternative operators to book more space for the deployment of fibre and ensuring that idle capacity in ducts is taken up more speedily.

Finding 34. NRAs have different views on whether SMP operators retain sufficient incentives to invest in new civil engineering infrastructures when SMP access obligations are imposed.

Telefónica[610] advocates that in order to reflect the new self-standing remedy of access to CEI under the EECC, the successor recommendation should acknowledge that in those markets with effective access to CEIs, pricing remedies as well as the ERT should be removed if an effectively monitored TRT or KPIs are in place. Such an approach would provide an incentive to SMP operators to improve access to their CEIs.

Scope of the access obligation

The definition of civil engineering infrastructure in Point 11 of the NGA Recommendation explicitly refers to the local loop. One may thus imply that the mandated access to civil engineering infrastructure is limited to those facilities (like ducts[611]) that are deployed to host local loop cables, which generally run from the ODF/cabinet/manhole to the subscriber (or its proximity)[612]. Specific access obligations should be imposed for infrastructures between the MDF (or ODF) and the primary network segment (generally starting from the chamber outside the central office) and for infrastructures from the last distribution point at the end of secondary

[608] Based on the NRA online survey data.
[609] Art.46 of DELIBERA Nr 348/19/CONS. More specifically, Art.46 set the price for a 15 year IRU at €7,11 for up to 2 miniducts; €5,81 for up to 3; €4,91 for up to 4 miniducts; and €4,26 for up to 5.
[610] Written feedback to stakeholders' workshop of 9 June 2021.
[611] Access to full duct, access to segments of ducts or to micro-ducts.
[612] BEREC (2011), *BEREC Report on the Implementation of the NGA-Recommendation*, BoR(11) 43, October 2011, p.19.

network segments and the in-building wiring (generally the infrastructure composed of the last chamber on public land until the infrastructure inside the building)[613].

However, BEREC stresses that under some circumstances, it may be inappropriate to duplicate some network parts or elements (e.g. for backhaul networks or shelters hosting operators' passive and active equipment). However, if such related facilities have enough capacity to address the needs of future deployments, it may be appropriate to impose access obligations regarding those network elements. For example, existing dark fibre based backhaul networks, which are essential to connect deployed optical local loops, can offer connection capacities for new and enhanced networks and thus their duplication[614] can be avoided. "BEREC therefore considers that in order to grant an effective and non-discriminatory access to the civil engineering infrastructure, NRAs may impose an access obligation to related facilities"[615].

In line with BEREC's position and based on its experience, an NRA confirms that an access obligation to a backhaul section may be relevant for the access seekers[616]. In France also the NRA "ARCEP [imposes] the obligation on Orange to maintain and improve the provisioning of its current commercial backhaul offer (LFO) for providing access to ducts hosting a fibre link between two MDFs/ODFs and between an MDF/ODF and an alternative operator's Point of Presence (PoP)"[617].

As regards manholes, a Cyprus operator reports that the SMP operator was not offering access to manholes. However, the Cyprus operator was aware of many unused extra manholes and requested that an access product be provided, but there was a refusal to supply. The Cyprus operator filed a dispute which was ongoing at the time of this research. The Cyprus operator estimated that if its dispute were to be unsuccessful, they would have to create approx. 10k manholes (costs estimated at 3m EUR), even though there are many CYTA's unused manholes. The same operator also indicated that access to poles was granted only after a dispute and that regulated access product to in-house wiring for buildings housing less than 5 households was in discussion with the SMP operator[618].

Another issue is whether access should only be granted for the deployment of fibre networks. While acknowledging that scarce available space must be utilized in the most efficient and future proof way, the Commission nonetheless invited an NRA "to ensure that the scope of the access obligation is technologically neutral by extending it to deployments of networks other than fibre, unless such access request would objectively lead to an exhaustion of available space for future fibre deployments on that specific route".[619]

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[613] Idem, footnote 22.
[614] According to the BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q23, an artificial distortion of the competition between the SMP operator and access seekers would result from the former being able to use such resources with an important level of capillarity that falls into their property, while the latter would need disproportionate financial inputs to effectively deploy new and enhanced networks, precluding so the latter to deploy its fibre network at the same pace.
[615] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q23.
[616] An NRA response to the online survey.
[617] Commission Comments of 26.11.2020 concerning Cases FR/2020/2277-2278-2279-2280, p.11. In the meantime, the measure was adopted.
[618] Case study interviews.
[619] Commission Comments of 26.11.2020 concerning Cases cases FR/2020/2277-2278-2279-2280, p.20.

Increasing demand for poles

There seems to be a high demand for access to poles for deployment of VHCN:

- In Lithuania, ANOs are exploring a possible strategic cooperation with the electricity provider to use their electricity poles to improve fibre coverage in more remote areas (e.g. small towns/villages). Even though the SMP operator owns one of the most extensive duct networks covering nearly the entire territory of the country, access to poles is still a very relevant issue[620].
- In Ireland, Vodafone cooperated with the electricity provider to create the joint venture SIRO to use their electricity poles to roll out their FTTH network instead of using the SMP operator's CEI.[621]
- In Cyprus, two main ANOs have an agreement with the electricity provider and have rolled out their networks using electricity poles.[622]
- In Poland, the need for access to poles is very high – there are approx. 7m poles in Poland, and only 10% are used by telecommunications companies. UKE estimates that the need is 4-5 times larger. In February 2021 the NRA issued a decision regulating access to energy operators' poles in Poland. An operator claims that this decision was welcomed by the whole telecommunications market.[623]

However, it appears to be even more difficult to ensure access to information on available civil engineering, especially when it comes to available space. For example, even in the cases of Spain and Portugal, which have some of the most elaborate and well-developed information systems on the available civil engineering of the SMP operator, information on the available space of poles is not stored in the system[624].

d. Guidance on the centralisation of information on available civil engineering

Provisions concerned (NGA Recommendation)

- Point 17. NRAs should work with other authorities with a view to establishing a database containing information on geographical location, available capacity and other physical characteristics of all civil engineering infrastructure which could be used for the deployment of optical fibre networks in a given market or market segment. Such database should be accessible to all operators.

  Annex II, Point 2. INFORMATION ON THE CIVIL ENGINEERING INFRASTRUCTURE AND THE DISTRIBUTION POINTS

  The SMP operator should provide third-party access seekers with the same level of information on its civil engineering infrastructure and distribution points as is available internally. This information should cover the organisation of the civil engineering infrastructure as well as the technical characteristics of the different elements of which the infrastructure consists. Where available, the geographical location of these elements, including ducts, poles and other physical assets (e.g. maintenance

[620] Case study interviews.
[621] Case study interviews and desk research.
[622] Case study interviews and desk research.
[623] Case study interviews and desk research.
[624] Case study interviews and desk research..

chambers) should be provided, as well as the available space in ducts. The geographical location of distribution points and a list of connected buildings should also be provided.

The SMP operator should specify all intervention rules and technical conditions relating to access and use of its civil engineering infrastructure and distribution points, and of the different elements the infrastructure consists of. The same rules and conditions should apply to third-party access seekers as to internal access seekers.

The SMP operator should provide the tools for ensuring proper information access, such as easily accessible directories, data bases or web portals. Information should be regularly updated, so as to take account of the infrastructure's evolution and development and of further information collected, in particular on the occasion of fibre deployment projects by the SMP operator or other access seekers.

Did the guidance of the NGA Recommendation bring about centralisation of information on available civil engineering?

The NGA Recommendation is not specific as to which infrastructures (e.g. those belonging to the SMP or alternative operators, and/or those outside the ECN framework) should be included in the database referred to in its Point 17. One can assume that the database should cover both. In that case, the guidance of Point 17 needs to be articulated[625] with the national measures implementing Art.4.2 BCRD relating to the centralisation of information on the physical infrastructures held by public sector bodies and the obligation upon these bodies to make it available, upon request, to undertakings providing or authorised to provide public communications networks. If the relevant BCRD provision has been transposed and a single information point (SIP) has been established for that purpose and provides sufficient information[626], it makes little sense for an NRA to build/maintain a separate database.

The obligation for public bodies <u>to make available the relevant information</u> via a single information point is one of the several optional provisions left to the Member States' discretion to transpose, which means that Point 17 retains its relevance for certain Member States. According to the Commission's 2018 report on the implementation of the BCRD,[627] obligations "to require public sector bodies to make the minimum information concerning existing physical infrastructure available via the single information point, if it has such information from network operators in electronic format and by reason of its tasks, exist for instance in Austria, Bulgaria, Cyprus, Czech Republic, Greece, Finland, Lithuania, Poland, Portugal and Slovakia (Article 4(2))."

As regards <u>the data-base</u> containing information on geographical location, available capacity and other physical characteristics <u>of all civil engineering infrastructures</u> also referred to in Point 17 NGA Rec, the Commission's 2018 report says that the single information point's (SIP) tasks have been entrusted to organisations different from the NRAs (e.g. energy agency, e-utility, and road, planning/mapping or local authorities) in 10 Member States and in four cases to no organisation (see Figure 18). However, the SIP, more broadly, must under the BCRD also

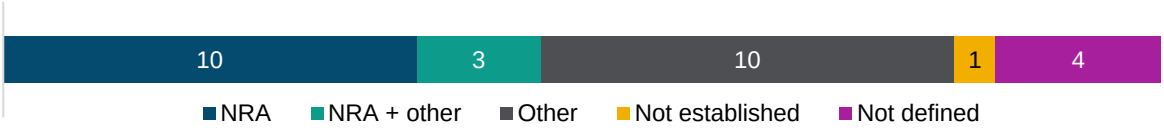
[625] The BCRD is currently being reviewed in light of technological, market and regulatory developments. Draft amendments by the Commission are due in the first quarter of 2022. See: High-speed broadband in the EU – review of rules, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12463-High-speed-broadband-in-the-EU-review-of-rules_en

[626] Even in cases where MS have transposed Art. 4(2), public sector bodies might not have up-to-date information on all physical infrastructures.

[627] COM(2018) 492 final of 27.6.2018

cover other types of information, i.e. related to planned civil works and procedures for permit granting.

Figure 18. Single information point tasks, set out under BCRD, assigned to NRAs in the EU



Source: COM(2018) 492 final of 27.6.2018.

The electronic communications NRA is the competent body assigned in 12 Member States, while in 2 Member States the NRA shares the SIP function with other bodies. Bodies tasked with the SIP function have to gather, from many different sectors, information on physical infrastructures, which requires strong coordination in collecting and integrating that data[628], which might be further described in Point 17, building on the experience acquired since the transposition of the BCRD.

Moreover, the current experience with the development of databases is susceptible to support the drafting of guidance on such databases.

Table 26. Overview of availability of a single database on PI.

Availability of single database		
Countries with SMP regulated access to civil engineering		
1	Belgium	KLIP/GIPOD is a digital platform which georeferences location and properties of underground cables.
2	Croatia	Not implemented
3	Cyprus	In the case of existing available infrastructures in electronic format, a mapping portal tool collects and provides available information to potential access seekers and/or access providers. Maps are provided via web services by the department of Lands and Surveys. For all other network providers that have not made available their infrastructure in electronic form, there are relevant contact points available on OCECPR's website
4	Estonia	Not yet implemented
5	France	'Guichet unique' which refers the access seekers to the network operators
6	Germany	Infrastruktur-Atlas managed by the NRA[629]
7	Greece	the Telecommunication Infrastructure Registry operated by the Ministry of Digital Governance provides access to information submitted by the owners of the infrastructures.
8	Hungary	An E-Utility System gives access to data from the own registers of public utility providers:(information from approximately 900 electricity, hydrocarbon, water supply, drainage, telecommunication and district heating network providers. Due to the applied Web Map Service (WMS) and Web Feature Service (WFS) technologies, these data are not stored in a central database but through web-based geospatial information services formed by public service providers. This can serve data requests of the e-utility system real time through online data links. Using these services, public utility networks are shown on a map interface of the

[628] Summary Report of Best Practices Outcome of phase 1 of the work of the Special Group for developing a common Union Toolbox for connectivity 16/10/2020-20/12/2020, p.6.

[629] https://www.bundesnetzagentur.de/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/ZIdB/ZIdB-node.html

Availability of single database		
		e-utility which is based on Open Street Map, but also incorporates basemap layers from the land registry and the National Orthophoto Database as well
9	Ireland	No[630]
10	Italy	Single information point (SINFI)[631]. NRA manages a parallel database[632]
11	Latvia	Database provided by the SMP operator
12	Lithuania	Maps from topographical data with the location of the infrastructure (mainly ducts) are available on the RRT website www.e-infrastruktura.lt (provides links to municipalities databases which are used for the generation of maps). Other availability of georeferenced location of the infrastructure and other information will be implemented in the Topography and Engineering Infrastructure Information System.
13	Poland	Managed by the NRA[633]
14	Portugal	Managed by the NRA[634]
15	Slovakia	Managed by the NRA[635]
16	Slovenia	Managed by the Surveying and Mapping Authority[636]
17	Spain	Managed by the SMP operator, but the current SIP in Spain is ready to store information on planned physical infrastructures for the coordination of civil works.
Countries without SMP regulated access to civil engineering		
18	Austria	The ZIS-Portal[637] managed by the NRA that collects data on physical infrastructure that is or can be used for telecommunication and civil engineering projects in many different sectors while also cooperating with public sector bodies of different levels including municipalities and ministries collecting and integrating data on e.g. funded infrastructure projects.
19	Bulgaria	No
20	Czech Republic	Managed by the NRA. However, it doesn't have complete information. Access seekers must apply for additional data to the network operator.
21	Denmark	Agency for Data Supply and Efficiency[638]
22	Finland	Managed by the NRA[639]
23	Luxembourg	National register for infrastructures managed by the NRA

[630] An inter-departmental Government working group has been established with the remit to map digital hubs across the country, and it is anticipated that a composite picture in respect of same will be available in 2021 (Summary Report of Best Practices Outcome of phase 1 of the work of the Special Group for developing a common Union Toolbox for connectivity, 16/10/2020-20/12/2020, p.149).

[631] https://www.sinfi.it/portal/. The data covers both underground and aboveground elements. The data follow a tree logic: each layer defines its themes, which identify its own classes, which are composed of several attributions. Layer 07 - "Subservice Networks" includes the following themes: Management of housing infrastructure networks; Water supply network; Water disposal network; Electricity network; Gas network; District heating network; Pipelines; Telecommunication networks. Specifically, the class network housing infrastructure (070001) covers "buildings with a prevalent longitudinal development of adequate size to accommodate one or more networks, i.e. pipelines, cables, main and ancillary works suitable for the provision of a public service". This type of infrastructure includes: conduits, technological tunnels, multi-purpose tunnels, manholes, pylons, poles, etc. See Summary Report of Best Practices Outcome of phase 1 of the work of the Special Group for developing a common Union Toolbox for connectivity, 16/10/2020-20/12/2020, p.150.

[632] https://maps.agcom.it/

[633] https://mapbook.uke.gov.pl/

[634] http://www.anacom.pt/render.jsp?categoryId=384370#.Vu-F9MfPy8U

[635] https://www.teleoff.gov.sk/data/files/48968_vestnik9.pdf

[636] http://e-prostor.gov.si/index.php?id=240

[637] https://www.rtr.at/TKP/was_wir_tun/telekommunikation/zentrale_informationsstellen/zis/ZIS.de.html

[638] https://ler.dk/Portal/P.10.English.aspx LER has since the beginning of 2020 offered a feature in support of the joint use of physical infrastructure for multiple cables. This feature is optional for cable owners and is still in the very early stages of deployment. Therefore, this feature cannot give a full overview of passive physical infrastructure or excess capacity in passive physical infrastructure. See Summary Report of Best Practices Outcome of phase 1 of the work of the Special Group for developing a common Union Toolbox for connectivity, 16/10/2020-20/12/2020, p.148.

[639] https://www.traficom.fi/fi/asioi-kanssamme/verkkotietopiste

Availability of single database		
24	Malta	No
25	Netherlands	The Netherlands' Cadastre, Land Registry and Mapping Agency – in short Kadaster operates an online information exchange portal for underground utilities called KLIC
26	Romania	The NRA created a software application available to the providers of public electronic communications networks as a single information point for transparency concerning physical infrastructure.
27	Sweden	"Ledningskollen (LK) managed by the NRA[640]https://www.ledningskollen.se/ It was established in 2010 for sharing information on cables, pipelines and other underground infrastructure.

Source: Summary Report of Best Practices Outcome of phase 1 of the work of the Special Group for developing a common Union Toolbox for connectivity 16/10/2020-20/12/2020.

The need for qualitative improvements in the directories of CEIs was mentioned by network operators. The latter is particularly important, because "situations such as the lack of proper information on the location and availability of the infrastructure (…) are some examples on how an efficient remedy in theory can be practically undermined"[641]. This is echoed by operators in several Member States:

- In Lithuania, ANOs regret the lack of access to relevant information. Operators indicate that the possibility to access (part of) SMP operator's database on available CEI occurred 3-4 years ago despite it being a requirement in the NRA decision for much longer. Access seekers have two opportunities: 1) order a physical inspection of the availability of access or 2) perform a technical feasibility test on the basis of data available in the database. In practice, information in the database is not sufficient for option 2). The database contains only a limited set of data, e.g. only the routes of duct network, but no information on the available space within the network; also there is no information on the diameters of ducts or manholes. The information is useful for the access seeker only for planning of the network route, and it does not replace a technical feasibility test with a physical inspection. The price differences between options 1) and 2) are significant, with option 1) being much more expensive)[642].
- In Cyprus, an operator alleges that information on where the ducts are placed is limited. The GIS tool (managed by the NRA) provides information on the rooting of ducts, but does not provide any information on the availability of space or how the building is connected to the duct; they have needed to go to CYTA each time and request this information. They won their dispute and CYTA was instructed to upload this information to the GIS tool within 6 months for urban areas and within 12 months for all of Cyprus (including information on manholes and poles), but at the time of the interview, the SMP operator had not yet complied[643].

Moreover, the justifications to restrict access to information on CEI availability should be assessed. An operator assumes that the databases on structural infrastructure do not have any personal data and thus, do not require additional conversion before the information is provided to competitors[644]. However, public security may justify restrictions. Electronic

[640] https://www.ledningskollen.se
[641] Vodafone response to the Targeted Consultation, Q23.
[642] Case study interviews.
[643] Case study interviews.
[644] German operator response to the Targeted Consultation, Q5. In Estonia, the SMP operator indicates that the database contains business secrets and other confidential information. In Lithuania, ANOs report that the SMP operator indicated the same concern.

communications infrastructures are critical infrastructures for a nation[645] and constitute potential targets of terrorist or criminal attacks.

Finding 35. The usefulness of the information made available by SMP operators is an issue in some Member States. The availability of online systems containing up-to-date information on duct location and availability with measures to ensure the accuracy of such data is a key requisite.

e. Usage of symmetric access obligations or negotiated access under the BCRD as alternative

Provision concerned (NGA Recommendation)

- Point 7. When applying symmetric measures under Article 12 [Framework Directive] granting access to an undertaking's civil engineering infrastructure and terminating segment, NRAs should take implementing measures under Article 5 [Access Directive].

Implementation of the guidance

Prior to the NGA Recommendation, several NRAs had already imposed transparency and access obligations under national law rather than transposition measures based on the Framework and Access Directives).

According to BEREC[646], in Croatia, France, Greece, Italy, Poland and Spain, decisions of NRAs on symmetric obligations in relation to the deployment of NGA networks fell within the scope of powers set out in Article 5 AD, Article 12 FD or Article 9 BCRD.

As a consequence of the transposition of the different EU legal bases, the civil engineering of SMP operators is subject to overlapping access regimes with different obligations.

For example, Orange reports that in Poland the same infrastructure can be subject to overlapping regulations: their infrastructure is currently subject to symmetric access obligations (together with cable operators) as well as, where the infrastructure was built using state aid, under the specific regime also mandating open-access. Consequently, they have to publish a different reference offer per regulation. They are concerned that a third regulatory layer might be added in case of regulation of the PIA market under the transposition of the EECC (and another reference offer, with potentially another price for access to CEI). They claim that it is problematic to have different regulations applying to the same infrastructure[647].

When could access mandated on the basis of the measures implementing the BCRD be sufficient?

Where an NRA imposes remedies on operators found to have a SMP, they must take into account other types of regulation or already imposed measures which affect the market power

[645] Directive (EU) 2016/1148 of the European Parliament and of the Council concerning measures for a high common level of security of network and information systems across the Union (NIS Directive)
[646] BoR (18) 214.
[647] Case study interviews.

of the SMP operator. This includes, in the case of a physical infrastructure, limitations of this market power deriving from rights granted to access seekers by the national laws transposing the Broadband Cost Reduction directive. The rights and obligations set by these national laws vary across the EU. For example, in Bulgaria, national law transposing the BCRD directive significantly reinforced its provisions by including obligations for access, non-discrimination, transparency (including the publication of a reference offer) and price control equivalent to a significant extent to the set of obligations imposed on BTC due to its SMP status. Thus, CRC considered that the opportunities for BTC's anti-competitive behaviour were constrained[648].

An NRA reports having observed no drawbacks from the implementation of the access regime under the BCRD: no disputes were submitted relating to electronic communications network operators[649] (even though symmetric access is occasionally used by operators[650]).

In Hungary, access seekers prefer to use civil engineering infrastructures of power suppliers to those of the SMP operators. There are informal complaints relating to access to civil engineering infrastructures of power suppliers but there have been hardly any formal requests to initiate dispute resolution also in cases of access to civil engineering infrastructures of power suppliers[651]. Access seekers are reluctant to initiate individual proceedings against civil infrastructure owners because they are afraid of ruining their good relationships with these giant (mainly electricity) companies in the future[652]. At the same time, the BCRD regime has an advantage over SMP regulation in that it does not depend on the outcome of periodic market decisions, so it is probably more predictable and reliable for access seekers. Under the SMP regulation, a partial (geographical) or total deregulation would result in the withdrawal of civil infrastructure access after a transitory period, which may potentially cause uncertainty in the return of investments and the local market presence of access seekers. Access seekers might possibly be able to use the infrastructure of other sectors' utilities, but their usability might be limited in practice. There may be different reasons for it, such as longer timing than for the SMP regulation[653], knowledge, experience, regulatory and standard compliance, information availability, architecture of infrastructure.

In Poland, while access to the ducts and poles of the SMP operator are regulated as an SMP obligation on Markets 3a and 3b, access to the ducts of the SMP operator can also be requested on the basis of Art. 3 of BCRD (decision from September 2018)[654]. However, according to the Polish NRA[655], costs of access and lack of space to deploy VHC networks

[648] BG/2019/2155 , quoted in the Explanatory Note accompanying the Commission Recommendation on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code, SWD(2020) 337 final, 18 December 2020, footnote 194.
[649] An NRA response to the online survey.
[650] Case study interviews.
[651] Hungarian NRA response to the Targeted Consultation, Q23.
[652] Hungarian NRA response to the Targeted Consultation Q26. The Hungarian NRA assumes that the revision of BCRD could deal with the problem. E.g. with the consideration of a broader entitlement for NRAs in choosing the way to handle issues arising from the application of implemented rules under the Directive, including, but not limited to the possible extension of the NRA's power for conducting sectoral investigations on its own initiative, on an *ex-officio* basis.
[653] The duration is also quoted by the Polish NRA in its response to the Targeted Consultation, Q23. At the same time, SMP access may also require some time. For example, in Lithuania, access seekers complained about the lengthy (around 20 days) technical feasibility study deadline before the provision of access services (Case study interviews).
[654] Polish NRA response to the Targeted Consultation, Q23.
[655] Ibid.

can hinder the usefulness of the BCRD regime. The latter obstacle does, however, not appear to be specific to access under the BCRD regime.

In Croatia, the SMP operator complains that it is the only infrastructure operator that is price regulated[656] in the country. No procedure to regulate prices of access to other facilities' infrastructure exists in practice as the NRA is not responsible for the regulation of municipal infrastructure[657]. The asymmetry between the access obligations imposed on the civil engineering of respectively the SMP operator and other utilities, however, did not prevent access seekers from using the latter's infrastructure in France, Italy and Portugal, in addition to the mandated access to the SMP operator's civil engineering.

Conversely, in Cyprus[658] and Lithuania[659], alternative operators also make use of the national law transposing the BCRD to access the civil engineering from the SMP operator.

In Romania, the NRA initially imposed access to civil infrastructure on the SMP operator. However, competing operators did not take advantage of this remedy, choosing instead to deploy aerial fibre loops (which are much less expensive). Despite a prohibition in Romania in 2011 on deploying aerial cables in the main cities[660], the NRA noted that 85 new operators entered the market both in rural and urban areas while existing operators invested further in urban areas[661]. As a consequence of the network build-out by competitive operators, the Romanian NRA decided in 2015 to phase out regulation in Market 3a. The NRA kept the regulatory remedies in place for one year and pointed out that, if access to civil engineering would be required in the future, it would be available under the symmetric legislation transposing Directive 2014/61/EU (BCRD). In Sweden, since dark fibre is readily and widely available, "there is no demand from access seekers for access to ducts and poles. This is also the reason why the national regulator PTS has revoked the previous obligation on the national SMP (the incumbent) to offer access to ducts and poles"[662].

An NRA reports that in its country, access to the physical infrastructure using the BCRD regime is seldom used. The Dispute Settlement Body has not dealt with any cases[663]. Yet another

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[656] The lowest by the benchmark in EU 28 (up to 4 times the average) and in the lowest in the Croatian market (up to 3 times the average). See Deutsche Telekom response to the Targeted Consultation, Q23.
[657] Deutsche Telekom response to the Targeted Consultation, Q23.
[658] The (symmetric) Collocation Decree.
[659] Case study interviews. In addition, ANOs make (limited) use of infrastructure owned by water or electricity companies, wherever necessary.
[660] Which would not be strictly enforced: "Most cities require underground infrastructure, which is expensive to approve, build, and maintain. But the Bucharest neighborhood networks never went through regulatory approval processes. Due to salutary neglect, aerial connections proliferated in Romania, giving rise to the poles with wire nests. As even the International Telecommunications Union noted, "Often, aerial fibre is deployed in areas where [underground] duct-based network roll-out is mandatory." Even though the law often required underground deployment, neighborhood networks would use poles to wire their community", Will Rinehart, The curious case of Romanian broadband, 15 October 2020, available at: https://medium.com/cgo-benchmark/the-curious-case-of-romanian-broadband-c58291b2fcda.
[661] Including using utilities' infrastructures. For example, RDS reports to have save 50% fibre deployment cost and increased 12% market share in 3 years by cooperating with utilities (Su Peng, Industry collaboration enables Smart City, slide presentation at the 3d Asia Pacific Regional Forum, slide 11).
[662] Stokab response to the online survey. As dark fibre is readily and widely available by neutral players such as the municipal networks, operators and other access seekers prefer access to dark fibre based on voluntary commercial agreements instead of having to request access under the BCRD and then invest in and roll out their own networks.
[663] An NRA response to the online survey. The NRA assumes that the drawbacks of the BCRD regime are: lack of information on ducts availability (process on request basis is not transparent enough, capacity information is not

NRA sees the BCRD rather as a soft law that requires good cooperation between the parties. On the other hand, access to the civil engineering infrastructure in the context of a SMP can be more direct and effective. Nevertheless, neither regime has been used in the country[664].

Several NRAs see drawbacks of using the BCRD regime instead of SMP regulation. The following were mentioned in the online survey:

- In contrast to relying on SMP remedies, commercial agreements and other means imposed by the BCRD are more complex and therefore more costly to negotiate and are therefore better suited to specific individual cases[665].
- Decisions based on the non-standardised BCRD criteria for the assessment of "fair and reasonable" terms might be less appropriate for generalisation compared to determining the cost of efficient service provision as applied under the SMP regulation.
- Access under BCRD does not include specified SLAs, SLGs and KPIs (contrary to SMP remedies).
- Under the BCRD regime access seekers do not have access to mandatory indicative information on the availability of physical infrastructures (while that obligation exists regarding the SMP operator's ducts)[666].
- Additional technical requirements by the host network (e.g. safety in power grids) and network topology variation.

For BEREC[667], the case-by-case approach to dispute resolution envisioned by the BCRD may not be sufficient to remedy important competition problems identified under SMP regulation, which rather requires a frequent and more general regulatory intervention. BEREC refers further to the additional potential drawbacks stemming from the exclusive application of the BCRD mentioned in the Report on access to physical infrastructure in the context of market analyses[668]. On the other hand, the BCRD may, according to BEREC, be sufficient in instances where physical infrastructure (in particular ducts and poles) is not widely available or is not widely used, as well as in instances where other economic agents besides the SMP operator have the means and incentives to grant access to their physical infrastructure, on the basis of economic and technical terms and conditions which are similar to those that may be available from the SMP operator.

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required), low incentive for utility companies to share ducts due to complexity (operational processes to be put in place, need to provide SLA to telecom...), uncertainties about the pricing in the absence of price control, risk of long negotiations. EIR response to the Targeted Consultation Q26 also advocates the strengthening and significantly reinforcing the provisions of the Directive, including the obligation to publish a reference offer, operators.

[664] An NRA response to the online survey.

[665] Another NRA mentions that while being able to take account of the particular circumstances of each individual case by considering them on a case-by-case basis is an advantage, the disadvantage lies in greater uncertainty for market players, which could potentially discourage investment. Here, there is the possibility of achieving an increasing clustering and standardisation of case categories via as many individual cases as possible, which are made transparent. This would offer the possibility of achieving greater predictability for possible investment decisions.

[666] However, this is not necessarily the case in all Member States, given that it will depend on the manner that national legislators transposed Art. 4(1) BCRD which provides that "every undertaking providing or authorised to provide public communications networks has the right to access, upon request, the following minimum information concerning the existing physical infrastructure of any network operator (…)"

[667] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q26.

[668] BoR (19) 94, available at: https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/8597-berec-report-on-access-to-physical-infra_0.pdf

Operators also report drawbacks. The process is long, the reference offer (if any) is less stringent than the SMP-regulated reference offer, and implementation is complicated at best and can be even more complicated when technical or security constraints[669] have to be managed[670]. An operator present in multiple Member States says that the BCRD regime might be a useful tool, but it could not in any case be a substitute to the SMP framework. This network operator maintains that SMP access to CEI is the only effective means of obtaining access to the incumbent operator's civil engineering, and it continues to be essential because of the ubiquity of the SMP operator's network[671].

Vodafone would not consider it appropriate to rely only on obligations under the BCRD. It argues (among other considerations) that in Germany Deutsche Telekom has not shown any willingness to come to a fair agreement based on bilateral negotiations under the BCRD regime, and that therefore *ex ante* SMP regulation is indispensable[672]. At the same time, the SMP access regime relates only to the access network, while the BCRD regime relates to the entire network[673]. Both are therefore complementary. Similarly, exclusive reliance on BCRD could be insufficient[674]. A Portuguese operator[675] also stresses the following limits of the BCRD regime:

- Prices: there is a cost orientation principle in the BCRD, but infrastructures owned by municipalities are not directly subject to NRA scrutiny. This leads to a high risk of access prices of infrastructures owned by municipalities being too high without an expeditious mechanism for operators to dispute them (the only instruments are national courts with timings that can go up to years).
- Operational issues: the absence of mandated EoI[676] such as potential operational overheads introduced by access providers aiming to a 'zero risk' situation and therefore establish cumbersome processes and inflate access costs.

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[669] A French operator's response to the online survey refers specifically to the requirements of the electricity grid operator Enedis for aerial deployment on its poles in less dense areas (the so-called public initiative area - Réseaux d'Initiative Publique (RIP)).
[670] An operator's response to the online survey.
[671] Iliad's response to the Targeted Consultation, Q26.
[672] Vodafone response to the Targeted Consultation, Q24. In Germany, the SMP operator rejected any access to their ducts and generally referred to their portfolio of active access products in the past. Due to the German implementation of BCRD (DigiNetz Law), Deutsche Telekom was forced to provide access to ducts on demand. In various dispute settlement procedures, Deutsche Telekom requested excessive access prices. In bilateral negotiations, Deutsche Telekom seems unwilling to reach an agreement on an acceptable pricing structure and level.
[673] Orange response to the Targeted Consultation Q26, therefore, advocates that BCRD access should be considered only for non-local loop civil engineering. Otherwise, SMP or symmetric obligation assessment is more appropriate regarding bottleneck considerations. However, Telecom Italia response to the Targeted Consultation Q26 considers that, in the areas where other operators have deployed their own infrastructures (privately in black areas and with public funds in white areas), there is no longer the need to rely on SMP remedies for the access to physical infrastructures and only symmetric regulation is justified .
[674] A view supported by the Italian association AIIP in response to the Targeted Consultation Q26, for which for the foreseeable future (i.e. 3 to 5 years), obligations on SMP operators for access to civil engineering infrastructure should not be replaced by obligations under the BCRD.
[675] An operator's response to the online survey.
[676] An operator in response to the Targeted Consultation Q26 also argues that the BCRD regime cannot replace the SMP access regime, first because „die Vorschriften aufgrund der Kostensenkungsrichtlinie auf eine Anwendung zwischen Wettbewerber – auf Augenhohe – angelegt sind. Zum anderen, da die schnelle Gewährung von Mitnutzungen für die Planung erforderlich ist, insbesondere bei Ausschreibungen – ob im Forderkontext oder ohne. Hier ist meist die Netz nähe, welche die Wettbewerber erst durch einen Zugriff auf die physische Infrastruktur des marktmachtigen Unternehmens erreichen konnten, entscheidend, um den bestehenden Wettbewerbsnachteil auszugleichen".

ECTA[677] stresses that, contrary to the BCRD regime, access pricing under the SMP regime relies on a cost-orientation methodology for reusable civil engineering assets values. The price control standard of fair and reasonable terms and conditions under the BCRD regime can lead to access charges (far) higher than those under an SMP obligation. There is thus no guarantee of access on predictable or feasible conditions.

Finding 36. Most NRAs consider that in the large majority of cases, the BCRD alone, as it stands today, is not sufficient to ensure effective access to relevant civil engineering infrastructures for access seekers. Access seekers share that view.

Effect on investment incentives of incumbent operators

According to the NRAs concerned[678] :

- In certain countries, the BCRD may be adequate to promote the deployment of new ducts.
- The possibility to enter into commercially negotiated joint ventures was instrumental for the SMP operator to deploy FTTH in several cities jointly with an access seeker.
- Contractual negotiations under the BCRD concerning the coordination of civil works also seem to be investment supportive.

According to BEREC[679], the BCRD regime will be sufficient in instances where a physical infrastructure (in particular ducts and poles) is not widely available or is not widely used, as well as in instances where other economic agents besides the SMP operator have the means and incentives to grant access to their physical infrastructure, on the basis of economic and technical terms and conditions which are similar to those that may be available from the SMP operator.

An access seeker[680] also sees advantages in the BCRD regime, in particular that there is no direct conflict between the interests of the access seeker and those of the access provider. This may help to overcome some disputes but, at the same time, it also leads to potential operational overheads since the access provider aims for a 'zero risk' situation, which may lead to cumbersome processes and inflated access costs.

Finding 37. According to some stakeholders, negotiated symmetric access, as under the BCRD, may provider stronger investment incentives, at least under specific circumstances.

[677] ECTA response to the Targeted Consultation, Q26.
[678] Based on the online survey data.
[679] BoR (19) 94, available at: https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/8597-berec-report-on-access-to-physical-infra_0.pdf
[680] An operator's response to the online survey.

8. Cooperative or sharing arrangements between operators aiming to foster the deployment of new fixed networks

a. Summary of findings

For the deployment of FTTH, operators use a mix of cooperative arrangements and commercial agreements for wholesale broadband access (entailing in some cases the grant of IRUs). The latter affect the competitive dynamic more rapidly. Most of the agreements have been taken into account during the market reviews. However, the threshold applied by some NRAs to determine whether to reduce regulatory obligations in the geographical coverage of the arrangements seems to be the same as for the definition of distinct geographical markets.

The study also looked at conditions that could trigger changes in the obligations. It found that at this stage NRAs are very reluctant to determine *ex ante* conditions that would trigger a relief in regulatory obligations in areas affected by cooperation arrangements. Instead, they stress the need for review of remedies on a case-by-case basis. Generally, NRAs want to set the bar for the initiation of non-routine market reviews relatively high. However, there seems to be some consensus on the criteria that cooperative arrangements should fulfil to justify such non-routine reviews. Looking from a different perspective, there is evidence that the absence of regulatory obligations leads to cooperative arrangements. Conversely, according to some operators, NRAs could also foster such agreements where regulated access is imposed.

The online survey and interviews revealed that operators had decided to enter into cooperative arrangements for the economic benefits that such agreements would yield, rather than for hypothetical regulatory relief[681]. In the same vein, economic literature provides very little empirical evidence of the impact of co-investment agreements on ultra-fast broadband deployment, as we explain in Section 8.c.

b. Introduction

The NGA Recommendation acknowledges that volume and long term commitments can be useful to share investment risks, but does not actively encourage cooperative agreements allowing parties to diversify the risk of investment. However, it provides some support by recommending that NRAs duly take into account any such agreements and whether they warrant a change in remedies (in particular, suspension or lifting of some SMP obligations). This is in line with general economic considerations, since co-investment and other forms of cooperative agreements lead to wider coverage, higher quality, lower costs and prices, and more intense competition[682].

Since the adoption of the NGA Recommendation, several NRAs have considered the existence of cooperative or sharing arrangements (made between competing operators aiming to deploy fibre infrastructure) in the framework of market reviews. This was the case in Spain where the deployment of such an infrastructure occurs in certain areas based on the 2012

[681] At the same time, SMP operators that entered or consider entering into such agreements plead for a predictable approach by NRAs as regards the possible reduction of remedies, and in particular pricing obligations. This expectation goes beyond the arrangements caught by Article 76 EECC and the BEREC guidelines on co-investment.

[682] CERRE (2020). *Implementing Co-investment and Network Sharing*. CERRE. M. Bourreau, S. Hoernig and W. Maxwell. May 2020.

network infrastructure sharing agreements between Telefónica and Jazztel[683] or the 2013 agreement between Telefónica, Orange, and Vodafone[684]. The French NRA even mandates cooperative agreements under symmetric regulation regarding drop cables and the in-house segment[685].

Today, in pursuit of its policy objectives, the EECC requires NRAs, among other things, to promote efficient investment and innovation in new and enhanced infrastructures, including (…) by permitting various cooperative arrangements between investors and parties seeking access to diversify the risk of investment. When such arrangements influence competitive dynamics, NRAs must consider these arrangements not only in their (forward looking) market reviews, but also in-between the periodic review cycles.

The EECC is encouraging participants to enter into co-investment agreements through offering regulatory incentives and recognises the positive attributes of co-investment: the EECC mandates NRAs to grant SMP operators regulatory relief where the latter offer commitments in the form of co-investment proposals for the deployment of VHCN open to other operators (Article 76 and Annex IV EECC). This chapter does not cover co-investments in new very high capacity network elements falling within the scope of that Article and for which extensive guidance was provided by BEREC[686].

Provisions concerned in the Recommendations

- Recital 27: "(…) Co-investment into NGA networks can reduce both the costs and the risk incurred by an investing undertaking, and can thus lead to more extensive deployment of FTTH".
- Point 11 of the NGA Recommendation: "'Co-investment in FTTH' means an arrangement between independent providers of electronic communications services with a view to deploying FTTH networks in a joint manner, in particular in less densely populated areas. Co-investment covers different legal arrangements, but typically co-investors will build network infrastructure and share physical access to that infrastructure".
- Point 28 of the NGA Recommendation: "Where the conditions of competition in the area covered by the joint deployment of FTTH networks based on multiple fibre lines by several co-investors are substantially different, i.e. such as to justify the definition of a separate geographic market, NRAs should examine, in the course of their market analysis, whether, in the light of the level of infrastructure competition resulting from the co-investment, a finding of SMP is warranted with regard to that market. In this context, NRAs should in particular examine whether each co-investor enjoys strictly equivalent and cost-oriented access to the joint infrastructure and whether the co-investors are effectively competing on the downstream market. They should also

[683] For example see: https://www.convergedigest.com/2012/10/telefonica-and-jazztel-announce-ftth.html
[684] For example see: https://www.commsupdate.com/articles/2014/01/10/vodafone-orange-in-new-network-sharing-agreement/
[685] Under the symmetrical regulatory framework any operator (SMP or not) which has deployed its own FTTH network must enable access to it for any other operator. The SMP operator, as an operator deploying its own FTTH network, offers access to it under two main modalities: either a line per line subscription (with a monthly fee) or via co-investment (20-years rights of usage). Alternative operators have access to the SMP operator's FTTH network via these two modalities. Conversely, the SMP operator is seeking access to FTTH networks deployed by competitors under the same modalities.
[686] BEREC (2020) *BEREC Guidelines to foster the consistent application of the conditions and criteria for assessing co-investments in new very high capacity network elements (Article 76 (1) and Annex IV EECC),* BoR (20) 232, 11 December, 2020.

examine whether the co-investors install sufficient duct capacity for third parties to use and grant cost-oriented access to such capacity".

Relevant provisions from the EECC

- Art. 3.4 EECC: NRAs should permit arrangements that allow parties to diversify the risk of investment while protecting competition.
- Art. 68.6 EECC which requires NRAs to "consider the impact of new market developments, such as in relation to commercial agreements, including co-investment agreements, influencing competitive dynamics", also in the case of arrangements that do not fulfil these strict conditions.
- Art. 76 EECC lists strict conditions under which SMP regulation can be lifted in case of co-investment agreements.
- Art. 79 EECC details the commitment procedure to be followed by SMP operators in order to benefit from regulatory relief among others in case of cooperative arrangements.
- Recital 181 EECC ("Reviews of obligations (…) during the timeframe of a market analysis should allow NRAs to take into account the impact on competitive conditions of (…)for instance of newly concluded voluntary agreements between undertakings, such as access and co-investment agreements, thus providing the flexibility which is particularly necessary in the context of longer regulatory cycles.")

c. Overview of cooperative or sharing arrangements already concluded or planned to be concluded

NRAs and operators have reported agreements that could be classified into the following categories[687]:

- **Co-investment or access agreements to which the SMP operator is party**. There are cases of co-investment via establishing a joint venture (Germany, Belgium, Italy), co-investment with reciprocal access (Czech Republic, Portugal, Spain), and reciprocal access without co-investment in deployment (Slovakia)
- **Co-investment agreements between alternative operators and third parties.** Examples include co-investment via establishing a joint venture (Ireland), and co-investment with reciprocal access (Portugal and Spain).

Table 27. A selection of notable co-investment or access agreements to which the SMP operator is party

Germany	**Co-investment (joint venture):** Telekom Deutschland GmbH (SMP operator) and EWE AG (utilities group) established the joint venture Glasfaser NordWest

[687] These agreements do not fully correspond to the categories used in the online survey, which were 1) Agreements under which the SMP operator is leading the deployment of VHC networks and shares part of the investment risk with alternative operators; 2) Reciprocal access: the SMP operator and the alternative operators are each responsible for deploying and operating their own respective VHCN in geographically separate areas; each party has access to all other VHCN; 3) Agreements between alternative operators or between alternative operators and third parties to which the SMP operator is not party. Respondents reported a variety of different agreements to which the above categorisation of agreements was not helpful in terms of capturing the variety of types of agreements.

	GmbH&Co.KG (to operate as a wholesale-only business), which will roll out fibre capable of gigabit speeds. It is a 50:50[688] co-investment to serve 1.5m premises in parts of north-west Germany. Glasfaser Nordwest began its operations in January 2020[689].
Belgium	**Co-investment (joint venture):** • Proximus (SMP operator) entered into agreements with Eurofibre and Deltafibre to deploy FTTH networks. The joint venture with Eurofibre should cover 500.000 households in Wallonia[690], while the joint venture with Deltafibre should cover 1.5m households in Flanders[691]. • Telenet is negotiating with the utility operator Fluvius about possible cooperation to deploy FTTH in Flanders. Fluvius has installed 15,000 homes with FTTH as proof-of-concept in five cities and municipalities (Antwerp, Diksmuide, Ghent, Genk and Poperinge) [692].
Italy	**Co-investment (joint venture):** In 2016, TIM and Fastweb created a joint venture (Flash Fiber) to turn their respective FTTC networks into FTTH networks. The joint-venture is managed and coordinated by TIM and envisages the equity investment of 80% by TIM and 20% by Fastweb. Flash Fiber is aimed at creating a FTTH network in 29 of the main Italian cities by 2020. The new infrastructures will make available by Flash Fiber to TIM and Fastweb at an agreed price, through the provision of passive access services on the GPON network; network resources exceeding the needs of TIM and Fastweb will remain available to Flash Fiber, which will be able to sell them to third party operators[693].
Czech Republic	**Co-investment (reciprocal access):** In December 2020, a co-investment agreement between CETIN and T-Mobile to roll out FTTH was signed. The first households targeted by this project should be connected in the second half of 2021. The project aims to cover "hundreds of thousands" of households within the "next years". The stated reason for cooperation was that there are locations where deployment is expensive or otherwise complicated, and in many of them individual operators cannot invest effectively[694].
Portugal	**Co-investment (reciprocal access):** In 2014, MEO (SMP operator) and Vodafone signed a co-investment agreement to deploy FTTH-PON, targeting mainly areas that were not already covered (namely in the less dense areas). The agreement provides

[688] Reuters (2020). "Deutsche Telekom launches fibre-optic joint venture in northwest Germany', available at: https://www.reuters.com/article/uk-telecoms-deutsche-telekom-idUKKBN1ZE1AE

[689] Telekom (2020). "Glasfaser Nordwest begins its work", available at: https://www.telekom.com/en/media/media-information/archive/glasfaser-nordwest-begins-its-work-591494

[690] Press release, "Eurofiber and Proximus sign agreement for joint venture fiber roll-out Wallonia", 30 October 2020, available at: https://www.eurofiber.be/en/press/eurofiber-and-proximus-sign-agreement-for-joint-venture-fiber-roll-out-wallonia/

[691] The JV was approved by the EU Commission on 24 March 202 (M.10087 - PROXIMUS / NEXUS INFRASTRUCTURE / JV, available at: https://ec.europa.eu/competition/elojade/isef/index.cfm?fuseaction=dsp_result&policy_area_id=2). Press release, "Proximus signe un accord final de collaboration avec EQT Infrastructure, concrétisant son ambitieux plan de déploiement de la fibre en Belgique", 27 Novembre 2020, available at : https://www.proximus.com/fr/news/2020/20201127-Proximus-reaches-collaboration-agreement-with-EQT-Infrastructure.html;pxcfrontend=09oar7M_qTQOc3RGQXHb5WexetI2VbkObx1Bh8q0.pxcp_frontend_21

[692] Fluvius (2020) Half-yearly financial report of the Fluvius-group as per 30 June 2020. Available at: https://over.fluvius.be/sites/fluvius/files/2020-09/fluvius-system-operator-group-condensed-consolidated-interim-ifrs-financial-statements-30-june-2020.pdf

[693] See more at: https://www.flashfiber.it/en/about-us/the-company/ and https://www.fibercop.it/en/offered-services/access-services/full-gpon/

[694] T-mobile (2020) "T-MOBILE and Cetin Will Build Common State-Of-The-Art Fiber Infrastructure for Hundreds of Thousands of Households and Businesses". Available at: http://www.t-press.cz/en/press-releases/press-news-archive/t-mobile-and-cetin-will-build-common-state-of-the-art-fiber-infrastructure-for-hundreds-of-thousands-of-households-and-businesses.html; https://www.cetin.cz/tiskove-centrum/-/asset_publisher/7E0pI2f3p5ci/content/cetin-uzavrel-se-spolecnosti-t-mobile-smlouvu-o-spolupraci-pri-vystavbe-optickych-pripojek-ftth?inheritRedirect=false&redirect=https%3A%2F%2Fwww.cetin.cz%2Ftiskove-centrum%3Fp_p_id%3D101_INSTANCE_7E0pI2f3p5ci%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-1%26p_p_col_pos%3D2%26p_p_col_count%3D3

	IRUs for 25 years[695]. The agreement which previewed the sharing of PON networks in circa 900 thousand homes (450 by each operator) has already been executed.
Slovakia	**Reciprocal access (no co-investment in deployment):** Slovak Telekom (SMP operator) and Orange Slovensko signed a commercial agreement in December 2020 of granting reciprocal access to the fibre networks. Orange started to use wholesale access to Slovak Telekom's fibre networks in December 2020, while Slovak Telekom plans to begin using Orange's fibre infrastructure in April 2021[696].
Spain	**Co-investment (reciprocal access):** In October 2012, Telefónica (SMP operator) and Jazztel signed a co-investment agreement for joint deployment of FTTH networks (limited to coverage of 3m premises), as well a provision of pre-existing fibre infrastructure and a vertical infrastructure access agreement[697].

Source: Indicated in footnotes.

Table 28. A selection of co-investment agreements between alternative operators and third parties

Portugal	**Co-investment (reciprocal access)**: In 2017, the two main alternative operators (Vodafone and NOS) signed a reciprocal sharing agreement to develop a FTTH-PON network for around 2.6 million homes mainly in areas not previously covered by FTTH, with each operator sharing an equivalent value in terms of investment[698]. The two operators were previously involved in a 2010 reciprocal access agreement covering FTTH rolled out in the cities of Lisbon and Porto[699]. The agreement ended as Vodafone bought the NOS (then Optimus) network in 2016 (following approval by the NCA of the Optimus/ZON merger); Vodafone was granted the option to buy the FTTH network that it shared with Optimus.
Spain	**Co-investment (reciprocal access):** In May 2013, Vodafone and Orange signed an agreement covering joint deployment of and reciprocal access to FTTH networks to reach 6m premises across 50 major cities by September 2017.The agreement also included deployment of a vertical infrastructure, reciprocal access and an agreement to jointly request access to any third-party vertical infrastructure[700]. In October 2016, Orange and MasMovil signed an agreement that granted MasMovil IRUs over a relevant part of Orange's FTTH network (co-investment agreement) as well as access to the entire FTTH network (provision of wholesale broadband access services). MasMovil promised to grant Orange IRUs over the infrastructure it planned to deploy in the coming years[701].

[695] Telecomlead (2014). "Portugal Telecom, Vodafone in fiber network sharing deal", available at: https://www.telecomlead.com/broadband/portugal-telecom-vodafone-fiber-network-sharing-deal-51934

[696] Comms Update (2021). "Slovak Telekom will use Orange fibre networks from April", available at: https://www.commsupdate.com/articles/2021/02/17/slovak-telekom-will-use-orange-fibre-networks-from-april/

[697] Comms Update (2012). "Jazztel inks FTTH deal with Telefonica for shared deployment", available at: https://www.commsupdate.com/articles/2012/10/10/jazztel-inks-ftth-deal-with-telefonica-for-shared-deployment/

[698] Fibre Systems (2017). "Vodafone Portugal and NOS strike network sharing deal", available at: https://www.fibre-systems.com/news/vodafone-portugal-and-nos-strike-network-sharing-deal.

[699] Commsupdate (2012). "Optimus, Vodafone agree to share fibre network", available at : https://www.commsupdate.com/articles/2010/12/20/optimus-vodafone-agree-to-share-fibre-network/

[700] Broadband Communities Magazine (2013). "Vodafone and Orange to Co-Invest in FTTH in Spain", available at: https://www.bbcmag.com/breaking-news/vodafone-and-orange-to-co-invest-in-ftth-in-spain

[701] CNMC (2020). Inicio y trámite de información pública del procedimiento para la definición y análisis de los mercados de acceso local al por mayor facilitado en una ubicación fija y acceso central al por mayor facilitado en una ubicación fija para productos del mercado de masas (mercados 3a-3b/2014), la designación de operadores con poder significativo de mercado y la imposición de obligaciones específicas [Initiation and processing of public information of the procedure for the definition and analysis of local wholesale access markets provided at a fixed location and central wholesale access provided at a fixed location for mass market products (markets 3a-3b/2014), the designation of operators with significant market power and the imposition of specific obligations], File no. ANME/DTSA/002/20/M3-2014.

Ireland	**Co-investment (joint venture).** SIRO is a joint venture between Vodafone and the ESB (Ireland's electricity incumbent) to roll out an FTTP network in certain parts of the country. It started in 2015 and based on publicly available information has passed some 338,000 premises in October 2020[702]. SIRO is a wholesale-only operator and provides an open access network.
Germany	**Co-investment (joint venture).** In October 2020, Telefónica announced a cooperation agreement with Allianz, through which Telefónica would invest up to 500m EUR, while Allianz would invest up to 1b EUR to deploy an FTTH network that would serve rural and "semi-rural" areas in Germany, in particular areas under-served by Deutsche Telekom (SMP operator), Vodafone, and other ANOs. Telefónica Group's participation will be made through its infrastructure division Telefónica Infra, which will have a 40% stake while Telefónica Deutschland/O2 will have the remaining 10% stake. Allianz Capital Partners will invest 50% in the joint venture on behalf of Allianz insurance companies and the Allianz European Infrastructure Fund. The joint venture plans to pass more than 2m homes with FTTH connections[703].

Source: Indicated in footnotes.

Francesco Castelli[704] proposes an alternative typology to classify these agreements:

- Co-Financing Only (CFO) where one party deploys and the other parties make a financial contribution.
- Separate Deployment (SD) with reciprocal wholesale access where each co-investing party deploys a network but in separate areas, giving each other mutual wholesale access.
- Joint Deployment (JD) where co-investing parties set up a joint venture that deploys the network.

A further typology is used by Stephen Curram et al.[705]:

- **Sharing of network rollout costs**. This type of co-investment retains infrastructure competition among two or more operators but has the potential to significantly reduce capital costs for network rollout. This may take different forms, as operators could agree to:
    a) share civil engineering works to lay multiple fibres and maintain completely separate infrastructures, or
    b) share costs for shared network infrastructure for the last drop (e.g. co-investment approach in France with share of either building access or concentration point aggregating 100 units in very dense areas, or connection points for 1,000 households in less dense areas).
- **Network sharing with joint ownership.** Two or more operators may co-invest in a single network and have shared access to it. In some cases, the operators will use a separate investment vehicle with a share of ownership. This reduces infrastructure competition between the operators but maintains retail competition and may lead to

[702] SIRO website, available at: https://siro.ie/news-and-insights/category/siro-for-home/
[703] Fierce Telekom (2020). "Telefonica hooks up with Allianz for FTTH rollout in Germany", available at: https://www.fiercetelecom.com/telecom/telefonica-hooks-up-allianz-for-ftth-rollout-germany
[704] TIM Group (2019) "Co-investment or wholesale-only: Which model will spur more incentives to invest?", Francesco Castelli FSR Conference – Florence, 13 December 2019 "The EECC and its impact on investment in very high capacity networks (VHCN)", available at: https://fsr.eui.eu/wp-content/uploads/2019/12/Francesco-CASTELLI_Co-.investment_TIM.pdf
[705] Stephen Curram et al. (2019). *Study on the determinants of investment in VHCN – a System Dynamics approach: Volume 1: Technical Report,* November 2019, p.37-38

VHCN deployment where two competing networks would otherwise be uneconomic (e.g. Telecom Italia and Fastweb).

- **Network sharing single ownership**. Two operators may have an agreement not to overbuild and to choose to invest in infrastructures in different areas but to allow access to each other's networks. This reduces infrastructure competition between the operators but maintains retail competition and may lead to quicker and more widespread VHCN deployment across a country (e.g. Telefónica and Jazztel).
- **Take or Pay contracts** (not strictly a co-investment but rather a co-business case). The business case of a wholesale infrastructure operator is boosted by guaranteed revenue from a client retail operator, possibly with exclusive access for a period of time. While not strictly a co-investment (only one operator is investing, and the EECC specifically excludes this as a type of co-investment), this type of agreement significantly strengthens the business case of the infrastructure operator by guaranteeing a minimum revenue stream, while giving the retail operator VHCN access to the region. Potentially, the infrastructure operator can get cheaper "patient" finance than the retail operator could, so it can provide a significantly cheaper route to VHCN for the retail operator than building their own infrastructure (e.g. Open Fiber & Vodafone).

Finding 38. To date, most co-investment initiatives in the EU have involved operators that are not designated as having SMP. As a result, while the number of co-investment schemes is growing, their overall impact on VHCN rollout in the EU remains somewhat limited[706].

NRAs also reported commercial access agreements that do not constitute co-investment agreements[707] in the strict meaning of the term (corresponding to Curram et al.'s above mentioned 'take or pay' category of):

- **Access to wholesale active services:** cases in Spain, Germany, Denmark, Luxembourg, Cyprus.
- **Access to passive services (physical infrastructure):** cases in France, Italy, Germany, Cyprus.
- **Access to both wholesale active and passive services:** such agreements seem to have been concluded only in Spain.

Table 29. A selection of commercial agreements on access to wholesale active services

Wholesale active access	
Spain	**Wholesale access agreement (active wholesale services only):** In March 2017, Telefónica (SMP operator) and Vodafone signed an agreement that guarantees Vodafone access to the entire FTTH network of Telefónica including premises located in geographical areas where Telefónica was not subject to

[706] This finding from Felipe Flórez Duncan (EU broadband: co-investing in a faster future, Oxera, September 2019) seems to correspond to the collected data.

[707] These agreements correspond rather to risk-sharing models allowing the risks involved in network expansion activities to be spread across multiple undertakings. They serve to reduce uncertainties regarding the future development of demand and the amortisation of investments for the undertaking carrying out the work.

	wholesale access obligations to its FTTH network. The agreement is based on purchase commitments over five years[708]. In February 2018, Telefónica (SMP operator) and Orange signed an agreement that guarantees Orange access to Telefónica's FTTH network. Orange gained access both in the geographical areas where Telefónica was subject to wholesale access obligations and where it was not[709]. In July 2018, Telefónica (SMP operator) and Digi signed an agreement, which guarantees Digi access to Telefónica's FTTH network[710] In February 2019, Telefónica (SMP operator) and MasMovil signed an agreement that guarantees MasMovil access to Telefónica's FTTH network[711]. In July 2020, Telefónica (SMP operator) and Euskaltel signed an agreement that guarantees Euskaltel access to Telefónica's FTTH network (NEBA FTTH) in areas exempt from regulation. The agreement is valid for five years and is renewable [712]
Germany	**Wholesale access agreements:** Other commercial agreements for wholesale access to the SMP-network have been in place since 2013 and accompany the remedies imposed on Deutsche Telekom in markets where the latter is designated as having SMP. Conversely also some access agreements where an access seeker is granted wholesale-access to an alternative ECN are known[713]. Wholesale access offer to ANO coax network Vodafone offers wholesale access to its HFC-network in favour of Telefónica pursuant to a respective commitment in a merger case where Vodafone took over the HFC-network Unitymedia (Liberty Global)[714]. Wholesale access offer to ANO coax network. Wholesale access is intended to be offered (starting in 2021) by the second largest HFC-operator TeleColumbus in favour of Telefónica on a voluntary basis[715].
Denmark	**Wholesale access offer to SMP coax network (bitstream product):** In 2016, TDC presented ANOs with a commercial offer regarding access to its coaxial network. The pricing is a combination of a payment for transmission capacity (that has to be booked in advance) and a fee paid per connection[716].
Cyprus	**Wholesale access agreement (commercial VULA offer):** the SMP operator is offering a "Bitstream IP2+" product as a commercial alternative to the regulated WLA VULA product, allowing ANOs to interconnect to 3 points of handover of the SMP operator's network. [717]
Access to passive services (physical infrastructure)	

[708] Telefonica (2017). "Telefónica y Vodafone firman un acuerdo comercial de acceso mayorista a la fibra óptica", available at: https://www.telefonica.com/es/web/sala-de-prensa/-/telefonica-y-vodafone-firman-un-acuerdo-comercial-de-acceso-mayorista-a-la-fibra-optica

[709] Telefonica (2018). "Telefónica firma con Orange un acuerdo comercial de acceso mayorista para fibra óptica", available at: https://www.telefonica.com/es/web/sala-de-prensa/-/telefonica-firma-con-orange-un-acuerdo-comercial-de-acceso-mayorista-para-fibra-optica

[710] El Espanol (2018). "Digi cierra un acuerdo con Telefónica para llevar fibra óptica a sus clients", available at: https://www.elespanol.com/invertia/empresas/20180312/digi-cierra-acuerdo-telefonica-llevar-optica-clientes/291471754_0.html

[711] Expansion (2019). "Telefónica llega a un acuerdo con MásMóvil para darle fibra y móvil", available at: https://www.expansion.com/empresas/tecnologia/2019/02/14/5c64908b468aeb5c0b8b45cb.html

[712] Xatakamovil (2020). "Euskaltel podrá usar la fibra de Movistar a nivel nacional durante cinco años y en plena expansión de Virgin Telco", available at: https://www.xatakamovil.com/movistar/euskaltel-podra-usar-fibra-movistar-a-nivel-nacional-durante-cinco-anos-plena-expansion-virgin-telco; Euskatel (2020). Relevant information note, available at: https://www.cnmv.es/portal/verDoc.axd?t={ae7b70a2-81a7-4ddc-9d4c-8ec7c5d4221a}

[713] Online survey data.

[714] Telecompaper (2019). "Vodafone offers Telefonica access to Geman cable network to seal Unitymedia deal", available at: https://www.telecompaper.com/news/vodafone-offers-telefonica-access-to-german-cable-network-to-seal-unitymedia-deal--1291630

[715] Digital TV (2021) "Telefonica begins marketing services on Tele Columbus network", available at: https://www.digitaltveurope.com/2021/07/15/telefonica-begins-marketing-services-on-tele-columbus-network/

[716] Wik-Consult (2019), *Competition and investment in the Danish broadband market (Non-confidential version)*

[717] Described in Case CY/2016/1883, as well as in the case study interviews.

Cyprus	**Access to physical infrastructure:** Primetel and Cablenet have agreements with the electricity company to use the electricity poles to deploy fibre networks[718].
Access to both wholesale active and passive services	
Spain	**Wholesale access agreement (active wholesale services together with access to infrastructure):** In November 2017, Orange and Euskatel signed an agreement that facilitates Euskaltel's access to Orange's FTTH network in the broadband wholesale access modality. This agreement also provides for limited sharing of infrastructure[719]. In September 2018, MasMovil and Vodafone signed an agreement, which guarantees IRUs to respective fibre footprints, as well as wholesale access over respective FTTH networks[720] In April 2019, Vodafone and Orange signed an agreement that includes both access to infrastructure and the provision to Vodafone of wholesale broadband access services to the FTTH network in 1m lines covered by the Orange network[721]. In September 2020, Adamo and Euskatel signed an agreement that provides Euskatel access to Adamo's FTTH network, which includes over 1m homes nationwide. The agreement is valid for five years, renewable by mutual agreement, and is expandable to the 500.000 additional homes that Adamo plans to reach with FTTH[722].

Source: Indicated in footnotes.

The French NRA "opted for a complex regulatory framework mandating that first investors accept co-investing entrants. The exact types of obligations differ between urban, suburban and rural regions"[723]. The authors nonetheless add that the "uptake of [mandated coinvestment] schemes has been rather low"[724].

Have NRAs taken cooperative or sharing arrangements into account in their regular market reviews? Have they led to any changes in remedies?

NRAs in countries where cooperative or sharing agreements have been made reportedly took three approaches:

1. Analysed the agreements within regular market review and found a significant impact of these agreements (warranting re-consideration of SMP remedies)
2. Analysed the agreements within the regular market review, but did not (yet) find a significant impact of these agreements
3. Did not take the identified agreements into account within the market review.

[718] Case study interviews.
[719] Euskatel (2017). "El Grupo Euskaltel inicia su expansión en el Norte donde llegará a un mercado de 7,6 millones de personas", available at: https://www.euskaltel.com/CanalOnline/nosotros/sala-prensa/notas-prensa/20171113131204881
[720] Masmovil (2018). "Communication of relevant information", available at: https://www.bmerv.es/docs/hechos/269/HS269374.PDF
[721] Orange (2019). "Orange y Vodafone amplían sus acuerdos de compartición de redes móviles y fijas en España", available at: https://blog.orange.es/noticias/orange-y-vodafone-amplian-acuerdos-compartición-de-redes-moviles-y-fijas/
[722] Euskatel (2020). "Euskaltel firma un acuerdo que le permite obtener acceso a la red de fibra óptica de Adamo a nivel nacional", available at: https://www.euskaltel.com/CanalOnline/nosotros/sala-prensa/notas-prensa/20200908061313865
[723] Bourreau, S., Hoernig, S., & Maxwell W. (2020). *Implementing co-investment and network sharing.* Centre on Regulation in Europe, Report, p. 46. Available online at: https://www.cerre.eu/sites/cerre/files/cerre_implementing_co-investment_and_network_sharing-26.05.2020.pdf;
[724] Ibid.

Cases in all three circumstances/approaches are summarized below.

The NRAs that reported to have **analysed the agreements within the regular market review and found significant impacts** to the market were DBA (Denmark) and CNMC (Spain).

Denmark: The NRA reported that even though the SMP operator TDC is no longer obliged to offer bitstream access on its HFC network, the operator has committed to continue providing this wholesale access under the same overall conditions[725].

Spain: In the market review, the NRA identifies the key wholesale commercial access agreements and takes them into account when describing and assessing the competitive dynamics (both at the retail and wholesale levels) in the context of its on-going market review of wholesale markets for local and central access provided at a fixed location (and whose final decision has not yet been adopted at the time of writing). The NRA notes that these agreements are subject to frequent revisions, generally aimed at extending the scope of wholesale services or infrastructures, reviewing the economic conditions applied and extending the duration of the agreements. The scope of trade agreements can be approximated by the number of premises to which they give access or plan to provide reciprocal access. Taking this reference, CNMC notes that commercial agreements for wholesale broadband access have a markedly greater scope than co-investment agreements, which are usually below two million premises.[726].

The large display of various cooperative agreements did not trigger non-routine market reviews in Spain, despite market anticipation. On the other hand, co-investment agreements were taken into account when designing remedies.

Other NRAs reported to have **analysed the agreements within the regular market review[727] did not (yet) find significant impacts that would justify changes to SMP remedies** (FICORA (Finland), BNetzA (Germany), ANACOM (Portugal), AGCOM (Italy), and ComReg (Ireland)).

Finland*:* FICORA reports that there are many cooperatives and municipal companies that roll out fibre networks and follow open access models. However, this did not change the SMP remedies. As noted in Case FI/2018/2052-2053, FICORA states that regional network operators do not have an SMP position in the wholesale local and central access markets. The NRA argues that their competitive behaviour differs significantly from the traditional, vertically integrated telecommunications operators, which aim normally to maximise returns. Most of these open access network operators also must comply with state aid obligations (having received public funding) and thus are obliged to provide access on fair and non-discriminatory terms.

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[725] Case DK/2017/1993-1994. The Commission Comments Letter notes in addition that the new offer even presents better conditions in relation to certain of its features (e.g. ordering capacity, billing or VOIP).

[726] CNMC (2020). Inicio y trámite de información pública del procedimiento para la definición y análisis de los mercados de acceso local al por mayor facilitado en una ubicación fija y acceso central al por mayor facilitado en una ubicación fija para productos del mercado de masas (mercados 3a-3b/2014), la designación de operadores con poder significativo de mercado y la imposición de obligaciones específicas [Initiation and processing of public information of the procedure for the definition and analysis of local wholesale access markets provided at a fixed location and central wholesale access provided at a fixed location for mass market products (Markets 3a-3b/2014), the designation of operators with significant market power and the imposition of specific obligations], File no. ANME/DTSA/002/20/M3-2014.

[727] In the 2002/2009 framework, the possibility to adapt remedies (without adapting the market analysis) in reaction to market developments was not foreseen.

Germany: as regards the co-investment agreement between the SMP operator and EWE AG (utilities group) establishing a joint venture, BNetzA took this agreement into account[728] when 1) carrying out market analysis, as well as when 2) carrying out the SMP assessment of Market 3a and 3b.

Portugal: the NRA considered the agreements when identifying the operator with the SMP within the defined geographic markets. In particular, ANACOM analysed the 2016 co-investment agreement between Vodafone and NOS in detail[729].

Italy: Regarding Flash Fiber (controlled by TIM), in the context of the last market analysis (decision 348/19/CONS), was taken into account only in relation to the impact of the Undertaking n. 3 (made binding by the Italian competition Authority - case I799) according to which Fastweb (as well as TIM) committed to launch independent wholesale offers for VULA and NGA bitstream services (using Flash Fiber semi-GPON network) at non-discriminatory conditions. In Telecom Italia's view, however, criteria for the geographical segmentation of remedies in the scope of the last market analysis of markets 3a and 3b pursuant to Decision 348/19/CONS were "unjustifiably too strict", leading many of the 29 cities where Flash Fiber deploys a FTTH network to not be recognised as competitive and thus not having remedies revised[730].

Ireland: ComReg included considerations on the impact of the joint venture SIRO in its market review D10/18 of 19 November 2018, however, concluded that "while SIRO offers VULA based WLA based services, the expected coverage of the SIRO network during the lifetime of this market review was likely to be limited, in particular, relative to that of Eircom."[731]

Two NRAs reported that they have **not yet analysed the agreements within the regular market review**. In both cases, the agreements have not yet been implemented and both NRAs expect to take these agreements into account in the next market review.

Some SMP operators share the view that certain commercial wholesale access agreements have a more immediate impact on competitive dynamics. They advocate therefore that such commercial agreements should lead also to relief of regulatory obligations imposed[732]:

- Deutsche Telecom: "Such agreements should also result in NRAs having to withdraw regulatory obligations and make them binding for at least seven years. It is not sufficient to take such agreements into account in the regulatory discretion. Such agreements have a similar positive effect on competition as co-investment agreements".
- ETNO and Telefonica (same answer presented): "Apart from the conformity with the conditions within the article 76.1, *all long-term agreements signed outside of a SMP-regime framework should be considered*, and in particular, networks based on long-term agreements should be covered, regardless of whether passive or active access is concerned. Those agreements should not only lead to review the remedies but should

[728] Commission Comments of 14.02.2020 conccerning Case DE/2020/2235, footnote 36, p.8.
[729] In its Recommendation from 29 November 2016 Cases PT/2016/1888 and PT/2016/1889, the Commission notes that "As to the possibility that a co-investment agreement in the NC areas could be reached between Vodafone and NOS, there is no evidence available to the Commission" (p.14).
[730] Telecom Italia response to the Targeted Consultation, Q28.
[731] ComReg Market Review D10/18 of 19 November 2018.
[732] The following citations are extracted from public replies to Q31 of the Targeted Consultation of the respective organizations (emphases added).

be taken into account in the market analysis itself (perimeter, three criteria test, SMP assessment, etc.) given its impact on competition."

Finding 39. For the deployment of FTTH, operators use a mix of cooperative arrangements and commercial agreements for wholesale broadband access (entailing in some cases the grant of IRUs). The latter affect the competitive dynamic more rapidly. Most of the agreements have been taken into account during the market reviews. However, the threshold applied by some NRAs to determine whether to reduce regulatory obligations in the geographical coverage of the arrangements seems to be the same as for the definition of distinct geographical markets.

When could remedies be adapted to take into account the impact of arrangements? Which agreements should be taken into account?[733]

NRAs were generally not comfortable with providing any specific criteria that could serve as a 'trigger' for the need of a new non-routine market analysis. According to BEREC, "there is no general answer to the question as to whether and to what extent the SMP obligation should be modified in the case of a commitment that has been declared binding. This is because *it will always be necessary to carefully assess each individual case*, and it is always important to consider which obligations have already been imposed and what scope there is for adjustment."[734] BEREC notes "that the development towards multi SMP operator market environments in Member States results in an increased administrative burden that should be born in mind. The process needs to be manageable and should not end in "micro-management"[735]. This reflects the approaches by NRAs of Spain, Ireland and Germany, which collected information on the networks deployed under such agreements for their market reviews, but did not specifically describe the effects taken into account resulting from each of the specific agreements concerned. In one case, the effects of cooperative agreements materialized after the market review (which was based on data predating the market review), but despite a request from the SMP operator, the NRA did not proceed to a review of the SMP obligations applicable in the areas concerned[736].

In its response to the targeted consultation, the Polish NRA advocates that: "[t]*he conditions and criteria for VHCN and other co-investment commitments should be equal*. Deregulation should be subject to the same transparent criteria related to open and non-discriminatory access and ensuring sufficient competition at the retail level."[737]

Vodafone stressed the need for regulatory predictability – since agreements are designed in accordance with the existing market situation, automatic revisions of market(s) after conclusion of an agreement, would be counterproductive[738]. Multiple operators reminded of the possibility to request their NRA to review the relevant market earlier, seemingly lending support to the view that a thorough case-by-case assessment on whether a new market review and/or adjustment of remedies are necessary is the most appropriate way.

[733] Sub-section summarizes patterns emerging from online survey responses and the responses to targeted consultation.
[734] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q31.
[735] Idem, Q28.
[736] Case study interviews
[737] Polish NRA response to the Targeted Consultation, Q31.
[738] Vodafone response to the Targeted Consultation, Q29.

Finding 40. At this stage, NRAs are very reluctant to determine *ex ante* conditions that would trigger a relief in regulatory obligations in areas affected by cooperation arrangements. Instead, they stress (in an overwhelming majority) the need for a review of remedies on **a case-by-case basis**.

However, in its 2018 market analysis, the Belgian NRA defined which cooperative agreements would trigger lighter regulation even before the next regular review (see Box 9 below)

Box 9. BIPT's approach to taking cooperative agreements into account when setting SMP remedies

If a new network is built under a cooperative agreement, which could trigger partial lifting of regulation, it must comply with the following criteria to be considered as a 3rd independent network (taking into account areas where such an investment is economically justified and two networks are already present)[739]:

1. Agreement between at least two independent parties providing electronic communication services and based on item 11 of the NGA Recommendation
2. Open network and transparency
3. Possibility for the party to act independently commercially and technically
4. Reciprocal access if agreement covers complementary networks
5. Possibility to resell all agreement or part of it with all rights and obligations
6. No exclusivity
7. Authorization of wholesale services to parties not a part of the agreement
8. Duration of agreement must be significantly longer than 3 years
9. Pricing and non-pricing clauses must be fair and non-discriminatory
10. Information interchange limited to requested information for deployment and maintenance, and no possibility for a party to discover the strategy of its partner

The areas used for segmentation are the statistical units from the National Institute of Statistics (around 20,000, while there are 581 municipalities), thus independent of network architectures. In order to be defined as competitive, 50% of area's households must be able to access services from three different NGA operators. The regulator proposes to lift the obligations on the SMP operators on Market 3a, 3b1, 3b2 and radio broadcasting, except the following obligations:

(i) the obligation to negotiate in good faith
(ii) access to duct splice, splint or, failing this, dark fibre
(iii) access intended to serve non-residential multi-site customers
(iv) transparency measures related to the evolution of the network and
(v) access to copper unbundling in the parts of the areas where fibre is not yet present

[739] Conférence des régulateurs du secteur des communications électroniques, Décision du 29 juin 2018 Analyse des marchés du haut débit et de la radiodiffusion télévisuelle, paragraph 1502.

Source: Visionary Analytics based on Conférence des régulateurs du secteur des communications électroniques, Décision du 29 juin 2018, Analyse des marchés du haut débit et de la radiodiffusion télévisuelle, section 19.8.

The measure was followed by talks between operators to enter into cooperative arrangements that are susceptible to bring about the emergence of situations where three sufficiently independent operators would be present in certain areas in the future. However, to date, the trigger was not yet matched by any arrangements. How the trigger will be implemented in practice is therefore not yet clear.

One operator suggests very similar criteria to apprehend the effects of commercial agreements and the transition from regulated offers to commercial offers[740]:

- General level of competition in wholesale markets (e.g. sufficient number of independent and competitive wholesale networks)
- Fair treatment of retailers
- Enabling retail competition in downstream markets.

Conversely, another operator advocated that NRA decisions to relieve SMP operators from regulatory obligations should be based on actual results that have already materialized rather than on only the commitments themselves, because a co-investment announcement does not lead to an effective competition by itself[741].

The Belgian NRA's approach corresponds to the 'bright-lines' approach advocated by the Berkeley Research Group (BRG): "A bright-lines approach gives a clear statement of the conditions that need to be satisfied for a co-investment project to be deemed to be competitive. If a project meets these criteria, the bright-lines framework would require an NRA to presume that the services are being provided on an effectively competitive basis and therefore no regulation is required. This would allow market participants to understand in advance whether or not the project will qualify to be exempted from regulation. This could be confirmed through an approval process with the NRA. A bright-lines approach also avoids an open-ended commitment to no-regulation because, if the market structure evolved to the extent that it no longer met the criteria, the presumption of competition and therefore no-regulation would no longer hold. In addition, NRAs would continue to be able to undertake an investigation or market review if there was clear evidence that the market was not functioning correctly"[742].

The BRG proposed the following criteria[743]:

- Within the relevant market, there are three or more independently controlled networks
- The co-investment agreement does not unduly discriminate against one or more participants or prospective participants in the agreement
- No undertaking deemed to have SMP in the relevant market has or is expected to have more than 50% of the retail market served by networks that rely on the VHC network elements built through the co-investment project
- The co-investment agreement does not have the object or effect of restricting competition between participants to the agreement or between any party to the agreement and any other provider or potential provider of services in the same relevant

[740] An operator's response to the online survey.
[741] An operator's response to the online survey.
[742] Berkeley Research Group (2017), *Co-investment and commercial offers*, April 2017, p.42-43.
[743] Ibid.

market. Such terms or structures could include, for example, ones which had the effect of market-sharing, information-sharing, price-fixing or co-ordination of technological innovation.

Co-investment agreements may not be exclusive. This means that other operators may join during the lifetime of the project. However, conditions may be different over time, because by the time the new co-investor wants to join, the risk of the project failing will have diminished[744]. Moreover, co-investors should be allowed to refuse access to non-co-investors for the higher speed access products.

At the same time, the duration of the regulatory exemptions should be aligned to the duration of the project. If the exemption automatically expires after one (or two) review periods, this can have a significantly negative effect on the returns of the investment[745].

In general, alternative operators agree with the NRAs about the need for a market review before revising remedies since such agreements should be able to produce long-lasting positive effects before justifying any relief in regulatory obligations. According to ECTA, "only a full market analysis and market testing of *any proposed commitments* can ensure that a full assessment is made as to whether circumstances are sufficiently changed to review SMP obligations."[746]

NRAs mentioned two principles which could guide their decision-making on whether a cooperative agreement warrants a new market review to decide on a revision of remedies.

The first principle concerns the **impact of the agreement**. A non-routine market review should only be seriously considered if the effect of the individual agreement on the relevant market is regarded to be *of a structural nature, meaning a significant and long-term impact on the competitive environment*. In practical terms, however, BEREC notes that the actual impact of a commercial agreement/cooperative agreement on the relevant market is typically hard to determine. It is not always possible to foresee clearly and in the short term that a particular agreement is of such significance that it will fundamentally change the market situation identified and examined in the market analysis. This view is echoed by an operator who stresses that wholesale competition needs to emerge before any drastic deregulatory interventions are made[747].

The second principle concerns the **characteristics of the agreement**. Elements to be taken into account:

- *Degree of reliability/binding force* – only agreements with a high degree of reliability and binding force could be considered to trigger a non-routine revision of the market analysis. BEREC in particular points to binding commitments when referring to the degree of reliability.
- *Parties to the agreement* – when the SMP undertaking enters into an agreement with a competitor, this should only lead to an extraordinary review of the market analysis in

[744] Felipe Flórez Duncan (2019), "EU broadband: co-investing in a faster future", Oxera, September 2019, p.2.
[745] Idem, p.3. The author adds "It is therefore important for the regulator to give a clear indication of how the project might be regulated beyond the exemption date to allow investors to assess the expected returns of their investment with confidence. This is related to the principle that all investments should be regulated in a way that provides investors with a 'fair bet'.
[746] ECTA response to the Targeted Consultation, Q31
[747] An operator's response to the online survey.

specific individual cases. This is because in such cases NRAs do not exclude that the SMP undertaking entered into such an agreement at least partly due to regulatory pressure. Therefore, the SMP operator must not be given an incentive to prematurely trigger a new market analysis ultimately aimed at a reduction of regulatory control just by entering into any commercial agreement (which may be terminated at an early stage)"[748].

- *Type of agreement* – contracts on wholesale access conditions are deemed to be less likely to structurally affect the competitive environment than agreements concerning passive and neutral access (since ANOs in this case are able to act more independently).
- *Participation conditions* – some NRAs point to the importance of *structural rights* of alternative operators to newly-built infrastructure, or access to this infrastructure under long-term conditions and pricing (for instance via *IRU*). *The openness of such agreements to various market participants* could also point to a condition with potential influence on ANOs' ability to compete.

BEREC also points to its 'Guidelines to foster the consistent application of the conditions and criteria for assessing co-investments in new very high capacity network elements (Article 76 (1) and Annex IV EECC)', from which inspiration could be drawn on the criteria agreements should comply with, in particular, the requirement of a **fair and reasonable character of the commitment**.

Finding 41. Generally, NRAs want to set the bar for the initiation of non-routine market reviews relatively high. However, there seems to be some consensus on the criteria that cooperative arrangements should fulfil to justify such non-routine reviews.

Economic advantages of cooperative arrangements

As noted in Curram et al., "[c]o-investment by rival operators may be used to reduce capital costs. A risk in the business case is that capital investment is made but that a response by a competitor to overbuild reduces revenues to the point that the investment is unprofitable and performs poorly against other options. Co-investment will usually confer advantages of lowering capital costs by sharing them, at the expense of reducing revenues through retail competition. Risk is reduced through the smaller capital investment required while revenue, though lower, will be more predictable"[749]. Their study provides an assessment on the recent relevant literature, discussed below. It shows that economic literature is divided on the chances of co-investment arrangements being broadly used by operators.

Box 10. Review of relevant literature as provided in Cadman et al. (2019)

Cadman (2019) is sceptical about co-investment, pointing out that whilst operators may share risks, they would also share rewards and therefore co-investment is likely to be most relevant for capital constrained operators. Abrardi and Cambini (2019) report on a number of papers that address this question (including Nitsche and Wiethaus 2011, and Inderst and Peitz 2012), but find that "apart from a series of theoretical papers and a single

[748] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q28.
[749] Stephen Curram et al. (2019). *Study on the determinants of investment in VHCN – a System Dynamics approach: Volume 1: Technical Report*, November 2019, p.37

laboratory experiment, very few empirical evidences exist on the impact of co-investment agreements on ultra-fast broadband deployment" (p. 196).

Vogelsang (2019) says that there are two outcomes in the literature on co-investment: first that it leads to more infrastructure competition than under access regulation and secondly that it may lead to collusion and so needs policing by competition authorities. He points out that the Code provides for free entry by additional partners in a co-investment, but this will only occur if information accumulated after the original investment is positive. In addition, he suggests that the regulatory discretion allowed under Art. 74 of the Code increases regulatory risk.

All his concerns notwithstanding, Vogelsang concludes: "If (…) collusion [amongst co-investment partners] does not occur, co-investment projects should be particularly competitive because the forward-looking costs relevant for pricing decisions are close to zero. This contrasts with wholesale access-based pricing, where the access charges are the opportunity costs relevant for pricing" (Vogelsang 2019, p. 4).

We can interpret Vogelsang as meaning that co-investment partners who have built their own networks face a predominantly fixed cost with minimal variable costs. The marginal cost of an additional unit of output is therefore close to zero. By contrast, a purchaser of wholesale access buys units of output from a provider and so faces a real cost, which would then be passed on to consumers.

Aimene, Lebourges and Liang (2019) empirically explore the impact of co-investment in France on broadband adoption, coverage and competition. (…) Their econometric model first examines whether coverage is affected by co-investment. Once they correct for selection bias (i.e. selection of municipalities on exogenous economic factors), they find co-investment has no significant effect on FTTH coverage. In other words, their model suggests that there are no more municipalities that have FTTH as a result of co-investment than would have had them anyway, once selection bias is accounted for.

However, they find that where co-investment takes place, there is a significantly higher rate of adoption by consumers. They find that adoption is 7.6% higher (significant at 99%) than where it has not taken place. They also find that competition is higher with Orange losing a 7.8% market share where there is co-investment, although it is not clear which operators are gaining from Orange's loss.

Aimene, Lebourges and Liang (2019) is so far the only empirical study on the effects of co-investment. Until further such studies are conducted we cannot be certain that co-investment either promotes or constrains investment in VHCNs.

Source: Richard Cadman et al. (2019), *Study on the determinants of investment in VHCN – a System Dynamics approach: Volume 2: Literature Review*, p. 51-52.

To determine the impact of co-investment on competition and investment, Bourreau et al. (2018)[750] used a counterfactual or benchmark to "show that compared to a standard access regime, co-investment leads to:

[750] Bourreau, Marc, Cambini, Carlo and Steffen Hoernig (2018). Cooperative Investment, Access, and Uncertainty. *International Journal of Industrial Organization*, 56, 78-106, quoted in Bourreau, S., Hoernig, S., & Maxwell W. (2020). *Implementing co-investment and network sharing*. Centre on Regulation in Europe, Report, May 2020, p.21.

- Increased total coverage, and hence, expansion of the "grey areas" towards costlier areas: this is because, in the costlier areas, the entrant will not co-invest, increasing the return of covering these costly areas for the incumbent compared to the benchmark with access.
- Expansion of the areas with service-based competition ("black areas") if the access price is not set too high by the regulator in the counterfactual with access: this is because, while competition is slightly stronger with co-investment as it is with regulated access, due to a very low implicit access price, the deployment costs are shared in the former case, which makes it profitable to expand black areas.
- Lower prices for consumers in "black areas": this is because, with co-investment, the implicit access price is equal to the marginal cost of access, and typically lower than the regulated access price in the benchmark situation".

Francesco Castelli[751], comparing data from Cullen-International on co-investment initiatives (October 2019) in the five most populated EU countries with the FTTH penetration finds a positive correlation and suggests that co-investment projects in Spain, Portugal and France are among the drivers of high FTTH coverage.

Table 30. Co-investment projects in EU MS

MS	Co-investment initiatives	Targeted premises (min-max)	Co-investment typologies	VHCN coverage in 2019	Take-up (fixed, at least 100 Mbps, 2019)
ES	6	7%-16%	4 CFO, 2 SD	89%	52.9%
PT	4	10%-52%	4 SD	83%	55.8%
FR	4	10%-37%	1 SD; 3 CFO	43.8%	17.4%
IT	1	12%	1 JD	30%	13.4%
DE	4	4%-n.a.	2 CFO; 1 JD; 1SD	32.7%	20.6%

Source: TIM Group (2019) Co-investment or wholesale-only: Which model will spur more incentives to invest? Francesco Castelli FSR Conference – Florence, 13 December 2019 "The EECC and its impact on investment in very high capacity networks (VHCN)", available at: https://fsr.eui.eu/wp-content/uploads/2019/12/Francesco-CASTELLI_Co-.investment_TIM.pdf; data in the source is taken from Cullen International October 2019; DESI index data.
Note: VHCN category covers FTTH, FTTB and Cable Docsis 3.1.

Moreover, as the BGR notes "(…) co-investment also has the potential to increase the effectiveness of competition in the market for fixed-line services. This is because co-investment lowers the barriers to entry for new infrastructure players which creates more end-to-end network competition and could result in a more competitive wholesale market"[752].

Finding 42. Operators say that they entered into cooperative arrangement for economic benefits, rather than for hypothetical regulatory relief. However, economic literature provides very little empirical evidence of the impact of co-investment agreements on ultra-fast broadband deployment.

[751] TIM Group (2019) "Co-investment or wholesale-only: Which model will spur more incentives to invest?", Francesco Castelli FSR Conference – Florence, 13 December 2019 "The EECC and its impact on investment in very high capacity networks (VHCN)", available at: https://fsr.eui.eu/wp-content/uploads/2019/12/Francesco-CASTELLI_Co-.investment_TIM.pdf
[752] Berkeley Research Group (2017), *Co-investment and commercial offers*, April 2017, p. 54.

How can NRAs foster cooperative arrangements?

According to Curram et al. "(…) regulation may (…) encourage or enforce co-investment. In Portugal, where the wholesale obligation to allow access to FTTP networks (above copper speeds) was not imposed, co-investment became the feasible route for some alternative operators that previously were retail only to gain access to the market and retain market share (more recently non-obligated wholesale access has become available to other operators). In less densely populated regions of France there is a regulatory requirement for an operator to announce the intention to roll-out an FTTP network and allow other operators to co-invest in 5% allotments (it is also possible to invest after installation) in order to gain access to the infrastructure (see Aimene, Lebourges & Liang, 201837). In Spain's non-competitive areas, co-investment agreements were struck immediately on regulatory imposition of access to FTTP in 2016"[753]. Ilsa Godlovitch and Sonia Strube Martins also consider[754] that the experience in France, Spain and Portugal shows that "in the absence of regulation, reciprocal access arrangements or other forms of commercial co-investment or wholesaling can emerge to ensure choice in retail services". Conversely, where regulated access is in place, room for negotiating commercial agreements may be limited, as Telekom Italia, observed: "to date the conclusion of commercial access agreements have been difficult to arise due to the strict *ex ante* regulation based on the cost orientation of wholesale access services"[755].

Thus, there is evidence that the lack of access to SMP-regulated products on a reasonable basis can lead operators to conclude commercial agreements. This was also the case particularly in Germany, where more than one alternative operator noted that wholesale prices to regulated products offered by the SMP were too high. Therefore, operators entered into commercial agreements as they were the only viable alternative[756]. A similar situation occurred in Cyprus, where the regulated VULA product proved to be too costly to use (there were too many points to interconnect to ANOs, creating very high backhauling costs), which led to the provision of a different VULA product on a commercial basis between the SMP operator and ANOs[757].

However, tools are available to NRAs in promoting the conclusion of agreements. First and foremost, they can do so by **acknowledging the benefits of such initiatives**. This is elaborated by Proximus (see Box 11 below).

Box 11. Proximus insight into expectations for the regulators regarding assessment of cooperative agreements

Proximus acknowledges the benefits of cooperative agreements to foster large-scale and efficient VHCN deployment, yet expects the following from a regulator in relation to cooperative agreements[758]:

[753] Stephen Curram et al. (2019). *Study on the determinants of investment in VHCN – a System Dynamics approach: Volume 1: Technical Report*, November 2019, p. 38
[754] WIK-Consult (2019), *Prospective competition and deregulation, An analysis of European approaches to regulating full fibre*, 28 February 2019, p.32.
[755] Telecom Italia response to the Targeted Consultation, Q28.
[756] Online survey results as well as case study interviews.
[757] Case study interviews.
[758] Proximus response to the online survey.

- That regulators in general acknowledge the beneficial impact of such initiatives on the competitive market dynamics, and allow for an open investment climate, which means acknowledging the need for positive perspectives on return on investment for such investors. A rigid, un-flexible and severe wholesale pricing regime, to the contrary, would dissuade such investors to take the investment risk, in Proximus' view.
- That regulators take due account of such initiatives when carrying out the three criteria test in their market reviews (which should lead to the withdrawal of *ex ante* regulation where the test is not passed in the footprint of the arrangement).
- That regulators take due account of such initiatives in the context of the assessment of the presence of effective infrastructure-based competition; namely that creation of a network infrastructure with non-discriminatory access could bring about the same effects upon the market as infrastructure. In this case, Proximus also points towards the expectation of the lifting of *ex ante* price control regulation.

Source: Online survey data.

An SMP operator currently negotiating its first major co-investment agreement in the market has also noted that setting a precedent on how such co-investment deals are treated within market analyses is important, as it also sends signals for potential future deals[759].

Finding 43. There is evidence that the absence of regulatory obligations leads to cooperative arrangements. Conversely, according to some operators, NRAs could foster such agreements also where regulated access is imposed.

[759] Case study interviews.

9. Geographic dimension of regulation, in particular regarding the geographic segmentation of remedies

a. Summary of findings

The number of NRAs that differentiate remedies geographically is limited so far. Moreover, the scope of the differentiation and approaches differs among them substantially. In the future, there might even be less scope for differentiated remedies if NRAs follow the more granular approach to the geographic market definitions advocated by the 2018 SMP guidelines and the 2020 Recommendation on Relevant Markets.

However, a geographic segmentation of remedies is likely to be used increasingly for 'fine tuning' remedies according to geographical differences in competitive constraints that the SMP operator is facing in the same geographical market.

NRAs overwhelmingly support the usage of similar criteria for the geographic segmentation of remedies and the definition of distinct sub-national markets, though some advocate that more case-specific criteria should also be used for the segmentation of remedies to better reflect differences in competitive dynamics within a market in which an operator has been designated as having SMP.

While the assessment must be prospective, or forward-looking, under the competition law methodology used for the definition of subnational markets[760], NRAs currently segmenting remedies do not base segmentation on a prospective analysis, but on the current status of competition in the market.

Stakeholders advocate an assessment of cost as well as of benefits before implementing a geographic segmentation of remedies because segmentation is likely to increase administrative costs and to reduce predictability for access seekers.

b. Introduction

Regulation of Markets 3a/2014 and 3b/2014 has a geographic dimension because the situation within national markets may vary greatly across different countries. While, overall, an operator may have a SMP in a Member State, it may not necessarily be justified to subject this operator to the same remedies nationwide, even when the scope of the SMP operator's network is national[761]. Indeed, competitive constraints increasingly vary due to the deployment of alternative infrastructures. In many instances, it will nevertheless not yet be possible to conclude that the relevant areas constitute distinct geographic markets because the SMP operator does not yet face appreciably different conditions of competition to a degree that its activities are constrained in some areas but not in others. An indication, which is not sufficient by itself to conclude that a market is national[762], would be that despite these geographically

[760] As required in Point 25 of the 2018 SMP guidelines.
[761] In the case of Sweden, the Commission objected to a finding that the geographical market was national because the NRA had not established that ANO's services in different areas constituted a real alternative source of supply because in Sweden, contrary to other Member States, the (fibre) network footprint of the incumbent operator is no longer national (Commission's serious doubts of 6 December 2019 in case SE/2019/2216, p.12).
[762] In Case SE/2019/2216, the Commission observed that „While PTS presents some evidence that Telia acts uniformly within the areas in which it is present with its fibre network, the analysis does not sufficiently take into account the actual boundaries of Telia's network."

limited competing networks, the SMP operator continues to act uniformly across its network area, as reflected by national pricing by the SMP operator. However, such constraints may justify lighter access remedies in areas where an alternative infrastructure has been deployed, such as moving from cost orientation to 'non excessive' pricing obligations, leaving access seekers the choice between negotiating with the SMP operator or with the operator or operators that deployed the alternative infrastructures concerned.

If NRAs follow the more granular approach to geographic market definitions advocated by the 2018 SMP guidelines and the 2020 Recommendation on Relevant Markets, there might be less scope for differentiated remedies. Differentiated remedies will nonetheless remain relevant in particular for 'fine tuning' remedies according to geographical differences in competitive constraints that the SMP operator is facing in the same geographical market, for example where an alternative infrastructure is being deployed, but the NRA is reluctant in differentiating markets based on prospective infrastructure competition or where competitive constraints do not suffice in certain areas to conclude the absence of SMP (and the removal of all asymmetric access obligations) but where remedy differentiation is justified.

Provisions concerned

- Article 64(3) EECC (use of competition law methodology to define geographic markets) in combination with recital 172 regarding geographic segmentation of remedies.
- Article 68.6 EECC requires NRAs to consider the impact of new market developments, such as in relation to commercial agreements, including co-investment agreements, influencing competitive dynamics.
- Recital 172 reminds us that "[…] even if such differences do not result in the definition of distinct geographic markets, they should be able to justify differentiation in the appropriate remedies imposed in light of the differing intensity of competitive constraints".
- Recital 179 EECC: "When assessing the proportionality of the obligations and conditions to be imposed, NRAs should take into account the different competitive conditions existing in the different areas within their Member States"
- The 2018 SMP guidelines[763] provide guidance as to when opting for remedies segmentation instead of market segmentation.
- The BEREC Common Position on geographical aspects of market analysis (definition and remedies) of 5 June 2014[764] also provides guidance to the NRAs.
- The Commission Staff Working Paper accompanying the 2020 Recommendation on Relevant Markets[765] that "differentiation at the level of remedies should be limited to

[763] "If regional differences are found, but not considered to be sufficient to warrant different geographic markets or SMP findings, NRAs may pursue geographically differentiated remedies (43). The stability of the differentiation — specifically the degree to which the boundary of the competitive area can be clearly identified and remains consistent over time — is the key to distinguishing between a geographical segmentation at market-definition level and remedy segmentation", OJ C159 of 7.5.2018, p.8, Point 50.

[764] In particular in Point 165 "(…) where the available evidence suggests that the scope of the relevant market is national (any differences in the conditions of competition between geographical areas are not yet sufficiently stable or sustainable to justify the definition of regional or local markets), market power will have to be assessed within this national market. In case of geographical variations in competitive conditions within this national market, it may be appropriate to vary remedies within that national market, despite the fact that an operator is found to have SMP throughout the entire territory".

[765] See in particular p.19. The guidance in the relevant section relates nevertheless mainly to the criteria to be used for operating the geographic segmentation in order to assist NRAs in proceeding to a robust market definition.

less significant or less stable variations of competitive conditions (…). It might, for instance, be used by NRAs for a periodical or punctual update of remedies in accordance with Article 68(6) of the Code. The market review may foresee such reviews and the criteria to be used for that purpose"

- Point 9 NGA Recommendation states that NRAs should examine differences in conditions of competition in different geographical areas in order to determine whether the definition of sub-national geographic markets or the imposition of differentiated remedies are warranted. In case the conditions of competition are not stable and/or substantial, NRAs should monitor whether the deployment of NGA networks and the subsequent evolution of competitive conditions within a geographically defined market warrant the imposition of differentiated remedies.
- Point 50 and Annex II[766] NDCM Recommendation provide some examples of the ways in which differences in geographical areas can be addressed at the remedies stage. It says among other things that NRAs should differentiate the regulation within geographical markets, which includes removing price control, in cases where only in certain areas of the national market has retail competition emerged from the effective infrastructure-based competition and when EoI been implemented by the SMP operator offering wholesale access allowing technical replicability of its flagship offers (see chapter 5). An NRA can address this either by defining sub-national geographic markets or by imposing differentiated remedies, if a definition of a sub-national geographic market is not justified.

Differentiation of remedies will typically be foreseen in market reviews in order to capture expected market evolutions that have not yet fully materialized. When NRAs consider including geographical segmentation of remedies in their market reviews, they will have to address the following questions:

- On which grounds and with which objectives should remedies be differentiated geographically?
- What will be the trigger?
- On which parameters should remedies be differentiated geographically?
- What are the drawbacks of the geographic segmentation of remedies (risk assessment)?

To identify possible best practices, we will first examine the approaches of the NRAs that apply geographic segmentation of remedies or define sub-national geographic markets.

c. Application of geographic segmentation of remedies as opposed to sub-national geographic markets

BEREC notes that "geographic segmentation is an increasingly relevant aspect for the market analyses carried out by European NRAs for markets 3a, 3b and 4"[767]. The 2020 BEREC report

[766] More specifically, Annex II, which deals with the economic replicability test, states that NRAs may need to adapt the test according to the differences in the competition conditions detected at the geographical level, e.g. to take into account the fact that what is deemed to be the most relevant NGA access input needed to perform the test may be different in rural and densely populated areas.

[767] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q39.

on Regulatory Accounting[768] indicates that Belgium, France, Denmark, Italy and Spain apply geographic segmentation of remedies to at least some extent in Market 3a/2014. In Market 3b, only Belgium, France, Italy and Slovenia do this. Thus, there are a limited number of countries that are segmenting the remedies geographically. In addition to them, Cyprus, Hungary, Finland and Poland use market segmentation to account for the geographic variation in Market 3a/2014, while Germany, Spain, Finland, Hungary, Ireland, Poland and Portugal do so in Market 3b/2014.

The definition of geographic markets is dealt extensively in the Commission Staff Working Document accompanying the document Communication from the Commission Guidelines on market analysis and the assessment of significant market power under the EU regulatory framework for electronic communications networks and services[769]. In this report, we therefore only cover the geographic segmentation of remedies. Table 31 lists the geographic segmentation of remedies of NGA access products currently applied by NRAs.

Table 31. Geographic segmentation of remedies

Approach	3a Fibre LLU	3a VULA FTTC	3a VULA FTTH	3a Dark Fibre	3a Duct Access	3a term. seg.	3b legacy	3b NGA	3b FTTH
Remedies	DK	BE, IT	BE, ES, IT, *CY*	–	–	FR	BE, FR, IT, SI	BE, IT	BE, IT

Source: BEREC (20) 210 and *own research in italics*.

The differentiated remedies, the criteria for geographical differentiation and the approaches of the nine[770] NRAs applying geographic differentiation of remedies vary, including in defining the geographic units[771]. Indeed, while some NRAs use administrative geographical units, others take into account the network topology.

Finding 44. The number of NRAs that differentiate remedies geographically is limited so far. Scope of the differentiation and approaches differ among them substantially.

The reasons and objectives for differentiating the remedies geographically

It will often not be possible based on competition law methodology to conclude the absence of a SMP in any of the sub-national geographical markets that can be distinguished based on the level of competitive constraints. In this case, the geographical differentiation of remedies is a tool in the hands of NRAs allowing for a better targeting of remedies imposed in terms of the competitive environment in a particular area ("limited to less significant or less stable variations

[768] BoR (20), 210.
[769] Brussels, 27.4.2018, SWD(2018) 124 final
[770] AGCOM, BIPT, BNetzA, CNMC, ComReg, OCECPR, DBA (in market 3a/2014), AGCOM, ARCEP, BIPT, DBA in Market 3b/2014 and ARCEP and ANACOM in Market 2/2020.
[771] The explanatory note to the Recommendation on Relevant Markets refers to the following criteria that help identify the units: "NRAs should ensure that this unit: (a) is of an appropriate size, i.e. small enough to avoid significant variations of competitive conditions within each unit but big enough to avoid a resource-intensive and burdensome micro-analysis that could lead to market fragmentation, (b) is able to reflect the network structure of all relevant operators, and (c) has clear and stable boundaries over time", p. 16.

of competitive conditions"[772]), even if it is considered that an incumbent operator has a SMP nationally (or in a sub-national market, as is the case with the rest of Italy[773]).

An example of a driver/grounds for differentiating remedies is the difference between densely populated urban areas and less dense rural locales where the deployment of competing VHCN networks is more challenging and less likely. Given that alternative operators will, for cost reasons, continue to be dependent on wholesale access to the SMP network, these areas will likely require stricter remedies, for example, a cost orientation instead of an ERT. Conversely, in urbanised areas where alternative operators have a business case for deploying competing infrastructures, a cost orientation may have an adverse effect on their investment incentives, given that if alternative operators invest in the infrastructure, they may face competition on the retail market of access-based service providers, depressing retail prices and profit margins. In those areas, a wholesale margin squeeze test may be more appropriate to guarantee investors that the SMP operator will not price bitstream access too low.

The method for differentiating the remedies geographically

The segmentation of remedies aims to reflect differences in the competitive conditions between areas altough these differences may in some case be insufficient to justify a market differentiation. Such differentiation will in particular contribute to the regulatory objective of Article 3 EECC, including VHCN connectivity, when it incentivises investments that are not yet implemented (and may never materialize in the absence of the perspective of remedy differentiation). The criteria used for the segmentation need therefore to reflect prospectively likely market developments. Such prospective criteria can be:

a) The (prospective) number of competing networks

b) The (prospective) distribution of market shares

c) A preliminary analysis of (prospective) pricing and price differences at the regional level

d) Prospective behavioural patterns.

NRAs generally use the criteria listed in the Explanatory Note to the Recommendation of Relevant Markets[774] for the assessment of the geographical dimension of market definitions, but some also use other criteria.

a) NRAs using criteria listed in the Explanatory note

The Belgian NRA segments access obligations (see Box 10) on the basis of the presence of at least three sufficiently independent NGA operators (providing services over an infrastructure

[772] SWD, Explanatory note accompanying the document Commission Recommendation on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code.
[773] Two different geographic markets are defined in Markets 3a/2014 and 3b/2014: Municipality of Milan and Rest of Italy.
[774] SWD, Explanatory note accompanying the document Commission Recommendation on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code.

offering speeds of 30 Mbps and above, and where there is no or a maximum of one NGA infrastructure.

The Italian NRA differentiated remedies in municipalities matching the following indicators:

- Number of network alternative operators and their coverage: where at least two alternative access networks (FTTC or FTTH) are available, each of which covers 60% of customer premises.
- The combined coverage of both alternative networks is not less than 75%
- The SMP operator's retail NGA market share (by connections) is ≤40%
- The SMP operator's wholesale NGA active services (VULA and bitstream) is < 80%.

The Danish NRA withdrew an obligation to provide access to fibre in 56 postcodes (totalling 274,619 households) based on criteria (a) and (b), i.e., where the following criteria are met cumulatively:

(i) The SMP operator had a market share below 40 % in the previous year or a projected market share below 40 % in the subsequent[775] year.

(ii) At least 75 % of households in the postal code area must be covered by at least 2 alternative infrastructures.

(iii) The areas must include more than 25,000 addresses either individually or combined in a cluster of areas.

The Spanish NRA did not require[776] the SMP operator to offer VULA (layer 2 Ethernet wholesale broadband service over fibre) in the 66 so-called ultra-fast broadband (UFB) municipalities. These are municipalities matching both retail competition and NGA deployment criteria:

- With regard to retail competition, in case the following two criteria are fulfilled:
  - (i) Presence of at least 2 alternative operators operating either by means of their own infrastructure or of LLU access, having a market share of at least 10%.
  - (ii) Telefonica's market share in the same area is below 50%.
- Regarding prospective NGA deployment, when:
  - (i) There are at least 3 NGA networks (FTTH or HFC) deployed
  - (ii) Each of the NGA network has coverage of at least 20%. When a MDF fulfils all the above criteria (retail competition plus NGA deployment) it is considered to be an Ultra-Fast Broadband MDF and the municipalities containing at least one of those UFB MDF are considered UFB municipalities.

[775] In its Comments letter of 6 July 2017 in Case DK/2017/1993, the Commission says that the Danish NRA "considers it appropriate to use a projection that does not exceed the [subsequent year] because in its view fibre deployment is made stepwise. In other words, an area which has undergone a fibre upgrade in one period is likely to experience low activity in the next period. For this reason, it is only possible to project deployments for a short period of time, and in DBA's view not beyond [subsequent year]" (footnote 9).
[776] Commission Decision of 16.12 2016 concerning Case ES/2016/1952.

Nonetheless, the Spanish NRA does not operate geographical segmentation based on administrative borders but reviewed per local switch (MDF). 758 switches matched the above criteria.

NRAs overwhelmingly support the usage of criteria for the geographic differentiation of remedies similar to those for the definition of distinct sub-national markets (19 responses out of 20)[777]. The main arguments for such a position can be summarised as follows[778]:

- Differentiating geographic markets and differentiation remedies within a market pursue the same aim, i.e. to address the of variation in the competitive environment in different geographically defined units. Therefore, similar criteria should be used in both cases.
- The main drivers of regional variation in the competitive environment are similar (e.g. infrastructure, market shares, etc.) and, therefore, the criteria should also be similar.
- Using the same criteria would provide greater clarity to market players, in particular as regards the levels of competitive conditions that would trigger a differentiation of remedies and levels of competitive conditions that would trigger a differentiation of sub-national markets.

NRAs tend to see similar criteria as necessary because the coverage of network(s) deployed by alternative operator(s), market shares, and the number of providers active on the retail market are key indicators of competitive constraints. Some comments stressed that market share plays an especially important role, with several suggestions that it should be the main criterion.

Conversely, alternative operators question some of the criteria arguing that[779]:

- The number of retail service providers is not necessarily relevant, especially if these providers use the wholesale products of an SMP operator.
- A deeper analysis of each criterion might be needed (rather than superficial evaluation) in order to fully grasp the competitive situation in a geographically defined area.
- Assessment of the competitive environment can be highly individualised and vary from case to case.

Finding 45. NRAs overwhelmingly support the use of similar criteria for the geographic differentiation of remedies and the definition of distinct sub-national markets.

Some NRAs suggested that in specific cases additional criteria could complement the above-mentioned criteria and that national conditions may justify prioritizing certain criteria above others.

The following possible further criteria were suggested:

- Assessment of vertical integration

[777] Based on the online survey data.
[778] Summarised based on the responses to the online survey and the Targeted Consultation.
[779] Based on the online survey data.

- Households without Internet access[780]
- Number of service providers in the retail market

Finding 46. Some NRAs consider that beyond the criteria used for geographic market delineation, more case-specific criteria should be used to better reflect differences in the competitive dynamics within the market in which an operator has been designated as having SMP.

b) NRAs using criteria not listed in the Explanatory Note

The Cypriot NRA differentiated obligations in urban and rural areas, where the mandated provision of LLU was waived, if the SMP operator offered instead a virtual access product with equivalent characteristics based on vectoring. Conversely, in urban areas, the SMP operator is only allowed to introduce vectoring in agreement with the alternative operators[781].

The Irish NRA differentiates pricing remedies for pole, duct and dark fibre access, depending on the geographic area. The maximum annual price per metre of sub duct and per metre of dark fibre is differentiated between duct access in Dublin exchanges and duct access in provincial exchanges[782] while different price caps are set for pole access in the 'modified LEA' (i.e. in the footprint of urban exchanges) and outside of the modified LEA (i.e. in the footprint of the rural exchanges).

In 2016, the German NRA only required the SMP operator to offer VULA in the 'near areas' and for those street cabinets outside near areas[783] in cases Deutsche Telekom would withdraw previously granted copper access. In fact, the NRA only mandated VULA where it assumed that access seekers would be interested in such access. In addition, the NRA defined different rules on vectoring outside and inside the near areas.

In Finland (where there are many SMP operators, each covering geographic areas of different sizes), the NRA uses the size of the SMP operator as criterion. It imposed price caps only on the three largest SMP operators as regards wholesale local access. The Finnish case is nonetheless not fully comparable to the others since none of the remedies imposed on any of the SMP operators is segmented for a single SMP operator, but the differentiation is instead between the SMP operators.

How to design the trigger?

a) Prospective or not?

Different criteria are used by NRAs to trigger the geographic differentiation of remedies.

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[780] Suggestion by an NRA, likely referring to adapting remedies in such areas so as to make investments by the SMP operator more attractive.
[781] Commission Comments of 27.07.2016 concerning Case CY/2016/1882-1883, footnote 25.
[782] Comreg, Pricing of Eir's Wholesale Fixed Access Services: Response to Consultation Document 15/67 and Final Decision, Decision D03/16, 18 May 2016, p.22 and 24..
[783] Defined as areas outside of 550 meter wire length starting from the serving main distribution frame (MDF). See Fourberg, Niklas; Korff, Alex (2020), "Fiber vs. vectoring: Limiting technology choices in broadband expansion", *DICE Discussion Paper*, No. 334, ISBN 978-3-86304-333-9, Düsseldorf Institute for Competition Economics (DICE), Düsseldorf, p.9.

In Belgium[784], the NRA has set the following criteria which, if fulfilled, will trigger the differentiation:

- At least three sufficiently independent NGA operators (providing services over an infrastructure offering speeds of 30 Mbps and above) are present in an area corresponding to a statistical unit (administrative unit below that of municipalities).
- At least 50% of households can access services from three different NGA operators.

A second trigger has been defined by the Belgian NRA: the deployment of an NGA infrastructure by an SMP operator in areas which are currently covered by no more than one NGA infrastructure[785].

In Italy, the NRA identified municipalities ('competitive municipalities') within the geographic market that were deemed non-competitive and where an SMP operator was designated. The aim was to avoid over-regulating areas where competition was emerging, but where competition was not yet considered effective enough to conclude that the areas were part of a distinct geographic market. The triggering criteria could thus be described as a type of 'below dominance' criteria. These criteria are:

1. Coverage of alternative networks: presence of (at least) two alternative access networks (FTTC or FTTH) each of which covers 60% of customers' premises. The total coverage (of both alternative networks) must not be less than 75%.

2. TIM's retail NGA market share (by connections) must be less or equal to 40%.

3. TIM's wholesale NGA active services (VULA and bitstream) share must be less than 80%.

These criteria led to the identification of 26 competitive municipalities where no cost orientation obligation was imposed.

In neither the Belgian nor the Italian cases was geographic segmentation implemented based on future deployments. This contrasts with the competition law methodology used by NRAs to define sub-national markets, which must be forward-looking, as "*ex ante* regulation addresses the lack of effective competition that is expected to persist over a time horizon in accordance with the duration of the review period"[786]. Expected or foreseeable market developments must be considered. For example, an NRA reports already taking future infrastructure roll-out into account when carrying out a market analysis[787].

Most NRAs replying to the question[788] (16 out of 21) say that prospective infrastructure competition should be considered in addition to existing infrastructure competition for the sake

[784] Assessed by the Commission under Cases BE/2018/2073 and BE/2018/2074.
[785] The situation in Belgium is somewhat distinct because both access to the incumbent's network and the FTC operator's networks are regulated on respectively Markets 3b1/2014 and 3b2/2014. The measure aims to promote consumer choice in areas where only one of both provides high speed broadband.
[786] Commission Staff working Document, Accompanying the document Commission Recommendation on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code p. 9.
[787] An NRA response to the online survey.
[788] Online survey data.

of geographic differentiation[789]. This should not be misunderstood. In the case of segmentation of remedies, no *ex ante* definition of geographic boundaries is required. Indeed, geographic segmentation of remedies enables NRAs to address the main problem faced when defining a sub-national market, i.e. that network deployment "is hardly predictable and very inaccurate information as the situation, operator's plans can change quickly"[790], a problem also flagged by an NRA, which acknowledges that "information about the future availability of alternative infrastructures, based on declarations of operators […] cannot be the main elements to motivate the identification of geographical markets and/or of a geographical segmentation of remedies"[791]. Or, as Open Fiber says: contestability is not sufficient to determine competitiveness in a geographic area and NRAs should go for a gradual deregulation, allowing the entrant to build a position, so as not to reduce the competition by dropping the regulation too suddenly[792]. In the same vein, other stakeholders recall that[793]:

- Deployment of infrastructure needs significant time for the effects to materialise
- Time needed for a new operator to establish itself is significant and the mere fact of establishment may not be sufficient

Remedy segmentation enables NRAs to determine *a priori* 'triggers' in their market review, which if and once fulfilled will lead to a differentiation of remedies in areas where access over new infrastructures is effectively offered. As an NRA notes, segmentation or remedies allows "to consider prospective dynamic stemming from new network deployment or upgrades in the context of regulatory obligations, especially in situations when the period between regular market reviews were extended to 5 years, NRAs should [foresee mechanisms in their market analysis and remedies decisions] which will allow them to adjust remedies imposed under the pre-determined criteria set for the market or remedies segmentation by using up-to-date data about (alternative) infrastructure coverage"[794], i.e. actual data, not prospective data.

Finding 47. While a majority of NRAs advocate using similar criteria for the geographic segmentation of remedies to those used for the definition of subnational markets, the NRAs' currently segmenting remedies do not do this based on a prospective analysis, but on the effectively materialized triggering criteria.

b) 'Self-executing' or not?

A second aspect is when the differentiation is triggered. While some respondents did not have specific comments or suggestions on how such a process could work, several others suggested that automatically updating areas susceptible to the geographic differentiation of remedies would not be a good solution. An NRA noted that the approach "is always an individual assessment based on a number of criteria"[795], while another NRA said that the fulfilment of criteria "has to be evaluated on a case-by-case basis"[796]. Moreover, yet another NRA identified the legal difficulty of automatic adaptations of geographic segments: "such

[789] The question did however not ask the NRAs whether they saw a difference in the case of geographic segmentation of remedies as opposed to geographic market definition.
[790] An NRA response to the online survey.
[791] An NRA response to the online survey.
[792] Open Fiber response to the Targeted Consultation, Q38.
[793] Based on the online survey data.
[794] An NRA response to the online survey.
[795] An NRA response to online survey.
[796] An NRA response to online survey.

conditions are usually not allowed as part of the remedies in [the country] (the obligations have to be defined precisely, so that no additional proceeding is necessary for their interpretation - according to a court ruling)"[797]. Therefore, updates should always require at least the explicit confirmation by the NRA that the criteria have been fulfilled, i.e. an administrative decision susceptible to appeal by stakeholders concerned.

At the same time, the specific timing of an NRA assessment whether criteria are fulfilled is desirable. For example, Telecom Italia, invoking regulatory certainty, suggests that "it would be better that the criteria are set in the market analysis and applied at least annually in order to review/withdraw remedies accordingly"[798].

On which parameters should remedies be differentiated geographically?

Geographic segmentation of remedies allows NRAs to fine-tune their regulatory approach for areas where competition is adequate to allow "the market to work by itself under a lighter set of obligations, while ensuring competition at the retail level for non-competitive or less competitive areas via additional obligations aimed to ensure availability of wholesale inputs to alternative actors not in a position to self-supply their own wholesale services"[799]. This is echoed by several other stakeholders. For example, Liberty Global states that "in a single geographic market, there may be justification to differentiate inter and intra regions (for example, between urban and rural areas where the level of competition differs), all taking into account the principles of appropriateness and proportionality"[800].

A second difference between the definition of sub-national geographic markets and geographic segmentation of remedies is that in the latter case: (i) there will always be an operator designated as having SMP in the area – which is not necessarily the case in sub-national markets - and (ii) given that the 'geographic segments' will not be deemed competitive, all segments will continue to be regulated.

For example, in the case of Belgium, while pricing obligations will no longer apply in geographic segments fulfilling the criteria set in the 2018 market review, the following SMP obligations will still apply to the SMP operator:

i. The obligation to negotiate in good faith

ii. Access to duct splice, splint or failing this, dark fibre

iii. Access intended to serve non-residential multi-site customers

iv. Transparency measures related to the evolution of the network.

In parallel, access obligation on legacy copper access (LLU) will also remain.

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[797] An NRA response to online survey.
[798] Telecom Italia response to the Targeted Consultation, Q41.
[799] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q39.
[800] Liberty Global response to the Targeted Consultation, Q39.

What are possible drawbacks of the geographic segmentation of remedies (risk assessment)?

Segmentation of remedies could potentially increase the complexity of the geographic structure of remedies. For example, the Hungarian NRA expressed concern that since the country has six markets (three regulated with one SMP operator present and three deregulated with no SMP operators present), "geographic differentiation of remedies would further segment the market that would lead to highly fragmented regulation which would be difficult to manage both for market players and for the NRA"[801].

More specifically, the following risks were identified[802]:

- Variation of remedies in different geographic locales could create additional costs for the operators when complying.
- Unpredictable regulatory changes if adjustments are made in between market reviews.

As BEREC notes in its response to the targeted consultation, an SMP operator in Poland was subject to more than one set of remedies identified in 2011 in Market 3b. Due to the high compliance costs, a decision was made to a single reference offer that would adhere to the strictest set of requirements. Thus, only one set of remedies (the strictest) was implemented *de facto* by the SMP operator. Even if the lighter remedies in specific areas might have decreased the constraints of the SMP operators, the latter considered that overall, making use of the differentiation did not justify the costs associated with differentiating reference offers[803].

As regards the predictability of regulatory obligations, BEREC notes that "the possibility of changing remedies without a proper market analysis should be handled carefully to secure predictability and certainty of ex ante regulation"[804]. Market players need time to prepare for any possible changes. Vodafone notes that "deviating from this new source of predictability [i.e. 5 years review cycles] would require a very thorough analysis. This type of remedies review could, in our view, introduce a non-systematic decision making without proper analytical evidence (in case the remedies could be changed without a new market analysis)"[805]. Other operators that are also active on the retail high quality market contend that the geographic segmentation of remedies should be avoided because a nationwide access under homogeneous access conditions is necessary to compete effectively on this market, given that large businesses tend to be present in multiple locations. However, NRAs tend to disagree with such a position, maintaining that this should not justify a different approach towards the geographic segmentation of remedies on a high-quality market (13 vs. 5 responding NRAs)[806].

The burden of implementation **will also be felt by NRAs**. As noted by one NRA in the online survey, the data collection processes would have to be frequent to allow for a rapid reaction to changes in the competitive environment[807].

Even where market data would suggest that a segmentation of remedies might be warranted, NRAs do not always consider such an approach. For example, about half of the NRAs (9 out of 18 responding to the question) acknowledge that there is a significant geographic

[801] Hungarian NRA response to the Targeted Consultation, Q40.
[802] Based on the online survey data.
[803] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q39.
[804] Idem, Q41.
[805] Vodafone response to the Targeted Consultation, Q41.
[806] Online survey data.
[807] An NRA response to the online survey.

differentiation in the usage of ULL copper lines by alternative operators. However, most respondents to a related survey question (14 out of 16) also consider that there is no need to differentiate remedies geographically in order to maintain a copper anchor in some areas but not others, even where the difference in take-up of ULL reflects the pervasive deployment of alternative networks.

Finding 48. Stakeholders advocate an assessment of cost and benefits before implementing a geographic segmentation of remedies because the latter is likely to increase administrative costs and might reduce predictability for access seekers.

10. Regulatory incentives to foster migration from copper to fibre

a. Summary of findings

The study found that the NGA Recommendation brought about uniformity in the overall approach, but not for the details of its implementation. Variations may result from differences in the state of evolution of the networks from the regulated SMP operators in their respective Member States.

Many NRAs say that they are not aware of the SMP operators' plans to decommission, partially or totally, the copper network over the next 5-10 years. This may suggest that in many Member States decommissioning is still not a topical issue.

Field research suggests that the 5 years default notice period set in Point 39 NGA Recommendation no longer seem to correspond with the periods set by most NRAs. Several stakeholders consider that the notice period should be reconsidered.

There also seems to be little support for NRAs to set mandatory deadlines for (partial) switch-off from the legacy networks to foster migration to newly built fibre networks.

The study also found that views are divided on whether departing from the principle of cost orientation to set access prices to legacy networks would be appropriate to hasten migration to fibre networks. In any case, pricing alone will not achieve efficient migration to fibre.

Lastly, several comments suggest the need for a clear monitoring system to ensure that the migration process is non-discriminatory as there are concerns that SMP operators could use a copper switch-off to gain a competitive advantage.

b. Introduction

The EU's key objective for 2030 of 'top-notch trustworthy and secure Digital Infrastructures' of the proposed 2030 Digital Compass[808] and in particular the full coverage of homes with a gigabit network, suggests the need for migrating towards higher capacity networks in order to reach the required ultrafast broadband coverage.

According to the NGA Recommendation, NRAs should put in place a transparent framework for migration from copper to fibre-based networks and should ensure that systems and procedures put in place by the SMP operator facilitate the switch from copper to fibre for alternative service providers. In parallel, NRAs were asked to ensure that SMP operators design support systems to facilitate the switching of competitors to NGA-based virtual products.

At the time, the Framework Directive did not require Member States to grant specific powers to their NRAs to accompany the migration from copper generation networks to fibre networks. Art. 81 EECC now entrusts specific tasks to NRAs in this area and, in doing so, strengthens the legal basis for the guidance concerned in the NGA Recommendation.

[808] *2030 Digital Compass: the European way for the Digital Decade*, 9 March 2021, COM(2021) 118 final.

At the same time, while the NGA Recommendation aimed primarily - in order to foster consumer choice - at protecting investments by access seekers in unbundling of copper loops and subloops, the EECC takes a more balanced stance and underscores the need to avoid unjustified delays to the migration. The replacement of copper networks by more energy-efficient fibre networks fits within the environmental objective of incentivising the deployment of electronic communications networks with a reduced environmental footprint.[809] The Polish authorities, for example, estimate that replacing "the existing copper internet networks with fibre-optic networks results in a several-fold reduction in the energy consumption of telecommunications networks; in particular, it reduces the amount of energy needed to transmit the same data volume several times (a five-fold reduction according to estimates), the production of which in Poland is based on coal. 74% of the dismantled copper cable components can be reused for non-telecommunications products and services and the remaining components are recycled"[810].

Provisions concerned

- Art. 81 EECC: "1. Undertakings which have been designated as having [SMP] shall notify the NRA in advance and in a timely manner when they plan to decommission or replace with a new infrastructure parts of the network, including legacy infrastructure necessary to operate a copper network (…).

  2. The NRA shall ensure that the decommissioning or replacement process includes a transparent timetable and conditions, including an appropriate notice period for transition, and establishes the availability of alternative products of at least comparable quality providing access to the upgraded network infrastructure substituting the replaced elements if necessary to safeguard competition and the rights of end-users. With regard to assets which are proposed for decommissioning or replacement, the national regulatory authority may withdraw the obligations after having ascertained that the access provider:

  a) has established the appropriate conditions for migration, including making available an alternative access product of at least comparable quality as was available using the legacy infrastructure enabling the access seekers to reach the same end-users; and

  b) has complied with the conditions and process notified to the NRA (…).

  3. This Article shall be without prejudice to the availability of regulated products imposed by the NRA on the upgraded network infrastructure (…)".

- Recital 209 EECC: "(…) in order to avoid unjustified delays to the migration, NRAs should be empowered to withdraw access obligations relating to the copper network once an adequate migration process has been established and compliance with conditions and process for migration from legacy infrastructure is ensured (…)".

NGA Recommendation:

- Point 39: "Existing SMP obligations (…) should continue and should not be undone by changes to the existing network architecture and technology, unless agreement is reached on an appropriate migration path between the SMP operator and operators

[809] Summary Report of Best Practices Outcome of phase 1 of the work of the Special Group for developing a common Union Toolbox for connectivity pursuant to the Commission Recommendation (EU) 2020/13071,16/10/2020-20/12/2020, p.10.
[810] Idem, p. 191.

currently enjoying access to the SMP operator's network. In the absence of such agreement, NRAs should ensure that alternative operators are informed no less than 5 years, where appropriate taking into account national circumstances, before any de-commissioning of points of interconnection such as the local loop exchange. This period may be less than 5 years if fully equivalent access is provided at the point of interconnection".

- Point 40: "NRAs should put in place a transparent framework for the migration from copper to fibre-based networks. NRAs should ensure that the systems and procedures put in place by the SMP operator, including operating support systems, are designed so as to facilitate the switching of alternative providers to NGA-based access products".
- Point 41: "NRAs should use their powers under Article 5 of Directive 2002/21/EC to obtain information from the SMP operator concerning any network modification plans that are likely to affect the competitive conditions in a given market or sub-market. Where the SMP operator envisages to replace part of its existing copper access network with fibre and plans to de-commission currently used points of interconnection, NRAs should under Article 9(1) of Directive 2002/19/EC [now Art. 69 EECC] ensure that undertakings enjoying access to the SMP operator's network receive all necessary information in timely fashion to adjust their own networks and network extension plans accordingly. NRAs should define the format and level of detail of such information, and ensure that strict confidentiality of the information disclosed is respected".

BEREC Best practice for NGA wholesale products as of December 2009[811]: "(…) wholesale customers should obtain relevant information on roll-out of new infrastructure or technologies per geographical area. A reasonable window of announcement is necessary to create a level playing field on the retail market; Information on phasing out of legacy wholesale services should also be announced a reasonable period in advance to avoid discriminatory situations."

This guidance was complemented on 8 December 2012 by the revised BEREC Common Position on best practice in remedies on the market for Wholesale Broadband Access (including bitstream access) imposed as a consequence of a position of significant market power in the relevant market[812], of which the main guidance is summarized in Box 12.

Box 12. Best practices as identified by BEREC

- BP29 NRAs should require that switching procedures equally apply between legacy and NGA wholesale products.
- BP30 Where an SMP operator intends to phase out its legacy network (e.g. ATM), NRAs should impose specific obligations on the SMP operator in relation to: a framework for migration; a notice period; an obligation for the SMP operator to provide all relevant information on network modification such as decommissioning of MDFs, technology, access points and active equipment.
- BP31 NRAs should require that existing obligations remain in place until a certain migration path is agreed and finished.

[811] BEREC (2010). *Next Generation Access – Implementation Issues and Wholesale Products*. BoR (10) 08 p. 9.
[812] BEREC (2012). *Revised BEREC Common Position on best practice in remedies on the market for wholesale broadband access (including bitstream access) imposed as a consequence of a position of significant market power in the relevant market.* BoR (12) 128

- BP32 When imposing an obligation on SMP operators relating to a notice period for phasing legacy networks out, NRAs should take into account that the choice of the appropriate notice period may depend on the following factors: Notice period is likely to be longer for locations than for access products/technologies as a new access product may be available at the same location; Availability of a full-fledged alternative; Reasonable migration period for a switch of wholesale products. If a legacy access product will be phased out at an access location at which the NGA access product will also be available the reasonable notice period will be shorter than in a scenario where the NGA-access product will be available at a different access location, where competitors do not yet have a physical presence.
- BP33 NRAs should require that in cases where an active product has been foreseen as an alternative for the legacy access products (either temporarily or as definitive measure) this active product is in operation in adequate advance to the MDF decommissioning as bitstream products are likely to gain in importance in a scenario of MDF decommissioning.

Source: BoR (12) 128.

c. Initial follow up by NRAs

In 2011, a framework for migration from current to next generation access products referred to in Point 40 NGA Rec. was set by eleven NRAs[813]. Almost half of the NRAs obliged the SMP operator to provide information on network modifications, including the roll-out of new infrastructures. Four of these NRAs did provide specific provisions for the de-commissioning of Main Distribution Frames (MDFs) in line with Point 39 NGA Recommendation. There was nonetheless a variety of notice periods ranging from 3 months[814] to 5 years. Some of the NRAs[815] concerned allowed for shorter periods if agreed upon by the operators involved. Some NRAs[816] did explicitly link the decommissioning of MDFs to the availability of equivalent alternatives, whereas the Danish NRAs did not make the approval of decommissioning contingent on any conditions as long as the notice periods were adhered to[817].

As regards the modification plans referred to in Point 41, several NRAs[818] had already (in 2011) obligated their SMP operators to provide information on any roll-outs of new infrastructures. Notification periods varied between 4 and 12 months.

Two major issues are not covered by the NGA Recommendation: how to deal with stranded assets and how should the costs of migration be split between the SMP operator and the access seeker? In 2011, BEREC found that in Austria costs were borne by the operator rolling out the NGA network and a compensation scheme for frustrated investments applies if full unbundling is no longer possible or feasible. Belgium has specified certain actions (e.g. the

[813] The NRAs from Austria, Belgium, Croatia, Denmark, Hungary, Italy, The Netherlands, Portugal, Romania, Slovenia, Spain.
[814] The Polish NRA did not allow any withdrawal of access to copper loops already granted but the SMP operator could decommission its MDFs with a notice period of 3 months in other cases.
[815] The NRAs from Belgium, Denmark, Hungary, Portugal, Spain
[816] From Belgium, Hungary and Portugal.
[817] BEREC (2011). *Next Generation Access – Collection of factual information and new issues of NGA roll-out*, BoR (11 (06) p. 14-15, quoted in BEREC (2011). *Report on the Implementation of the NGA-Recommendation*, BoR (11) 43, October 2011, p.75.
[818] The NRAs from Belgium, Denmark, Hungary [about to be notified at the time], Italy, Poland, Portugal, Romania, Spain.

deconnecting of ATM access) that are not billed when migrating from ATM to Ethernet bitstream products. Other countries did not yet have provisions concerning the costs of migration[819].

The findings by BEREC in 2011 show that several NRAs had not included specific obligations relating to migration in the remedies imposed on the SMP operator. The main reason was that, at the time, no decommissioning of copper networks was expected in the short term.

d. Commission's comments letters

The comments letters from the Commission in reply to Article 7 notifications relating to Market 3a/2014 (Market 4/2007) seldom refer to the provisions of the NGA related to migration. This may show that NRAs were generally complying with the guidance when notifying of draft remedies.

Among the few letters explicitly reviewing migration obligations imposed on SMP operators in the market, we can highlight the following cases:

- The comments letter of 3 May 2010 to the Czech NRA recalling "that migration from copper to fibre loops and the dismantling of exchanges substantially affects the business case for alternative operators" and inviting the NRA "either in its final measure or in a subsequent amendment, to develop further remedies specifying in detail the migration process (including detailed information to be provided by the SMP operator in advance concerning its network rollout plans, the conditions for closing down the exchanges, and the methods of collocation for LLU operators at the newly-built access points and/or the provision of appropriate backhaul facilities if necessary), in addition to the obligation of transparency"[820].
- In another letter of the same year issued to Slovenia, the Commission notes that the NRA had clarified "that the non-discrimination obligation would entail a duty to provide operators and [the NRA] with information on planned upgrades of its network. This includes the obligation to provide services of the same quality and to provide the same information to all the operators and to make publicly available a set of quality indicators. (…) In addition, the SMP operator should ensure upon reasonable request the transition from bitstream access to the unbundled local loop and the transition from copper to the optical loop and ensure that any de-commissioning of points of interconnection or of an individual copper loop will not take place before 5 years have elapsed since access was granted, unless an agreement between the operators is reached" [821].
- More recently, the Commission noted that the French NRA foresaw "the possibility to increase the price cap of the unbundling monthly fee, before the end of the period of validity of this decision, if Orange comes up with a detailed plan for the switch-off of its copper network. ARCEP explains that such a price increase would be used as an incentive for Orange to promote economic efficiency by avoiding the need to operate two parallel networks". The Commission recalled that "prices shall reflect costs and WACC shall reflect the costs of capital" and that "any potential price-change (before the end of the period for which the prices are set, i.e. for 2021-2023 and in general) shall be subject to a notification to the Commission and shall be justified by a fully-

[819] BoR (11) 06, p.15.
[820] Commission Decision of 3.05.2010 concerning Case CZ/2010/1070.
[821] Commission Decision of 22.12.2010 concerning Cases SI/2010/1158 and SI/2010/1159.

fledged analysis of underlying costs and of the impact of such change on competitive conditions"[822].

e. The current situation

The December 2019 BEREC internal workshop on 'Migration from legacy infrastructures to fibre-based networks' shows substantial differences between the remedies imposed across the EU, which may partly reflect the differences in the decommissioning plans of the various national SMP operators as well as the variation in the number of unbundled lines.

Table 32 below summarises the migration practices in the selected Member States as identified in the BEREC summary report.

Table 32. Migration practices by selected Member States

MS	Migration period	Replacement products	Information available for alternative network operators and end-users
EE	Unbundled loops to remain in place at least 6 months after notice	No special wholesale access product	No special information defined
IT	Switch-off prohibited before: 100% NGA coverage (incl. FWA if necessary) and 60% of NGA retail take-up Then LEX can be switched-off 12 to 24 months	VULA, bitstream and SLU SMP operator covers one-off wholesale costs of migration as well as additional costs for decommissioning co-location	SMP operators must inform access takers once a month
PT	5-year notice period for total switch-off 3-year notice period if fully equivalent WBA is provided	Nothing defined by the NRA yet. No wholesale access was provided at the 6 MDF that were switched-off.	Rules foreseen under 2017 market analysis
ES	5 years if ULL, 1 year if bitstream, 6 months if no wholesale. The incumbent may negotiate shorter periods with ULL operators. *[The 2020 draft market review published for consultation indicates that the NRA proposes to decrease to 2 years if ULL]*[823]	VULA or enhanced bitstream, there are no conditions or obligations regarding the migration costs.	The NRA publishes the list of exchanges in closing process on its website. The SMP operator provides information when notifying an exchange closure: date of closure and details about FTTH deployment in exchange (such as OLT locations, percentage of FTTH, homes passed)
SE	The SMP operator is obliged to inform co-localized operator 5 years before shutting down an MDF. The NRA proposes to shorten this period of time to 18 months.	Wholesale fibre access. If there is no fibre in an area the SMP operator normally offers end-users an FWA-solution which connects via the	The timing of the decommissioning of MDFs is made available on the SMP operator's homepage.

[822] Commission Comments of 4.12.2020 concerning Case FR/2020/2284.
[823] CNMC (2020) La CNMC lanza la consulta pública sobre la regulación de los mercados mayoristas de banda ancha. Available at: https://www.cnmc.es/novedades/2020-11-17-la-cnmc-lanza-la-consulta-publica-sobre-la-regulacion-de-los-mercados

MS	Migration period	Replacement products	Information available for alternative network operators and end-users
		SMP operator's LTE-network	

Source: BEREC (2019). BEREC summary report on the outcome of an internal workshop on "Migration from legacy infrastructures to fibre-based networks". BoR (19) 236.
Note: information in *italic* is own research, based on sources in the footnote(s).

Most of the NRAs responding to the survey question on following NGA Recommendation's guidance on migration indicated that they did not deviate from the recommended approach (15 out of 18 respondents to the relevant question). The measures advocated were generally not challenged, as confirmed by an NRA, which "used the NGA recommendation as a justification for imposing this. There was no negative feedback from the market players on this"[824].

Of the NRAs responding to the survey, 10 (out of 22) indicated that they monitor the migration from a main distribution frame (MDF) towards an Optical Distribution Frame (ODF) or towards active access at a higher level in the network (e.g. layer 2), while 12 NRAs responded that they do not. Likewise, 10 NRAs impose a requirement on the SMP operator to publish transparent transition timetables (some with penalties foreseen in case of delays), while 12 do not[825].

An overview of the data from the BEREC summary report (BoR (19) 236), online surveys, and the targeted consultation allowed for identifying the fact that variations mostly concerned the advance notice time, both generally and for specific circumstances, as well as the specific details of the obligations imposed.

Finding 49. The NGA Recommendation brought about uniformity in the overall approach to migration, but not in the details of its implementation. Variations may result from differences in the state of evolution of the networks from the regulated SMP operators in their respective Member States.

Ilsa Godlovitch et al. (2019) confirm that regulatory approaches "in France, Spain and Portugal mainly reflect the guidelines set out in the 2010 NGA Recommendation and 2013 Recommendation on cost methodologies and non-discrimination, and pursue a cautious and gradual approach, which may limit disruption for consumers and alternative operators (…)"[826].

However, migration from copper to fibre is not yet a live issue in all Member States because the extent of achieved FTTH deployment varies across the EU. The number of MDFs closed is, in some countries (EE, SE), already significantly high (e.g. EE 70%) and in other countries (IT and PT) is still low[827]. In Portugal and Hungary (by 2025), SMP operators plan to close all of their MDFs and in Italy most of the MDFs[828]. The SMP operator in Sweden plans to complete

[824] An NRA response to the online survey.
[825] Online survey data.
[826] WIK-Consult (2019). *Prospective competition and deregulation: An analysis of European approaches to regulating full fibre*, p. 27-28.
[827] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q34.
[828] Ibid.

its copper shut down by 2026.[829] By September 2020, 54% of copper exchanges had been switched off, the majority of which were rural.[830]

This different progress rate of FTTH deployment across the EU likely explains the divide in awareness regarding SMP operators' plans to decommission the copper network over the next 5-10 years. In the online survey, 11 NRAs indicated that they were not aware of such plans and 12 indicated that they were aware of them[831]. Only one NRA indicated setting a tentative deadline for a switch-off of the legacy network.

As a matter of fact, the pace of migration was much slower than anticipated at the time of the drafting of the 2010 NGA Recommendation. However, migration is now starting to pick up in those Member States and areas that are the most advanced in terms of VHCN deployment and we observe increasing attention to the issue of migration and a copper switch off[832].

Finding 50. Many NRAs say that they are not aware of the SMP operators' plans to decommission, partially or totally, the copper network over the next 5-10 years. This may suggest that in many Member States decommissioning is still not a topical issue. However, we observe increasing attention to the issue of migration and the copper switch off.

f. Different evolution stages of network development across the EU explain most of the divergence found

The lack of plans to decommission, partially or totally, the copper network over the next 5-10 years may reflect that many SMP operators do not see a need for a migration in the short term. Indeed, the operator survey has shown that some SMP operators express concerns regarding the demand for higher speed Internet connections as products providing an alternative to fibre (such as VDSL) can provide speeds that satisfy end-users' needs over the coming years[833]. The argument is that if the needs are satisfied there is no willingness to switch, especially if the customer has to bear the costs associated with it (e.g. a faster Internet plan costs more). The difference between the coverage of ultrafast broadband and the share of households that actually use it supports the views expressed regarding limited demand (see Box 13).

Box 13. Coverage of VHCN and ultrafast broadband take-up

According to the most recent DESI report (2020), there is a significant gap between VHCN coverage across the EU and the take-up of very high-speed broadband (100 Mbps and higher). While the average rate of VHCN coverage across the EU constitutes 44%; the take-up of high-speed broadband lies at merely 25.9%. Certainly, the terms VHCN and ultrafast broadband are not interchangeable (see Chapter 2 of the report), but the higher

[829] Telia (2021) *Telia Strategy Update*. Available at: https://www.teliacompany.com/globalassets/telia-company/documents/reports/2020/q4/210129-strategy-update.pdf, p. 48
[830] WIK-Consult (2020). *Copper switch-off, European experience and practical considerations*; and BoR (19) 236.
[831] Online survey data.
[832] See e.g. BEREC calls for fast fibre networks roll-out available at: https://advanced-television.com/2021/05/12/berec-calls-for-fast-fibre-networks-roll-out/ and FTTH Council Europe's position available at: https://www.ftthcouncil.eu/home/latest-news/new-study-on-copper-switch-off-shows-accelerated-migration-to-fibre-benefits-the-entire-economy-and-society?news_id=3865&back=/home/latest-news
[833] Online survey data

share of VHCN coverage than its uptake indicates that demand may be limited or has not yet caught up with the supply. The differences across countries further bolster this evidence. For example, while the VHCN coverage rate in Malta is 100% according to the DESI 2020 indicators, only 33.7% of Maltese households use access to the ultrafast broadband. Other similar examples include Denmark, Croatia, Bulgaria, Slovakia, Estonia, Slovenia, Finland, France, Poland, Lithuania, Latvia, Netherlands, Luxembourg, Spain, and Portugal. At the same time, there are also the three cases of Austria, Hungary and Sweden where the take-up rate of an ultrafast broadband is slightly higher than the VHCN coverage rate. However, the overall picture suggests that the higher rate of VHCN coverage does not necessarily mean a higher access rate ultrafast broadband, possibly indicating a lower demand than supply (or the demand may not yet have caught up with the supply).

Source: DESI (2020).

Ilsa Godlovitch and Peter Kroon[834] report that one of the factors supporting the migration process from copper to fibre in Spain identified by the NRA was that "customers have shown a demand and willingness to pay a premium for high value ultrafast broadband products that are often bundled with pay-TV alongside voice and mobile connections. Indeed, benchmarks suggest that prices for triple play bundles including ultrafast broadband in Spain are above the EU average. This has improved the business case for the deployment of FTTH".

Do the migration rules set by NRAs delay the replacement of copper networks by fibre networks?

When guiding the migration process in their countries, NRAs need to address numerous regulatory issues. BEREC identifies the following[835]:

- Deciding on the parts of the legacy access network to be decommissioned
- Migration framework
- Notice period and factors that affect it
- Information provision obligations on the SMP operator
- Duration of existing obligations
- NRA's procedure to establish migration rules
- Stakeholder involvement
- Regulatory treatment of migration costs
- Trial/test run with the operators
- Ensuring/monitoring the availability of alternative access products of a suitable quality

However, the Swedish NRA says that in their country migration has not been much of a problem. They only have two remedies in the SMP decision (obligation to give notice and to

[834] WIK-Consult (2020). *Copper switch-off, European experience and practical considerations*, p. 15.
[835] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q34.

offer co-location in fibre networks replacing previous copper networks). Rather than monitoring a copper shut-down, the Swedish NRA monitors a fibre roll-out[836].

g. The prior notice period in the absence of a commercial agreement

Under Point 39 NGA Recommendation SMP obligations – such as LLU and subloop unbundling – should continue unless agreement is reached on an appropriate migration path between the SMP operator and all access seekers using such products. Failing to reach such an agreement, NRAs should ensure that alternative operators are informed no less than 5 years (where appropriate considering national circumstances) before the de-commissioning of any points of interconnection. 5 years is advocated because it would correspond with the standard investment period for unbundling a local loop or local sub-loop. However, in cases where the SMP operator provided equivalent access at the MDF, the NRA could decide to set a shorter period of time[837].

Ilsa Godlovitch and Peter Kroon (2020)[838] provide an overview of the notice periods and associated wholesale obligations in the 10 countries covered by their analysis (see Table 33).

Table 33. Overview of the notice periods and associated wholesale obligations in 10 EU Member States.

MS	Notice period for exchange closure	Wholesaling obligations linked to exchange closure
Estonia	6 months	None, but fibre wholesale access is available under similar conditions to copper wholesale access
France	5 years – a shorter period may be requested for copper in "fibred" zones, but 5 years applies to the PSTN switch-off. *[In 2020, the NRA reduced the notice periods and introduced more differentiated notification periods for technical and commercial closure, see Chapter 10.9]*	Wholesale offers must allow altnets to replicate “in an equivalent manner” offers available on the copper network
Germany	1 year notice to withdraw LLU	Alternative wholesale offers must be made - in practice cabinet VULA, local bitstream
Italy	3 years if no LLU, 5 years if LLU - can be reduced to 3 if suitable wholesale	Technically and economically equivalent VULA guaranteed for 2 years after switch-off
Netherlands	Before: 3 years notice before end of life and 1 if suitable wholesale replacement. IN March 2020 nullification of NRA regulation due to incomplete evidence of joint market power KPN and VodafoneZiggo	Unbundled FTTH, VULA FTTH or WBA FTTH - KPN must offer different price model if scale is obstacle for access seekers
Poland	12 months	No specific wholesale requirements
Portugal	5 years or 3 if equivalent wholesale	Products "equivalent" to copper wholesale
Spain	5 years (LLU), 1 year (no LLU) *[The 2020 draft market review published*	Exchange can only be closed when > 25% of customers are connected by alternative means

[836] Case study interviews.
[837] Recital 40 NGA Reccomendation.
[838] WIK-Consult (2020). *Copper switch-off, European experience and practical considerations*, p. 41.

MS	Notice period for exchange closure	Wholesaling obligations linked to exchange closure
	for consultation envisages to reduce the notice period to 2 years for MDFs where ULL is used][839]	(e.g. fibre). If there are alternative operators unbundling the loop, Telefónica must continue to provide this wholesale service for 5 years, with 6 months' notice. If there are no alternative operators in the plant, the guarantee period is reduced to 1 year with 6 months' notice.
Sweden	5 years for exchanges with co-located operators, but commercial agreements made with 18-month notice. *[In 2020 the 5-year period was shortened to 18 months]*[840]	No specific wholesale requirements
United Kingdom	No established rules	No established rules, but WLR obligation in place until 2020

Source: WIK-Consult (2020). Copper switch-off, European experience and practical considerations, p. 41.
Note: the update in *italic* is own research, based on sources in the footnote(s).

Ilsa Godlovitch and Peter Kroon note that "whereas the conditions in Estonia and Poland are relatively light (6 and 12 months respectively) with no specific associated wholesale requirements, much longer periods have been applied in many other countries".

The notice time set by NRAs has been pointed out by some NRAs and operators (mainly having a SMP in specific markets) as a factor in delaying the replacement of copper networks by more energy-efficient fibre networks, as it increases the cost of replacement. For example, the obligation to operate copper and fibre networks in parallel because access seekers use unbundled copper lines in the former, increases costs for the SMP operator concerned. As ETNO puts it in its response to the targeted consultation, "the cost of parallel exploitation of the new networks should be taken into account in order to allow cost recovery. This assessment will be very relevant in the last phases of the copper decommission, where the huge technical and economic effort needs to be encompassed by a softer approach and increased flexibility in the terms agreed with NRAs"[841]. This sentiment is further supported by FTTH Council Europe, adding a point on environmental externality: "Obliging the sector to maintain two networks, particularly when that legacy network has a much larger carbon footprint makes no sense. The priority must be to ensure a rapid shut down of the copper infrastructure"[842].

Several operators argued for a shorter notification period. For example, in the targeted consultation, Deutsche Telekom argued for a more accelerated notification of three years in Greece, less than the current five years in Croatia (unless all involved operators agree), and less than 1 year in Slovakia if agreement with wholesale partners is reached[843]. According to Telefonica, "shorter notice periods ease overall framework certainties while increasing economic viability for VHCN for those remote and sparse regions", which also suggests that notice periods could be modified based on switches' size (smaller switches meaning shorter periods)[844]. Moreover, implementation of long-term plans (e.g. five-years notification period)

[839] CNMC (2020) La CNMC lanza la consulta pública sobre la regulación de los mercados mayoristas de banda ancha. Available at: https://www.cnmc.es/novedades/2020-11-17-la-cnmc-lanza-la-consulta-publica-sobre-la-regulacion-de-los-mercados
[840] PTS Decision 15-7200 of 08 June 2020.
[841] ETNO response to the Targeted Consultation, Q34.
[842] FTTH Council response to the Targeted Consultation, Q37.
[843] Deutsche Telekom response to the Targeted Consultation, Q34.
[844] Telefonica response to the Targeted Consultation, Q34.

can also be affected by such shocks as Covid-19, for example, due to its effects on the workforce[845].

On the other hand, a French operator warns that the notice periods decided by the French NRA (e.g. two months for residential access and six months for companies' access) may be incompatible with the duration of commitments made by alternative operators in the framework of offer in response to calls for tenders. The EECC does not provide alternative operators the right to terminate end-users contracts (the ones that could not be migrated at the end of the notice period for the technical shutdown). This brings insecurity with regard to operators' access obligations, contractual obligations with their end-users, European and national consumer rules they have to observe[846].

Moreover, an operator pleads for consistency between a copper switch-off and a PSTN switch off. Alternative operators need to avoid double-migrations of customers a first time on the PSTN (PSTN migration to Total Unbundling if fiber is absent) and then with the end of copper a second migration towards FTTH[847].

Box 14. Country-specific issues related to the notice period

A number of issues reported relate to how the notification period requirement is organised in specific Member States:

- An SMP operator pe identified a challenge where the civil engineering of an electricity distributor is used, the operator itself receives a shorter notice and cannot comply with the requirement set by the regulator[848].
- Deutsche Telekom noted that in Slovakia the minimum period of 12 months is too long, when an agreement is made with the alternative operator on a shorter period[849].

Source: Online survey and Targeted Consultation data.

More NRAs agreed (13) than disagreed (8) with the position that a five-year period, set as the notification period by default in the NGA, should be shortened[850]. Among the latter, an NRA argued that since all alternative operators use ULL to reach most of their retail customers, in cases of a simultaneous switch-off from multiple LEXs, the 5-year period may even be short enough to enable alternative operators to migrate their entire subscriber base to other wholesale products or to deploy networks, while another NRA recalls that the 5 year period corresponds to the time needed to depreciate the access seeker's equipment. Yet another NRA considers the default period of 5 years reasonable since the NGA Recommendation allows them to set shorter periods when justified by the circumstances[851].

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[845] Ibid.
[846] Case study interviews.
[847] Case study interviews.
[848] An operator's response to the online survey. The operator also notes that "migration to fibre in these areas is forced, cannot comply with the notification period, and in many cases, is unsuccessful - there is no business case to redeploy fibre and we are forced to abandon the services entirely".
[849] Deutsche Telekom response to the Targeted Consultation, Q34.
[850] Online survey data.
[851] Online survey data.

At the same time, the views of the respective NRAs are conditioned by the specific national market structure in their jurisdiction. Protecting a competitive market in some Member States does not require such a long switch-off period (e.g. in the online survey response, an NRA noted that there is no need to use a five year period, because "operators use their own infrastructure or bitstream central access. Migration from copper to fibre and the potential decommission of copper network or exchanges would affect a small part of the market"[852]). ETNO also notices the need for flexibility in the approach, as "inflexible deadlines for prior notice for decommissioning included in Recital 39 of the NGA Recommendation are no longer appropriate in view of the principles established Art. 81 of the EECC"[853]. Moreover, where not ULL but bitstream products are used, the sunk costs of the access seekers (equipment, connection costs to points of handover etc) may be lower and mostly already depreciated.

BEREC justifies the different notice periods set by NRAs across the EU therefore because of differences between the various Member State as to whether and which (i) type of wholesale access product (e.g. ULL, bitstream) based on the legacy copper infrastructure is used by access seekers and therefore needs to be replaced at the respective MDF location, (ii) the wholesale access products to which the access seekers can migrate are e.g. ducts, unbundled fibre, shared fibre, VULA and bitstream[854].

But sunk costs are only a part of the migration cost. Migration requires investment in new equipment – including in some cases a customer's equipment – as well as ensuring access to new points of hand-over. Not surprisingly, alternative operators plead for a cautious approach to the transition. In ECTA's view, the French[855], Italian, UK and Greek approaches managed to balance new network deployment, access and take-up, while also ensuring that a copper local loop remains where it is relevant[856].

Finding 51. The 5 year default notice period set in Point 39 NGA Recommendation no longer seem to correspond with the periods set by most NRAs. Several stakeholders consider that the notice period should be reconsidered.

h. Alternative products of at least comparable quality providing access to the upgraded network infrastructure

The NGA Recommendation does not provide specific guidance on the characteristics of the new NGA access products that could replace the copper generation access products. How should NRAs ensure that the new products provide the same quality of services as the legacy products do, so that the migration itself does not lead to a deterioration of services?

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[852] An NRA response to the online survey.
[853] ETNO response to the Targeted Consultation, Q34.
[854] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q34.
[855] Before the latest market review. Since the 2014 market review, the SMP operator was required to use a 5-year prior notice approach for its plan to switch off the PSTN network. However, in 2020 this notice period was reduced to an 18 or 36-month notification period for residential products and a 36-month notification period for business products, except in areas where the 4 main commercial operators are yet present on the FTTH network. In those areas, the SMP operator may proceed to the commercial closure of the corresponding copper lines with a 2-month notification period for residential products and a 6-month notification period for business products (see Commission Comments in Case FR/2020/2284, p.6).
[856] ECTA response to the Targeted Consultation, Q34.

Access seekers consider that the same quality goes beyond downloading and uploading speeds and that QoS guarantees must also encompass other parameters (e.g. "delay parameters on Ethernet compared to SDH on data transport")[857]. From the perspective of alternative operators, it is important that the new SLAs/SLGs are not inferior to those that were used for the legacy network, as ECTA notes in its response to the targeted consultation[858]. Moreover, "specific attention is needed to SMP operators' planned and effective performance in terms of quality and related KPIs and penalties for non-compliance, which need to be genuinely dissuasive of discrimination and poor general performance."[859]

ETNO acknowledges the need to update the SLAs and KPIs to reflect the phasing out[860].

BEREC[861] recommends that before the migration process starts, a wholesale service substitution matrix identifying each wholesale legacy service (such as LLU, Shared Access, analogue leased lines and DSL copper bitstream, etc.) and corresponding wholesale fibre-based NGA service be drawn to provide transparency and predictability to the market players. This matrix should enable access seekers to evaluate those access products deemed to be similar, consider the structure of different access levels and the corresponding additional costs related to the handover of traffic in order to be in a position to choose the most adequate mix of new access products so that their business would not be adversely affected. Indeed, several products will not be replicable on the new network and should be substituted following the wholesale matrix or by means of different services that cannot be directly compared with the original services in terms of specific parameters. To define the wholesale substitution matrix, not only the wholesale services and related parameters should be considered but also its impact at the retail level of the migration.

BEREC lists[862] the following parameters as possibly relevant:

- Down and upstream bandwidth speeds
- SLG/SLA parameters and KPIs such as provisioning time, service availability and repair time[863]
- The details of operational processes in the reference offers concerned, e. g. elements referred to migration from legacy products and infrastructure
- Locations of Points of Handover (PoHs) of the new services

The French NRA added to the requirement that the replacement product must offer functional and proven technical and economic conditions of access conditions that would allow third party

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[857] Deutsche Telekom response to the Targeted Consultation, Q35.
[858] ECTA response to the Targeted Consultation, Q34: "It is also decisive to ensure that SLAs/SLGs for FttH-based networks are not inferior to those for copper local loop unbundling, in terms of the general activation and repair processes and times, as well as regarding improved SLAs/SLGs that are relevant to serve business customer sites (e.g. smaller sites of larger organisations) and smaller sites of socio-economic drivers such as schools and hospitals, where dedicated connectivity would be too pricey".
[859] ECTA response to the Targeted Consultation, Q35.
[860] ETNO response to the Targeted Consultation, Q34.
[861] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q35.
[862] Idem, Q35.
[863] BEREC provides the example of Layer 2 wholesale access products on market 4/2014 (now 2/2020 that are used for retail business services. In that case, relevant QoS parameters apart from the bandwidth are Frame Loss Ratio, Frame Delay and Frame Delay Variation and regarding SLAs provisioning time, service availability and repair time. BoR (20) 169, p.54.

operators to replicate sufficiently closely the main offers that they provided over the copper local loop and circumstances that suggest that this is the case in practice over the whole area for which the offer is proposed. These criteria are that:

- At least two commercial operators distinct from the infrastructure operator making use of the product
- The number of active accesses based on the product (excluding the infrastructure operator) amounts to at least 10,000 lines or 10% of the lines concerned
- At least one retail fibre-to-the-home offer is available to all connectable premises in the area[864].

The French NRA's approach seems to correspond to the one advocated by Deutsche Telekom[865], i.e. that when "the regulated company retires its legacy retail products and introduces succession products, it should be ensured that the assessment of the comparability of the products is based on the new retail offers of the SMP operator" and not on parameters that the new infrastructure and technology cannot replicate.

The French NRA's approach would also match the approach advocated by the FTTH Council Europe, in that it notes that "the absence of electric power and the need to switch to batteries should not be considered"[866] when assessing the comparability of the replacement product with the previous access product. Indeed, "the fact that the copper telecom network is powered has allowed a variety of services and applications to 'piggyback' on that power source" (e.g. house alarms and security cameras). However, fibre networks are not powered and thus cannot provide access products capable of enabling the continuation of such derived applications that should switch to batteries.

Successor products are nevertheless susceptible to having a negative impact on investment incentives. For example, in Sweden, where the SMP operator offers fixed wireless access (FWA) as an alternative access product to copper, other stakeholders express concerns because these alternative products are also made available to users connected to fibre networks. In their view, such approach facilitating fixed-mobile substitution limits the incentives for further fibre roll-out, notably in areas where state aid is available for fibre deployment.[867]

Moreover, an adequate monitoring framework is needed (also to ensure that the new products provide at least a comparable quality of service). In the case of comparable quality, NRAs see the following possible stakeholders engaged in this process[868]:

- 17 NRAs agreed that NRAs should be involved
- 14 NRAs agreed that SMP operators under NRA's control should be involved
- 14 NRAs agreed that access seekers should be involved
- 8 NRAs agreed that operators of the new network should be involved.

As regards the implementation of the migration itself, the French NRA plans to closely monitor the decommissioning, to monitor that the SMP operator does not favour commercial closures

[864] Decision no. 2020-1446 of 15 December 2020 portant sur la définition du marché pertinent de fourniture en gros d'accès local en position déterminée, sur la désignation d'un opérateur exerçant une influence significative sur ce marché et sur les obligations imposées à cet opérateur à ce titre, p.168.
[865] Targeted Consultation, Summary of answers, p.2, Point 5.
[866] FTTH Council response to the Targeted Consultation, Q35.
[867] Case study interviews.
[868] Online survey data, N = 23.

in areas where it has already completed its own fibre coverage (as opposed to a competitor's). The NRA requested the SMP operator to provide comprehensive data showing the status of fibre access points and copper exchanges: closure status, fibre coverage of the area and the availability of retail services over fibre.

In order to foster end-user interests, postponement to the date decided for decommissioning of the network may in some cases be appropriate to guarantee service to older end-users or people with disabilities until alternative products have been made available[869]. In Sweden, there are households and companies where the copper network has been closed down despite the fact that no alternative solutions had been offered. The Swedish NRA has no power to prevent the SMP operator from closing parts of its copper network in rural areas[870].

i. Regulatory incentives to facilitate migration from copper to VHCN

In countries in which FTTH deployment has become more widespread, there is a clear economic case to move towards a copper switch-off to minimise duplicate network costs and to improve the business case for a VHCN. The following three regulatory tools were mentioned:

a) Setting mandatory deadlines for the (partial) switch-off of the legacy network

b) Changing legacy wholesale access prices

c) Ending the obligation imposed on the SMP operator to provide wholesale access to its legacy network in the future

However, besides the question of the effectiveness of these tools, another issue that NRAs need to consider is the likely impact of the treatment of alternative operators relying on LLU at copper exchanges which are due to be closed, as well as how to handle the switch-off of legacy analogue equipment that may be in use – especially for businesses.

a) Setting mandatory deadlines for the (partial) switch-off

There are also suggestions that once certain predefined fibre coverage is reached, NRAs should give a reasonable date for switching off the remaining legacy network[871]. Wholesale access over copper and over fibre are increasingly susceptible to constitute distinct product markets[872]. In the view of some stakeholders (e.g. Orange[873]), this could mean that the copper market may be deregulated.

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[869] Case study interviews.
[870] Case study interviews.
[871] An operator's response to the online survey.
[872] "(…) the entry of firms building their own FTTH networks and the emergence of HFC cable as a powerful network competitor to the existing copper network have invariably increased network competition in the relevant market (all else the same). If, however the existing copper network (even if upgraded) no longer constrains these alternative networks and has to be excluded from the analysis, competition in a new market for very high-capacity services would be confined to FTTH and HFC Cable networks" (Feasey & Cave (2017), *Policy towards competition in high-speed broadband in Europe, in an age of vertical and horizontal integration and oligopolies*, CERRE, 20 February 2017, p.45). In its comments of 6 December 2019 in Case SE/2019/2217, the Commission urged the NRA, should the [copper] market continue to shrink at the past rates (…) to revisit its finding of SMP, also taking into account, if relevant, mobile broadband, and to deregulate the market ahead of the end of the standard review period".
[873] Orange response to the Targeted Consultation, Q37.

A delaying factor is that there is cost to provide low end services (e.g. basic universal service products) on fibre and the risk that customers would turn from the SMP operator because they do not want the intrusive work required to introduce fibre taking place inside of their homes, particularly in the presence of cable competition that requires less intrusive upgrading work[874]. Eventually, mobile networks can be used for replacing low-end services and to comply with universal service obligations. For this reason, BEREC considers that hard-set deadlines for migration could achieve the objective but says that a gradual migration will ensure more stability in the market[875].

Finding 52. There is little support for NRAs setting mandatory deadlines for a (partial) switch-off from legacy networks to foster migration to newly built fibre networks.

b) Changing legacy wholesale access prices

As an incentive for the SMP operator to swich off copper exchanges, the French NRA foresees the possibility[876] to increase the price cap of the unbundling monthly fee where the SMP operator comes up with a detailed plan for the switch-off of its copper network[877].

In the UK, the NRA has decided to remove price controls[878] on LLU from June 2023 onwards in areas where FTTH was completed and within a minimum of two years from the stop sell (see Point c) below)[879], which will likely lead to price increases.

While the positions differ, a changing legacy access price is seen as a potential means of affecting the migration process. However, while some stakeholders expressed their opinions that fibre deployment by alternative operators would incentivise the SMP operator to respond by migrating to fibre, others are not so sure. The NRA survey showed that more NRAs (12) consider this not to be true as opposed to those who agreed with such a statement (10)[880]. The Polish NRA suggests an alternative: that an SMP operator can be given incentives to migrate from increased WACC for services delivered through a fibre infrastructure[881].

Looking from the incentives' perspective, variations of the copper unbundling price can bring about either positive or negative effects. In principle, both a price increase and a price decrease

[874] Cable operators can continue using in-house coaxial cabling, when deploying FTTfd (Fibre To The Front Door), which enable services of a quality similar to FTTH – and will also continue using Eurodocsis to avoid replacement of active equipment (named H-PON, Hybrid PON).
[875] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q37.
[876] In the 2019 public consultation, the NRA suggested that either the SMP would be subject to a "non-excessive" pricing obligation or defining price caps which could be expressed in dependence of cost-based calculations in form of mark-ups. In addition, a maximum yearly increase percentage of LLU fees would be implemented.
[877] Decision n° 2020 1446 of 15 December 2020 states however that the NRA " ne dispose toutefois pas à ce stade d'éléments permettant de démontrer l'efficacité d'une éventuelle modulation géographique du tarif pour inciter à une migration vers la fibre ou au vidage du réseau cuivre. La migration du cuivre vers la fibre optique accélère98 alors même que le tarif du dégroupage n'a subi ces dernières années que des variations modérées. (…) Néanmoins, l'Autorité se réserve la possibilité de reconsidérer sa position, y compris au cours du cycle d'analyse de marché, si la situation venait à évoluer ou en cas d'obtention de nouveaux éléments à ce sujet."
[878] Except where FTTP is not available.
[879] OFCOM, Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26, Volume 1: Overview, summary and structure, 18 March 2021, p.18.
[880] Online survey data (answers to question "In case VHCN network(s) are deployed by alternative operator(s) but not by the SMP operator in a given area, do you consider that the SMP operator would have the incentive to plan the switch off of its copper network in that area?")
[881] UKE response to the Targeted Consultation, Q37.

could provide incentives to speed up migration, according to the French Competition Authority[882]:

- A higher copper unbundling price would discourage access seekers from using legacy networks and promote switching to fibre to avoid higher retail prices when copper is used.
- On the other hand, maintaining the current or lowering the copper unbundling price could decrease SMP operators' incentives to maintain the copper line QoS affected by commercial closures, encouraging alternative operators to switch their customers to fibre in order to ensure that service for their customers does not deteriorate.

However, the French Competition Authority, while maintaining the need for a careful analysis of reasons why the "supply and demand in retail markets are not switching to fibre in some cases", expresses doubts about the first alternative because access seekers do not necessarily control the rate of switchover by their customers, some of whom have been reluctant to accept the fibre installation work. In the event of an increase in copper tariffs, a temporary rent will be granted to the SMP operator.

Conversely, Open Fiber supports a price increase of the legacy products at a wholesale level. Such increase "should lead to an increase of retail legacy prices and make the migration economically interesting for all of the operators"[883]. Similarly, EIR points out that low prices of access to a legacy infrastructure do not encourage alternative operators to invest in a new infrastructure, thus reducing the need for the incumbent operator to invest in response[884] and KPN notes the same incentive[885]. On the other hand, Iliad argues that the lower price of copper would provide incentives for the SMP operator to migrate[886], and ECTA considers that higher copper prices would distort incentives as "SMP operators are unjustifiably rewarded with windfall profits on assets that are long sunk […], while alternative operators' ability to serve and increase their customer base and either plan their migration or invest in their own fibre networks is severely diminished"[887].

According to Cadman (e.g. 2019)[888], wholesale price setting for legacy networks can impact investment behaviours by incumbents and alternative operators offering legacy network retail services through unbundling, bitstream or re-sale. The relationship between legacy wholesale prices and incentives to invest in VHCN (or NGA) are the subject of several academic papers examining the impact and likelihood of different operator types investing in NGA or VHCN), of which two are quoted:

First, Hellwig (2014), who concludes that "a low access price on the old network leading to a low retail price makes consumers less willing to switch to the new network, hampering investment. A high access price for the old network (relative to retail prices) aimed at incentivising entrants to invest in new infrastructure can disincentivise incumbents to invest

[882] Quoted by Iliad in its response to the Targeted Consultation, Q37.
[883] Open Fiber response to the Targeted Consultation, Q37.
[884] EIR response to the Targeted Consultation, Q37.
[885] KPN response to the Targeted Consultation, Q37.
[886] Iliad response to the Targeted Consultation, Q37.
[887] ECTA response to the Targeted Consultation, Q37.
[888] *Study on the determinants of investment in VHCN – a System Dynamics approach: Volume 2: Literature Review*, November 2019, p.24.

due to lost wholesale revenue for the old network and fear of triggering investment by entrants. Relative access pricing for the new network must also be carefully considered:

"…a low access price [for the new infrastructure relative to the old infrastructure] could hamper investment as firms then find access-seeking more attractive and the potential first mover would accordingly invest less" (p.69)

Second, Cave (2014), who summarises the effect of copper unbundling on fibre investment:

"Clearly, unbundling which forces down the price of copper broadband is likely to have a restraining effect on fibre investment, by reducing the price of current generation broadband and thus the price which owners of fibre networks can charge. However (…) copper access decisions are mostly irreversible by now: policy makers and regulators must now lie upon whatever unbundled copper bed they have made." (p. 679)

Cadman (e.a. 2019)[889] , summarizes key points from academic literature investigating the impact of the pricing of access to the copper local loop on incentives to deploy FTTH as follows:

- "Low wholesale legacy prices incentivise incumbents to invest due to low opportunity cost – low legacy wholesale prices relative to costs create a low profit margin for the incumbent operator, so the opportunity cost from lost NPV value for the legacy network is lower, reducing the threshold that the VHCN NPV must exceed.
- Low wholesale legacy prices disincentivise alternative operators from investing due to high opportunity cost – low legacy wholesale prices relative to retail prices creates a higher profit margin for alternative operators retailing legacy broadband using the incumbent's legacy network, so the opportunity cost from lost NPV value for the legacy network is higher, creating a higher threshold that the VHCN NPV must exceed. This is termed the "replacement effect" by Bourreau, Cambini & Doğan (2012). In efficient markets it would be expected that high profit margins would attract more retail operators and so over time competition would cause retail prices and margins to be squeezed.
- High wholesale legacy prices incentivise alternative operators to investing due to the low opportunity cost – high legacy wholesale prices relative to retail prices offer a lower profit margin for alternative operators retailing legacy broadband using the incumbent's legacy network so that the opportunity cost from lost NPV value for the legacy network is lower, lowering the threshold that the VHCN NPV must exceed.
- High wholesale legacy prices disincentivise incumbents to invest due to high opportunity cost – high legacy wholesale prices relative to costs create a high profit margin for the incumbent operator from the legacy network wholesale, so the opportunity cost from lost NPV value for the legacy network is higher, raising the threshold that the VHCN NPV must exceed. Bourreau, Cambini & Doğan (2012), term this the "wholesale revenue effect". Further, they point out that the incumbent risks triggering alternative operators to build their own VHCN in retaliation, losing wholesale revenue for the incumbent for both its old and new networks.
- Low legacy wholesale prices restrict VHCN prices – Bourreau, Cambini & Doğan (2012), argue that low legacy wholesale prices lead to low retail prices for legacy broadband, which in turn will restrict VHCN retail prices since operators must offer low VHCN prices to encourage consumers to switch. They term this the "migration effect".

[889] *Study on the determinants of investment in VHCN – a System Dynamics approach: Volume 1: Technical Report*, November 2019, p. 68-69.

As discussed in section 7.9.7.3, even without formal VHCN price regulation, there can be an informal anchor pricing impact from legacy network prices at least during the transition period where operators are looking to persuade consumers to switch to the VHCN."

Similarly, Ilsa Godlovitch et al (2019)[890] report that "it has been acknowledged that pricing copper in a manner that purely reflects consumer welfare in copper-based retail services, could have a negative impact on FTTH investment and migration. More specifically, if the FTTH retail price is constrained by a low copper wholesale charge, this may limit the viable scope of deployment, while if FTTH wholesale and/or retail charges are set significantly above those charged for copper, this may impact alternative operators' incentives to invest in FTTH (rather than relying on access to the cheaper legacy infrastructure) and retail customers' incentives to migrate to the more modern technology".

However, these findings as such cannot be extrapolated to estimate the possible impact of the granting of pricing flexibility for ULL access and/or increases of its pricing once fibre is already rolled out. Indeed, while the mentioned literature relates to the impact of the relative prices of copper and fibre at the moment when the decision to invest or not is taken, the question today is whether the relative prices of copper and fibre will have an impact on the pace of the migration after the end of the deployment and on when running parallel networks can be ended and, in the relevant case, how substantial the impact could be.

Examining the latter question, Karl-Heinz Neumann e.a. (2020)[891], stressed nonetheless the „limits of provoking end customer and market participants' reactions by pricing and therefore steer the desired outcome. As experience shows, user behaviour is far more complex than being able to be steered by one parameter. (…) Customers with high bandwidth preferences will rather - independently of the retail prices - switch to fibre as soon as it is available, given their higher willingness to pay for high bandwidth. Experience shows that about 1/3 will remain unaffected by pricing due to a reluctance for opening their in-house cabling to be replaced by fibre, which might also be reasoned by legal causes. Just like there is a group of high bandwidth affine users, there will remain a group of subscribers without the need to upgrade a telephony only- or a narrow band subscription. By 2018, the share of narrow band subscribers in France was still 25 %, with a good share within these number of customers that have technical access to higher bandwidths".

Ilsa Godlovitch and Peter Kroon (2020)[892], acknowledge that reluctance from end-users to switch can be a "significant barrier to achieving migration from copper to fibre. Switching barriers for customers can be affected by:

- Relative pricing of ADSL/FTTC products in comparison with FTTH/B
- Satisfaction with ADSL-based offers (thereby seeing limited value in upgrading)
- Practical difficulties associated with switching from one product to another or from one platform to another
- Legacy equipment which is not supported by an IP-based communications infrastructure.

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[890] WIK-Consult (2019). *Prospective competition and deregulation: An analysis of European approaches to regulating full fibre*, p. 27.
[891] WIK-Consult (2020). *Copper switch-off, fibre take-up and ULL tariffs in France*, p.96.
[892] WIK-Consult (2020). *Copper switch-off, European experience and practical considerations*, p. 37.

Interviews conducted in the context of their study suggest that "in France, customers are reluctant to migrate to fibre-based services due to the high quality of the DSL network and lower prices compared to fibre-based broadband. In other words, there was a perceived lack of imperative to switch. The intervention of a technician in the home was also not always welcome. In Spain, making contact with owners of second homes and holiday residences was considered a challenge by interviewees. (…) Interviewees in nearly all countries agreed that business customers could often be more challenging to migrate than residential customers due to the extensive use by some businesses of legacy equipment such as PABX and ISDN connections, which in many cases are also still the basis for their internal corporate network and call centres".

Moreover, access seekers will be reluctant to pass on possible price increases to their retail customers since under Art. 105.4 EECC, the latter would then have the right to terminate their contract without incurring any further costs. Such a right to cancel the contract is only not granted when the change of contractual conditions is directly imposed by national law, which would not be the case.

Finding 53. Views are divided on whether departing from the principle of cost orientation to set access prices to legacy networks would be susceptible to hasten migration to fibre networks. In any case, pricing alone is not the just means to achieve an efficient fibre migration.

Ilsa Godlovitch and Peter Kroon (2020)[893] therefore draw attention to the demand side and point to the likely contribution of the setting by the operators of retail prices considering the fact that the "similarity of pricing between ADSL 20Mbit/s offers and services offering 100Mbit/s or more in France should also support migration, while in Spain copper-based retail offers are no longer actively marketed at all in areas served with fibre".

c) Ending the obligation imposed on the SMP operator to provide wholesale access to its legacy network for the future

In France, the NRA distinguishes technical closure of the copper local loop (which corresponds to the definitive interruption of services) from commercial closure of the copper local loop (which corresponds to the moment when Orange stops selling products based on the copper local loop)[894].

For the commercial closure, ARCEP distinguishes two cases:

- If all national commercial operators are already connected to the fibre local loop, then Orange can proceed to a quick commercial closure at the level of the fibre mutualisation point with a 2-month notification period for mass-market products and 6-month notification period for business market products if certain conditions are met[895].

[893] WIK-Consult (2020). *Copper switch-off, European experience and practical considerations*, p. 39.
[894] Commission Comments of 26.112020 concerning Cases FR/2020/2277-2278-2279-2280
[895] (i)All the main FTTH commercial operators must be present at the concerned mutualisation point at the time of the notification.
(ii) At least one activated offer based on FTTH must be available to serve business needs.
(iii) At least one high-quality passive access offer based on fibre must be available under technical and pricing conditions comparable to SDSL offers – for instance FTTH-based access with improved QoS.
(iv) At least one FTTH-based high quality activated offer must be available under similar conditions as in (iii).

- If some of these commercial operators are not present at the mutualisation points of the local loop, then the SMP operator can only proceed to the commercial closure with an 18-month notification period for mass-market products in less dense areas of private initiative (ZMD-AMII), a 36-month notification period for mass-market products in the rest of the territory, and a 36-month notification period for products serving business customers[896]. These periods may be shortened once Orange presents a concrete switch-off plan.

In the UK, the NRA has authorised[897] an SMP operator, where the latter has covered 75% of premises connected to a copper exchange with fibre connections from June 2021 onwards, to stop selling copper services when a customer moves premises, changes service or switches provider (the "stop sell").

Some SMP operators support such a "stop sell" approach (see Box 15).

Box 15. Approach advocated by the Belgian SMP operator Proximus

Regarding costs, Proximus provides an elaborate assessment (in response to the online survey) that it uses a two-factor approach to help minimise costs (including of networks run in parallel):

1. Initially, the operator identifies a broad set of operational processes for ensuring a gradual transition for all clients on the copper network. This includes sending notices explaining the advantages and a clear timeline of ceasing of services.

2. During the transition period (when both copper and fibre networks are in place), it is necessary that the SMP operator is allowed to connect new retail and wholesale clients exclusively on the new network, stopping the orders of old copper products, which will be phased out soon due to migration.

Source: Online survey data.

d) Other factors delaying migration

An Italian operator[898] alleges that the NRA delays migration because it does not allow the SMP operator to notify the switch-off until the area is fully NGA covered and 60% of end customers has migrated to NGA accesses and that the SMP operator must notify the switch-off 12 (for non-LLU central offices), 18 (for LLU central offices) or 24 months (for central offices in the areas where a public NGA network will be deployed by a concessionaire different from TIM)

[896] At the end the notification period, the following criteria must be met:
i. At least one FTTH local loop is deployed and able to fully serve the area concerned by the commercial closure.
ii. The fibre local loop(s) in the area must offer access under technical and commercial conditions that allow access seekers to reproduce sufficiently closely their offer on copper, for instance with the presence of at least two commercial operators on top of the infrastructure operator and a number of active lines (on top of the infrastructure operator's) of at least 10 thousand or 10% of the lines concerned by the access offer.
iii. At least one FTTH-based retail offer is available for all locals in the area.
iv. At least one activated offer based on FTTH must be available to serve business needs.
[897] OFCOM, Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26, Volume 1: Overview, summary and structure, 18 March 2021, p.17.
[898] TIM response to the Targeted Consultation, Q34.

before the start of the technical migration process. Moreover, only the SMP operator bears the cost of migration.

Ilsa Godlovitch and Peter Kroon (2020)[899] acknowledge that such obligations could "be a hurdle for network operators to switch-off their copper networks". Moreover, they advocate that migration could be implemented even if not all subscribers can be migrated to FTTH in the area concerned. They refer to the approach in Estonia, which is a frontrunner as regards migration, where "the copper subscriber access lines will be replaced by access lines based on a mixture of fibre (50%), Fibre to the Curb (FTTC) in combination with G.fast (40%) and Fixed Wireless Access (10%)"[900].

An SMP operator claims that the migration process is delayed due to end-user protection under the EECC, such as the possibility to end the contract following its change, and due to the cost and time required to exchange all end user modems[901].

Other concerns expressed

A concern raised by stakeholders active in several countries relate to the transparency of the migration process and prevention of discrimination/anti-competitive behaviour. An example of such behaviour could be the self-supply of copper local access by the SMP operator if it is not available to access seekers. ECTA notes the examples of "for elevators, industrial machines, backup lines or mobile backhaul"[902] that could be susceptible to such behaviour.

Finding 54. Several comments suggest the need for a clear monitoring system to ensure that the migration process is non-discriminatory, as there are concerns that SMP operators could use a copper switch-off to gain competitive advantage.

Moreover, several comments advocate an inclusive process during which the different stakeholders participate. Since their positions and incentives are likely to diverge, a joint process to identify the way forward would benefit in ensuring a more rapid migration from copper to fibre, while also ensuring a non-discriminatory approach.

[899] WIK-Consult (2020). *Copper switch-off, European experience and practical considerations*, p. 42-43.
[900] Idem, p. 12.
[901] An operator's response to the online survey.
[902] ECTA response to the Targeted Consultation, Q34.

PART III: FORWARD LOOKING ANALYSIS

11. A suggested way forward

A successor to the two Recommendations is called for in order to take subsequent market, legal and regulatory developments into account. Overall, our results suggest that many aspects of the current Access Recommendations remain fit for purpose, but with further refinement needed.

All of our forward-looking recommendations must be understood in conjunction with the ongoing evolution of:

- Overall EU policy goals as regards the digitalisation of the EU as a whole
- The changes in focus embodied in the EECC itself in comparison to the previous RFEC
- Changes that are already visible in electronic communications markets in the EU Member States, including changes that are visible since 2018 when the EECC was enacted

To begin with, EU policy over the past twenty years has reflected the strong desire to progressively increase the capability of EU communications networks as a crucial underlying element in strengthening the productivity, sustainability and global competitiveness of the EU (see Sections 2.b and 2.h). Communications networks are a key enabler that can contribute to broad spill-over effects into the broader society and economy. The shift in focus from the goals of the *Digital Agenda for Europe (DAE)*,[903] which seem quite modest by today's standards, to the *Gigabit Society*[904] represented a significant raising of the bar. In 2021, the Commission's *Digital Compass Communication*[905] notes that "achieving gigabit connectivity by 2030 is key." It calls for all European households to be covered by a gigabit network by 2030 (versus 59% today), with all populated areas covered by 5G (versus 14% today). These strategy pronouncements are backed up by a number of concrete measures, notably including the Recovery and Resilience Fund (RRF),[906] which requires that 20% of funding of up to €672.5 billion (2018 prices) be applied to promoting digitalisation and addressing its consequences, and explicitly identifies various forms of VHCN and 5G as candidates for funding.

Secondly, promotion of "connectivity and access to, and take-up of, very high capacity networks, including fixed, mobile and wireless networks" became an explicit policy objective with the adoption of the EECC (Art. 3), and with it, a shift to "efficient infrastructure-based competition". This was accompanied by a shift in focus to make greater use of access to passive civil engineering assets rather than active network services. The Recommendations already represented a step in that direction, but the EECC took the process further. Some of our suggestions in this chapter seek to take this process still further.

Thirdly, progressively more high speed broadband has been deployed within the Member States. The Access Recommendations were enacted at a time when this process was still at

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[903] European Commission (2010), *A Digital Agenda for Europe*, COM(2010) 245.
[904] European Commission (2016), *Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society*, COM/2016/0587 final.
[905] European Commission (2021), *2030 Digital Compass: the European way for the Digital Decade*, COM(2021) 118 final.
[906] European Union (2021), "Regulation (EU) 2021/241 of the European Parliament and of the Council of 12 February 2021 establishing the Recovery and Resilience Facility".

an early stage. Moreover, the nature of high speed broadband deployment and with it the nature of the competition is changing – with a progressive increase in consumer demand and willingness to pay (WTP), facilities-based network operators who are willing and able to compete head to head at wholesale level with SMP operators have emerged in many Member States (for instance, in Italy and Ireland). In Spain, Portugal and France, the use of SMP CEI has played a crucial role in the emergence of facilities-based competition.

In parallel with this shift in emphasis in the EECC, the number of regulated markets (i.e. markets susceptible to *ex ante* regulation) has been progressively reduced from 18 to 2 in successive versions of the *Relevant Markets Recommendation (RRM)* as a response to improving competitive conditions in the Member States.

Our task here, based on our retrospective assessment of the performance of the current Access Recommendations in Chapters 3 through 10, and in light of the goals expressed in the EECC, is to identify possible ways in which a successor recommendation might be made more effective, efficient, coherent, and more in line with EU added value than the current Recommendations. This is very much in line with the spirit of the EU's long-standing core principle of Better Regulation: "Evaluate first!"

In keeping with our treatment throughout the report, we are covering not only Market 3a/2014 in this chapter, but also where appropriate Market 3b/2014, even though Market 3b/2014 has not been carried forward in the latest revision of the Relevant Markets Recommendation.[907] Market 4/2014 issues are linked to those covered here, but we are treating them as being out of scope for this report.

In the sections that follow, we begin by considering the scope that should apply to each provision in the successor recommendation in Sections 11.a, followed by price regulation, non-discrimination, cooperative agreements, geographic differentiation, and migration from legacy infrastructure in Sections 11.b through 11.g, respectively.

a. The scope of each provision of the successor Recommendation

The scope of each provision in a successor to the Access Recommendations should be carefully considered on a case by case basis.

The Access Recommendations seek to provide guidance on the implementation of the EECC as it relates to broadband deployment. The scope of the current Access Recommendations is broader overall than NGA. This is a property that deserves to be preserved – the successor Recommendation should not be limited as a whole to only NGA, or only to a VHCN.

Many of the measures in the Access Recommendations specifically deal with obligations on SMP operators. The successor recommendation should express a scope that reflects the Relevant Markets Recommendation of 2020[908], which recognises that the former Market 3b/2014 is progressively becoming more competitive. Nonetheless, many NRAs will continue to regulate Market 3b/2014 services until they become effectively competitive (although the NRA will have the burden of proof to continue to regulate). With that in mind, we propose that any provisions that relate to SMP should have a scope that reflects markets as defined in the

[907] European Commission (2020), "Commission Recommendation of 18.12.2020 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code", C(2020) 8750 final.
[908] Ibid.

Member State in question, reflecting the Article 68 EECC process. This implies that the future recommendation should seek to provide guidance to NRAs on the most appropriate remedies to address SMP not only for Market 1, but also (where relevant) in the former Market 3b.

Many of the measures of the current Recommendations that seek to promote high speed broadband deployment (i.e. NGA) can now be linked explicitly to Art. 3(2)(e), which calls on all relevant public authorities to "promote connectivity and access to, and take-up of, very high capacity networks, including fixed, mobile and wireless networks, by all citizens and businesses of the Union". NGA deployment is not explicitly identified as a "general objective". At the same time, Art. 74(1) calls on NRAs to "take into account the need to promote competition and long-term end-user interests related to the deployment and take-up of next-generation networks, and in particular of very high capacity networks", when they assess whether price control obligations would be appropriate.[909]

Taking all of this together, the EECC as a whole should be understood to reflect a political consensus at the EU level that the general objective is to promote the deployment and adoption of VHCN. Promotion of non-VHCN NGA as defined in previous instruments is positive, but is not a general objective. In other words, it plays a secondary role.

On that basis, the successor Recommendation should place its primary emphasis on the promotion of VHCN, treating the promotion of NGA as at most a second-best alternative. Again, case by case analysis is required. In a number of instances in this chapter, we propose that the successor Recommendation explicitly refer to VHCN rather than NGA. In instances where current NRA measures refer to NGA, transitional measures may be needed to permit an orderly phasing out of arrangements that are currently in place.

BEREC observed in its consultation response that it is not always clear whether the current Recommendations should apply only to VHCN, or also to other high performance networks that may or may not fall short of meeting the definition of VHCN. Which, for instance, are pertinent only to fixed networks? Which might be relevant to mobile or wireless networks?

Among networks that fulfil the conditions identified in the BEREC VHCN Guidelines, we recommend that they be addressed by the successor Recommendation in as consistent a manner as possible.

The BEREC Guidelines summarise their definition of the VHCN (based on the EECC) as comprising:

- Any network providing a fixed-line connection with a fibre roll out at least up to the multi-dwelling building
- Any network providing a wireless connection with fibre roll out up to the base station
- Any network which provides a fixed-line connection and is capable of delivering under usual peak-time conditions a network performance equivalent to what is achievable by a network providing a fixed-line connection with fibre roll-out up to the multi-dwelling building and meeting *performance thresholds 1* as defined in the Guidelines
- Any network which provides a wireless connection and is capable of delivering under usual peak-time conditions a network performance equivalent to what is achievable by

[909] See also Art. 22 and Recitals 193 and 209.

a network providing a wireless connection with fibre roll-out up to the base station and meeting *performance thresholds 2* as defined in the Guidelines.

Under the BEREC definition, FTTB and FTTH networks are always treated as VHCN, as well as wireless networks where the base station is connected by fibre (the wireless access speed is also important in practice, but a wireless network is classified as a VHCN irrespective of speed if the base station is connected by fibre). Other networks, including cable DOCSIS 3.1, G.Fast, and other wireless networks may constitute a VHCN depending on their performance characteristics.

In sum, the applicability of each provision of a successor recommendation should be considered in light of (1) the range of applicability of any corresponding provisions in the EECC; (2) for provisions that seek to address market power, the markets where SMP has been found to be present; and (3) for provisions that seek to promote deployment, all forms of VHCN as defined in the BEREC Guidelines, which should be addressed in as technologically neutral a manner as possible. In a few carefully selected instances, it may be appropriate to treat NGA as a second-best alternative to VHCN.

b. Price regulation and pricing flexibility

Both Recommendations sought to strike a more suitable balance than the 2002 Regulatory Framework had done between (1) ensuring effective competition and thus protecting consumers, and (2) fostering efficient investment into innovative services, with a focus on high capacity broadband services.

The economic and policy arguments in favour of striking a proper balance between the two are reasonably clear in the literature (see Chapter 2), and in our judgment continue to be sound.

Price regulation and pricing flexibility do not function in isolation, but rather must be understood together with mechanisms that seek to prevent discrimination and market foreclosure that are covered in Section 11.c.

For VHCN, pricing flexibility is preferred over price regulation, provided that a number of underlying conditions are fulfilled. The basic logic of price regulation and pricing flexibility, as initially put in place in the NDCM and then codified in part in Art. 74 EECC, are that:

- *If* a lack of effective competition means that the undertaking concerned may sustain prices at an excessively high level, or may apply a price squeeze, to the detriment of end-users, price control obligations may be imposed.
- *If, however,*
    a) sufficient competitive safeguards are in place;
    b) a demonstrable retail price constraint is present; and
    c) obligations imposed including any ERT ensure effective and non-discriminatory access,
- *Then* pricing flexibility is encouraged (i.e. no price control obligations).
- Before imposing price control obligations, NRAs should consider whether they would be appropriate in light of the need to promote competition and long-term end-user interests related to the deployment and take-up of next-generation networks, and in particular of very high capacity networks.

In our historical analysis in Chapter 5, we paid considerable attention to the market for wholesale central access (WCA) provided at a fixed location for mass-market products (the former Market 3b). We place somewhat less focus on WCA in this forward-looking section because it has been removed from the list of markets susceptible to *ex ante* regulation in the new Relevant Markets Recommendation due to the expectation that it will progressively become competitive in the coming years.[910] In general, price control obligations will not apply to WCA markets at some point in the future; however, they may remain subject to SMP regulation in many Member States for some years to come.

Price regulation of civil engineering infrastructure (CEI) is a special topic that we take up later in Section 11.d.

We consider separately cases where price regulation is imposed on an SMP operator versus cases where pricing flexibility is granted in line with the NDCM (and where it could be granted going forward under Art. 74 EECC as transposed into national law), since they have very different implications relative to the Access Recommendations.

Pricing flexibility

As noted at the beginning of Section 2, pricing obligations should be imposed on an SMP operator under Art. 74 EECC if a lack of effective competition means that the undertaking concerned may sustain prices at an excessively high level or may apply a price squeeze to the detriment of end-users. If, however, (1) sufficient competitive safeguards are in place; (2) a demonstrable retail price constraint is present; and (3) obligations imposed including any Economic Replicability Test (ERT) ensure effective and non-discriminatory access, then pricing flexibility is encouraged (no price control obligations).

Further, before imposing price control obligations, NRAs should consider whether they would be appropriate in light of the need to promote competition and long-term end-user interests related to the deployment and take-up of next-generation networks and, in particular, of very high capacity networks.

The need for sufficient competitive safeguards is expressed mainly in terms of effective non-discrimination. We take this up separately in Section 11.c because in addition to being a precondition for pricing flexibility, non-discrimination is a regulatory remedy in its own right.

One of the price constraints is expressed in the NGA Recommendation in terms of a “copper anchor”. It goes without saying that the effectiveness of copper legacy products as a price constraint has been declining over time. These provisions continue to be relevant, but they are in need of an update.

The NDCM also requires a Technical Replicability Test (TRT) “when EoI is not yet fully implemented”.[911] This continues to be relevant. Our surveys and case studies show that the TRT (or at least KPIs ensuring non-discriminatory replicability) are available throughout the EU. However, comments received suggest that there is some room for improvement (see Chapter 6).

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[910] The successor recommendation should reflect the 2020 Relevant Markets Recommendation. However, in applying the successor recommendation, NRAs will also need to consider the market definitions that they have made pursuant to Art. 64(3) EECC.
[911] Points 48 and 49 in conjunction with Points 11 through 18.

Non-discrimination as a precondition for granting pricing flexibility

Our assessment is that the time has come for guidance to make clear that pricing flexibility can be granted based on non-discrimination regimes that are effective, including in some cases where full Equivalence of Input (EoI) would be disproportionate but where effective non-discrimination can be ensured adequately through Equivalence of Output (EoO).

This is not the case in current guidance. In Art. 48 NDCM Recommendation, non-discrimination based on EoI is an explicit requirement.

Art. 74 EECC codifies the non-discrimination obligation, but not its explicit reliance on EoI. It requires instead that the obligations imposed ensure "effective and non-discriminatory access". Recital 193 EECC clarifies that "pricing flexibility should be accompanied by additional safeguards to protect competition and end-user interests, ***such as strict non-discrimination obligations***, [emphasis added] measures to ensure technical and economic replicability of downstream products, and a demonstrable retail price constraint resulting from infrastructure competition or a price anchor stemming from other regulated access products, or both." Recital 193 goes on to note: "Those competitive safeguards do not prejudice the identification by national regulatory authorities of other circumstances under which it would be appropriate not to impose regulated access prices for certain wholesale inputs …"

As we explain in Section 11.c, the EECC recognises in Recital 185 that "[i]n order to address and prevent non-price related discriminatory behaviour, equivalence of inputs (EoI) is in principle the surest way of achieving effective protection from discrimination," but it also recognises that EoI is likely to trigger higher compliance costs than other forms of non-discrimination of access. Art. 70 EECC describes obligations for non-discrimination in terms of equivalence of access rather than equivalence of input. In other words, the value of EoI is recognised, but it is also recognised that it is not the most appropriate or the most proportionate solution in all cases.

In a workshop with BEREC members conducted in support of this project on 15 April 2021, a number of NRAs expressed the view that a well implemented EoO non-discrimination regime could be as effective, or nearly as effective, as an EoI regime – the main difference being, in their view, that non-discrimination provisions are more self-enforcing under EoI than under EoO.

Non-discrimination was discussed at length in the same workshop with BEREC members, in our workshop with stakeholders on 9 June 2021, in our survey and case study interviews, and also in the Commission's targeted consultation. Based on that input, our belief is that hallmarks of a mature, effective non-discrimination regime include (1) appropriate and well-crafted KPIs, (2) effective monitoring on the part of the NRA, and (3) timely imposition of dissuasive penalties when appropriate. Of these, KPIs combined with associated penalties for consistent failure to adhere to them are the criteria that can most readily be used to establish measurable criteria to justify non-discrimination that is sufficiently effective (in conjunction with a price constraint and with technical and economic replicability) to justify pricing flexibility under Art. 74 EECC. (SLAs and SLGs are also important, but they are in principle commercial agreements between the parties and therefore less suitable to identify or to constrain discriminatory behaviour.)

Recommendation 1. We recommend that the successor recommendation require effective non-discrimination, rather than requiring equivalence of input (EoI) as a prerequisite in all cases. EoI would be a sufficient condition (but not a necessary condition) for recognising a non-discrimination regime as being effective, and thus meeting the non-discrimination criteria necessary to grant pricing flexibility. The successor recommendation should set forth a succinct list of suggested KPIs based on NRA experience that can be presumed, as part of an overall effective implementation of non discrimination by the NRA, to provide non-discrimination sufficiently effective to meet the non discrimination criteria necessary to grant pricing flexibility.

The "copper anchor"

In the NDCM, one of the key preconditions for granting pricing flexibility is the presence of a retail price constraint. This is expressed, for instance, as "a demonstrable retail price constraint resulting from the infrastructure competition or a price anchor stemming from cost oriented wholesale copper access prices". As we strive to drive the deployment of VHCN today, the relevance of legacy copper services is declining along with the usage of wholesale ULL services.

This possibility was foreseen in Point (56) of the NDCM. "If the product offered by the SMP operator on the legacy access network is no longer able to exercise a demonstrable retail price constraint on the NGA product (for example in the event of a copper switch-off), it could in principle be replaced by an NGA-based product that is tailored to have the same product features. However, it is not envisaged that such an NGA-based anchor will be required in the immediate future or before 2020."

The approach is in order, but 2020 has come and gone and NRAs would benefit from some more specific guidance regarding suitable anchor products. While copper can still serve as an anchor in some Member States, an entry level fibre-based product is more appropriate today in other Member States. However, fibre ULL is probably not suitable because there is no upper limit on its performance. There are other Member States where no wholesale product can serve as an effective price anchor today.

In defining the NGA product that might replace the copper anchor, an NRA will need to examine the chain of substitution between different access products and will need to identify a product that is likely to create a genuine effective downward pressure on retail broadband prices (in a forward-looking perspective) that is capable in turn of imposing a constraint at the wholesale level. The regulated broadband anchor product should be an entry-level product and not necessarily the most popular product. The price anchor product will typically be a product with less capability (and offered at a lower price) than that of the products whose retail price it constrains. As with the copper anchor today, an anchor product can constrain the price of VHCN offerings without itself having to be a VHCN service[912].

Where a fibre-based virtual access product is chosen as an anchor product, it will generally be appropriate to define the regulated anchor product in terms of speed and quality. Choosing a

[912] BEREC recalls that NRAs should consider whether there is a need for stricter regulation of any NGA product, response to the Targeted Consultation, Q12.

fibre-based anchor product might also simplify the migration from legacy copper to fibre since the anchor is not dependent on underlying copper-based technology[913].

It is important to bear in mind that an anchor product is not the only form of retail price constraint recognised by the EECC in the context of pricing flexibility. Recital 193 EECC makes it clear that there are many different ways in which to provide "safeguards to protect competition and end-user interests". Moreover, the retail price constraint does not work in isolation – the combined effects of any non-discrimination obligations, measures to the ensure technical and economic replicability of downstream products, and the effects of any infrastructure-based competition or competition from non-regulated products should be taken into account. Recital 193 EECC also makes clear that NRAs might identify "other circumstances under which it would be appropriate not to impose regulated access prices for certain wholesale inputs, such as where high price elasticity of end-user demand makes it unprofitable for the undertaking designated as having significant market power to charge prices appreciably above the competitive level or where lower population density reduces the incentives for the development of very high capacity networks and the national regulatory authority establishes that effective and non-discriminatory access is ensured through obligations imposed in accordance with this Directive."

The presence of a facilities-based competitor offering wholesale access services might also serve as an effective price constraint, even if the degree of competition is not sufficient for a finding that no SMP is present.

Recommendation 2. The reference to the "copper anchor" should be updated to provide constructive guidance and criteria as to how a suitable anchor product should be identified. The ideal anchor product would be (1) an entry level product that is used, or amenable to being used, by alternative operators to provide their own retail products and (2) with a price that is either price regulated or else constrained in such a way that regulation is not necessary. If a virtual fibre-based access product is chosen, its speed and quality should be defined and constrained. It is important, however, to bear in mind that an anchor product is not the only form of retail price constraint recognised by the EECC in the context of pricing flexibility.

The Economic Replicability Test (ERT)

The Economic Replicability Test (ERT) continues to be highly relevant, but its use as an enabler for pricing flexibility, and thus as an alternative to cost orientation, has been more limited in practice than might have been expected. BEREC acknowledges in its 2020 Regulatory Accounting Report that "the NDCM Recommendation on the ERT for NGA products as the alternative for ex ante price control is not fully applied. Summing up, margin squeeze tests are used mainly as a complementary measure for a price control method. The traditional margin squeeze test is often used complementary to cost oriented price regulation rather than as a substitute."[914]

[913] As advocated by Brian Williamson (2017), "Supporting fibre rollout and infrastructure competition in Ireland via continued pricing flexibility", June 2017, Communications Chambers, p.33,
[914] BEREC (2020), *BEREC Report: Regulatory Accounting in Practice 2020*, BoR (20) 210.

The ERT has also proven to be complex to implement in practice, and there are many questions as to how best to apply it.

At a workshop held on 9 June 2021 in support of this project, several participants[915] argued that the ERT's exclusive focus on the SMP operator has the unfortunate side-effect of depressing investment on the part of other network operators, including wholesale-only operators.

A word about terminology is in order. As in the previous chapters, we use the term *ERT* to refer to an *ex ante* margin squeeze test used to implement pricing flexibility in the sense meant by the NDCM. We refer to any other *ex ante* use of a margin squeeze test as an *ex ante MST*. We refer to the use of a margin squeeze test by the national competition authority as an *ex post MST*. NRAs make extensive use of *ex ante* MSTs (see Figure 14 in Section 5.g), but fewer NRAs use the ERT as an alternative to price control in the sense meant by the NDCM.

The areas where clarifications could be considered include (1) whether the flagship products assessed under the ERT should be individual products versus a portfolio of products; (2) if a portfolio includes unregulated services (for example, video content), then how to reflect this in the ERT; (3) in dealing with scale economies, whether to use a Reasonably Efficient Operator (REO) versus a scale-adjusted Equally Efficient Operator (EEO), and, in either case, what scale should be assumed; (4) how to deal with volume discounts and long term pricing in the ERT; (5) the time frame in which the ERT should be conducted; (6) possible use of a wholesale ERT (e.g. between ULL and bitstream); and (7) the process to be followed in order to ensure transparency and stakeholder engagement. We consider each of these in turn.

Applying ERT to individual products versus a portfolio of products

The NDCM calls on NRAs to implement the ERT only for "flagship" products, but provides only limited guidance as to what the relevant retail products might be. "The NRA need not to run the test for each and every new retail offer but only in relation to flagship products to be identified by the NRA. … NRAs should … assess the margin earned between the most relevant retail products including broadband services (flagship products) and the regulated NGA access input most used … as the most relevant for delivering the retail products for the market review period in question."

The trade-offs between portfolio versus product-by-product approaches are clear enough in principle. A portfolio approach provides the SMP operator with more flexibility, makes it easier for the SMP operator to implement welfare-enhancing Ramsey-Boiteux pricing principles,[916] and in some Member States may better reflect market realities; however, it potentially permits a selective price squeeze on some products and may reflect market realities less well in some other Member States.

This became clear in the course of a workshop with NRAs and BEREC conducted on 15 April 2021. Both Spain and Luxembourg implement pricing flexibility, but they implement the ERT very differently and each approach could be justified relative to their respective national

[915] Edoardo Fagiolini of Open Fiber, a wholesale-only operator in Italy; Tony Shortall of the consultancy TELAGE; Maurizio Mucci, of Sky, Italy; and Felipe Florez Duncan of consultancy Oxera, who questioned whether the ERT is needed at all when there is wholesale competition.

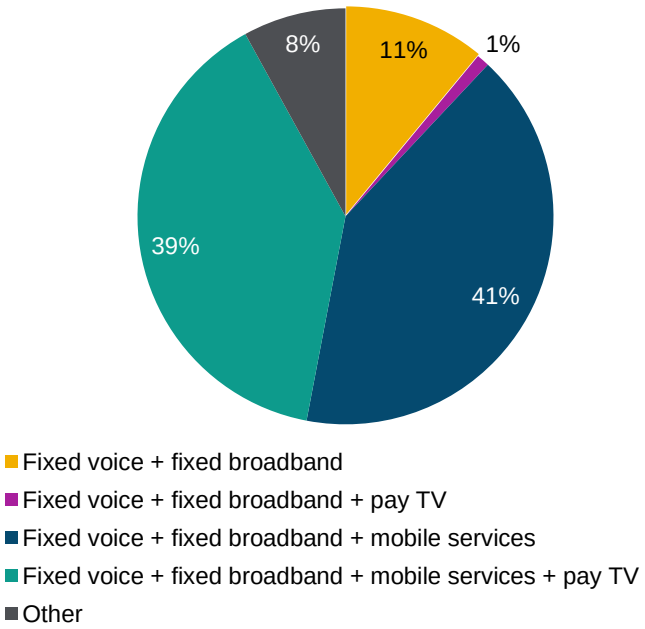
[916] With Ramsey-Boiteux pricing, mark-ups on different offerings reflect demand elasticity for those offerings. Note that the SMP operator will in general be just as strongly motivated as the NRA to impose Ramsey pricing, and is better able to do so because it has a better understanding of retail demand elasticities. Cf. Laffont and Tirole (2000), *Competition in Telecommunications*.

circumstances. Luxembourg conducts the ERT relative to relatively pure broadband access services,[917] while Spain conducts the test against a retail portfolio that includes a range of services including video content.[918]

Luxembourg has chosen a product-by-product approach. They have a strong SMP operator with a substantial market share (some 62%), but customers can easily opt in or out of optionally bundled services. The flagship products chosen represent some 70% of turn-over.

In Spain, the market share of the SMP operator is much smaller and the take-up of complex bundles is widespread. Bundles that include pay-TV services represent a large portion of the market (see Figure 19); consequently, they cannot be ignored.

Figure 19. Take-up of bundles in the Spanish broadband market.



Source: Spain CNMC (2021), "Update on the current challenges faced by the NRAs regarding the ERT".

Geographic differentiation of wholesale products might also come into play. The NDCM considers this possibility, but provides limited guidance.[919] We suggest that the same principles that are used to geographically differentiate markets or remedies (see Section 11.f) should apply here, and that the ERT should reflect the same geographic delineation used for differentiated markets or remedies. If a Member State employs geographically differentiated markets or remedies, it will typically be appropriate to consider wholesale costs and retail prices separately for each of the different markets in which SMP is present. The ERT should seek to ensure that the prices for the flagship retail services available in each geographically differentiated area leave enough economic space for competitors relative to the price or prices of the main SMP wholesale access products that could be used to produce them in the same geographic area.

[917] Commission Decision of 4.08.2014 concerning Cases LU/2014/1663-1664 and LU/2014/1637.
[918] Spain CNMC (2021), "Update on the current challenges faced by the NRAs regarding the ERT", presentation.
[919] Per Point (67): "Should national competitive circumstances show a difference between geographic areas in terms of the NGA access input used (for example in rural and densely populated areas) NRAs should vary the test based on specific inputs identified as the most relevant."

Recommendation 3. Principles on which to choose ERT flagship products would appear to have merit. National circumstances would need to be taken into account, including the degree of market power of the SMP operator, and the prevalence and nature of bundled offerings. Factors that the NRA should take into account include (1) how the SMP operator packages its most popular offerings in practice (e.g. whether as individual connectivity offerings, versus, for instance, bundles that include unregulated elements such as content); and (2) whether selection of a portfolio as an ERT flagship would provide a strong SMP operator with too much scope to abusively price individual narrower offerings.

How to reflect unregulated services within a portfolio in the ERT

Where the ERT is conducted using a bundled flagship retail product, it will often be the case that some components of the bundle are regulated while others are not. This poses multiple challenges, including:

- How much of the retail price should be allocated to which element of the bundle?
- What cost should be imputed to the unregulated elements? The NRA will typically have limited tools for estimating these costs, and the SMP operator will not necessarily be legally obliged to provide information.
- What is the risk of cross-subsidisation between the components of the bundle?

The experience of the Spanish CNMC, which has experience in conducting the ERT on bundled services that include unregulated components, is instructive.[920] They note that the analysis can become complex, both because the NRA must obtain information about many components of the bundle, and because non-replicability might be caused by unregulated components. Indeed, the regulated components might represent a small fraction of the cost and price of a large bundle. Further, determining whether the costs of the unregulated components are efficiently incurred can also be challenging. Taking all of this into account, they see three possible approaches to regulating these bundles:

- **Impute a price for just the regulated elements of the bundle.** The stand-alone price of the unregulated elements of the bundle is subtracted from the total. This approach might not be satisfactory if for instance the stand-alone offers are not much taken up. Also, the price of the bundle will often be considerably less than the sum of the stand-alone prices of its components.
- **Apportion the price of the bundle to the different components of the bundle.** This may be difficult to do in practice. Further, it is not clear how to deal with possible cross-subsidisation of some elements of the bundle by other elements.
- **Conduct the ERT for the bundle as a whole.** The challenge in this case is that it is necessary to estimate the cost of all of the regulated and unregulated components.[921]

There are challenges with each of these approaches, but the second seems somewhat less problematic than the first or the third.

[920] Spain CNMC (2021), "Update on the current challenges faced by the NRAs regarding the ERT", presentation.
[921] Despite its complexity, this approach is in use in Denmark, for example.

Recommendation 4. Identify best practices on how to conduct the ERT when a flagship product is a bundle that includes unregulated elements. The most promising approach in general appears to be to apportion the retail price to the different elements of the bundle, but it is not clear that this approach is best in all Member States or in all circumstances. Further exchange of best practice on these issues, especially in the context of some relevant BEREC workstream, might be helpful.

In its response to the public consultation, BEREC specifically noted that most NRAs lack legal authority to gather information on the unregulated components of bundled flagship products, and that this constitutes a limitation to their ability to conduct the ERT.[922] This could be particularly problematic where the unregulated component is provided by an undertaking established outside of the EU (for instance, from a right holder of premium media content). However, we know from our interviews with NRAs that EU SMP operators sometimes refuse to provide information (or delay responding to information requests, or provide incomplete or misleading information) about the distribution of costs or revenues for the different components of a bundle that includes both regulated and non-regulated elements. BEREC specifically noted that they "would welcome the Commission to provide explicit support for the gathering of information (especially the information related to the costs of the non-regulated components) …, as this is essential to carry out the replicability analysis of broadband bundles. In any case, in this context it has to be ensured that the information required is proportional to what is strictly needed."[923] We think that the request is well founded.

Art. 20(1) EECC would appear to already address this in principle. "Member States shall ensure that undertakings providing electronic communications networks and services, associated facilities, or associated services, provide all the information, including financial information, necessary for national regulatory authorities, other competent authorities and BEREC to ensure conformity with the provisions of, or decisions or opinions adopted in accordance with, this Directive and Regulation (EU) 2018/1971 of the European Parliament and of the Council." Nonetheless, SMP operators dispute in practice whether they are obliged to provide information about otherwise non-regulated products, and there is a risk that NRAs will be unable to properly implement the ERT in consequence. Clarifying this point in the successor recommendation is likely to enhance legal certainty for all concerned.

[922] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169. "Sometimes, information on the non-regulated components included in a bundle are essential to determine whether a broadband bundle is replicable. Information on non-regulated components are also essential to identify (unfair) cross-subsidies between regulated and non-regulated services or some other anticompetitive practises affecting the regulated service. However, SMP operators are usually reluctant to provide solid information on the non-regulated component of bundles and can argue they are not obliged to do so. Therefore, BEREC would welcome the Commission to provide explicit support for the gathering of information (especially the information related to the costs of the non-regulated components) in these cases, as this is essential to carry out the replicability analysis of broadband bundles. In any case, in this context it has to be ensured that the information required is proportional to what is strictly needed."

[923] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, pages 18-19.

Recommendation 5. The successor recommendation should clarify that information needed to allocate the price of a flagship retail bundle across regulated elements and any non-regulated elements of the retail bundle for purposes of the ERT constitutes "information, necessary for national regulatory authorities, other competent authorities and BEREC to ensure conformity with the provisions of …" the EECC, and thus falls within the scope of Art. 20(1) EECC. The SMP operator must respond to these information requests, even where they involve non-regulated services.

Scale economies: EEO, REO, and scale adjustments

Recital (26) of the NGA Recommendation speaks both of an equally efficient competitor test and of a reasonably efficient competitor test. The former assesses whether the SMP operator's own downstream operations would be able to trade profitably on the basis of the upstream price charged to its competitors by the upstream operating arm of the SMP operator ('equally efficient competitor' test), while the latter compares the same upstream to the downstream operations of a reasonably efficient competitive service provider (reasonably efficient competitor test).

Points (64) and (65) of the NDCM speak only of an equally efficient operator (EEO) test, but provide for the possibility of scale adjustments. "Where specific market circumstances apply, such as where market entry or expansion has been frustrated in the past, NRAs may make adjustments for scale to the SMP operator's costs, in order to ensure that economic replicability is a realistic prospect. In such cases, the reasonably efficient scale identified by the NRA should not go beyond that of a market structure with a sufficient number of qualifying operators to ensure effective competition."

In its response to the public consultation, BEREC advocated "the consideration of both tests (EEO and REO/scale adjusted EEO) on the same level in the new access recommendation".[924]

This text implicitly links the ERT to the market review, and explicitly links it to a sought-after number of competitors ("the reasonably efficient scale identified by the NRA should not go beyond that of a market structure with a sufficient number of qualifying operators to ensure effective competition"). The value chosen potentially has an important impact on prospects for competitive entry. If, for instance, the EEO is scaled to assume a market share of 25%, it would tend to suggest that not more than three competitors to the SMP operator have enough economic space between their costs and their retail revenues to successfully achieve competitive entry.

In practice, the relationship between the scaling factor and the number of competitors is not straightforward. Furthermore, this relationship might be different at different levels of the value chain, might be different for facilities-based competitors versus access seekers that are not facilities-based, and will tend to evolve over time.

It is clear that the scale factor must be chosen with care. If it is set too high, it limits the number of competitors that can be expected to successfully enter or maintain themselves in the market. If, on the other hand, the scale adjustment is set too low, it might possibly lead to inefficient

[924] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, page 18.

competitive entry. If it were to be set so low as to result in setting the price of wholesale products below the SMP operator's costs, it can be expected to lead to economic distortions.

We observe that practice among NRAs that use the ERT in order to provide pricing flexibility is diverse. In the case of Luxembourg, for instance, the ILR has reported that it assumes a reasonably efficient competitor with a market share of 15% (even though market shares of the alternative operators are lower in practice).[925]

In light of comments made by NRAs at the workshop held with BEREC in support of this project, together with follow-up discussions with one of the NRAs, the link to the desired number of competitors may be too narrow and thus too restrictive. We suggest instead that the scale adjustment should be based on a general assessment of the competitive situation in the Member State in question. The number of competitors can be a factor in that assessment, but it is only one of many. Other measures of competition can be taken into account as appropriate, including for instance the current HHI at each level of the value chain and its expected evolution over time, the size of the largest competitors relative to that of the SMP operator, and the size of the broadband and VHCN markets in the Member State (which might influence the number of competitors that can be economically viable).

Recommendation 6. The successor recommendation should provide principles for determining the market share to be used in any scale adjustment to the scale of the SMP operator. The scale adjustment should reflect the overall level of competition for broadband and for VHCN in the Member State, taking into account (as appropriate) factors which for instance might include (1) the number of competitors that are likely to be viable at each level of the value chain, (2) the current HHI at each level of the value chain and its expected evolution over time, (3) the size of the largest competitors relative to that of the SMP operator, and (4) the size of the broadband and VHCN markets in the Member State (which might influence the number of competitors that can be economically viable). A scale adjustment will not necessarily be required in every Member State.

Negotiated volume discounts and long term pricing and the ERT

The use for purposes of calculating the ERT of long term discounts, volume discounts and commercial agreements that have been negotiated between the SMP operator and one or more alternative operators would tend to imply a lower wholesale price for analysis, and thus once again implies that some constellations would pass the ERT that otherwise might fail. In effect, smaller alternative operators might not have enough economic space to operate profitably.

For this reason, it would appear to be simpler in most cases for the NRA to base the ERT on the non-discounted price of wholesale services, and to use the scale adjustment to the EEO/REO test to ensure that the market is sufficiently open to competition; however, a number of additional factors should be considered.

The need for a case by case assessment is not a departure from Annex II of the NDCM Recommendation, which says that "in order to ensure the right balance in national

[925] Commission Decision of 13.02.2019 concerning Cases LU/2019/2137-2138 and LU/2014/163, footnote 13: "There are 16 alternative operators present on the Luxembourgish retail market, the largest alternative operator has a market share of 13 %. 5 local cable operators hold a combined market share of approx. 10 %."

circumstances between incentivising efficient and flexible pricing strategies at the wholesale level and at the same time ensuring a sufficient margin for access seekers to maintain sustainable competition, NRAs *should give due weight* [emphasis added] to the presence of volume discounts and/or long-term access pricing agreements between the SMP operator and access seekers." This suggests that there is a need to reflect on how to most appropriately handle these discounts in the context of the ERT.

There are a number of instances where reflecting the discounts in the ERT might be appropriate. First, there are some markets, e.g. Germany and Spain, where most alternative operators achieve some level of wholesale discounts. For such markets, the NRA may need to explicitly reflect discounts in order to accurately reflect market realities in conducting the analysis.

Second, if the discount structure is imposed by the NRA as a price control measure, it will generally be appropriate to explicitly reflect it in the ERT.

Recommendation 7. The handling of long term discounts and volume discounts in the ERT requires a case by case analysis. In most cases, long term discounts and volume discounts to wholesale prices should be ignored when conducting the ERT. Guidance should reflect the fact that in most cases, scale adjustments to the EEO/REO based on undiscounted wholesale prices will be the simplest and best way to ensure that the ERT is effective in protecting competition. If, however, the discount structure is imposed by the NRA as a price control measure, or if the market is such that most alternative operators achieve some level of wholesale discounts in practice, then it will typically be appropriate to reflect them in the ERT.

The time frame in which the ERT should be conducted

Point (56(b)) of the NDCM sets forth the time frame in which an ERT must be completed. "The procedure that the NRA will follow to conduct an *ex ante* economic replicability test, specifying that the NRA can start the procedure on its own initiative or at the request of third parties, at any time but no later than three months after the launch of the relevant retail product, and will conclude it as soon as possible and in any case within four months from starting the procedure."

In practice, the NRA's choice of timing for conducting an ERT (if one is needed at all) is likely to depend on many factors, including the degree to which the retail product is entirely new versus being a minor adaptation of an existing retail product.

The fact that the NRA has the option to apply the test *ex post* appears to be positive inasmuch as it can provide useful flexibility to the SMP operator. The SMP operator can avoid needlessly delaying product introduction, and thus can hasten the time to market for new retail offers.

Even so, the time frame could easily be problematic. In particular, if a product were to fail the ERT months after it has been released, it is not clear what should happen. Our case studies turned up at least one instance where this happened (Lithuania) and was problematic.

There is also an argument to be made that, if a TRT is also required, the timing should be aligned as much as possible.

In its consultation response, BEREC asked for additional time to complete the ERT. "BEREC agrees with the Commission that the determination of replicability must be carried out rapidly, but a new access recommendation should also consider that the NRA follow up the evolution of existing flagship products (price modifications, temporary discounts, incorporation of new bundled services, etc.) as the mapping of those is complex and subject to change over time. In case relevant changes are detected, NRAs can update the list of flagship products or revise the result of replicability analysis according to updated information more rapidly. Hence, the limits set out in [a successor to Point 56 of the NDCM Recommendation] should be compatible with a follow-up activity." One BEREC official indicated that BEREC would appreciate having six months to complete the ERT instead of four months. There appears to be a trade-off here between providing the NRAs with time that they might occasionally need (but not always), versus possibly introducing delay into an already lengthy process.

Recommendation 8. Permitting the NRA to initiate the ERT up to three months after the launch of the relevant retail product and completed within four months thereafter continues to be appropriate. If the TRT is conducted in advance of the launch of the SMP operator's new retail offering, however, it will often be desirable that the ERT be conducted at the same time.

Use of a wholesale margin squeeze test (MST)

There are instances of a wholesale Margin Squeeze Test (MST) being implemented (for instance in Ireland[926], France, and the Czech Republic, and it is in the process of being implemented in Italy). The typical intent is to ensure an adequate spread between the wholesale price of LLU or VULA products (the former Market 3a) versus bitstream (the former Market 3b).

The NDCM already recognises the possibility of a wholesale margin squeeze text in Recital 63: "NRAs may also apply an *ex ante* margin squeeze test to regulated wholesale inputs in order to ensure that wholesale access pricing of copper-based access products does not hinder competition at retail level or to ensure an adequate economic space between the different copper access inputs."

Given that the 2020 Relevant Markets Recommendation no longer treats the former Market 3b as being susceptible to *ex ante* competition, this possible concern has taken on a very different character. It was probably never a major issue for the EU overall, but there is still some possibility going forward that the price of SMP offers for VULA and unregulated bitstream might not leave enough economic space for competitors to offer bitstream service in certain Member States. There is also the possibility of misalignment between the price of SMP CEI and the price of VULA from the same SMP operator.

The existing guidance remains generally fit for purpose, but should be updated to reflect the considerations just noted.

[926] ComReg Ireland (2018), "Pricing of wholesale broadband services: Wholesale Local Access (WLA) market and the Wholesale Central Access (WCA) markets: Response to Consultation Document 17/26 and Final Decision", ComReg 18/95, Decision D11/18.

Ensuring transparent process and stakeholder engagement

The ERT is an important procedure for which transparency and stakeholder engagement are important. Points (66) and (67) of the NDCM provide basic guidance: "The NRA should set out and make public in advance in its adopted measure following a market analysis the procedure and parameters it will apply when running the *ex ant*e economic replicability test. … The economic replicability test set out by the NRA in advance should be adequately detailed and should include as a minimum a set of relevant parameters in order to ensure predictability and the necessary transparency for operators."

Our survey and case studies have flagged a number of alleged NRA shortcomings regarding the transparency of the process of designing the ERT. We also heard complaints regarding the transparency and alleged lack of predictability of the ERT process in the course of the stakeholder workshop held in support of this project on 9 June 2021.

One SMP operator alleged that lack of transparency about which data the NRA would use to conduct the ERT, or how it would use the data, led to unexpected penalties when the ERT was implemented retrospectively after a new retail product had been introduced. They specifically alleged that their NRA chose to use 2018 data in an ERT, even though the SMP operator had already provided more up-to-date data in 2019. We cannot judge the merits of this specific case, but the issue raised is fair as a general proposition – the NRA must be transparent about the data that it will employ in the ERT, in line with Point 66 of the NDCM Recommendation: "The NRA should set out and make public in advance in its adopted measure following a market analysis the procedure and parameters it will apply when running the *ex ante* economic replicability test." In cases where an ERT is applied retrospectively, it is particularly important that the NRA refrain from changing the rules with retrospective effect unless there is a compelling need to do so.

Recommendation 9. Transparency continues to be important for the conduct of the ERT. Point 56(a) and Annex II NDCM identify a number of aspects of the ERT that must be subject to public consultation in advance: (1) the relevant downstream costs taken into account; (2) the relevant cost standard; (3) the relevant regulated wholesale inputs concerned and the relevant reference prices; (4) the relevant retail products; and (5) the relevant time period for running the test. The successor recommendation should expand the list to include, where applicable: (6) how flagship products will be determined, (7) whether flagship products are intended to be individual versus portfolio products, and (8) what approach will be taken to any unregulated products that are part of the flagship bundle

Flexibility and measures to protect facilities-based competition by preventing unfair price competition

Pricing flexibility permits the SMP operator to price at a level different from that of BU-LRIC cost. The arrangements in the NDCM Recommendation and in the EECC provide extensive protection against prices that are too high, but do nothing to protect against prices that are too low.

At the public workshop held on 9 June 2021 in support of this project, a few participants argued that price cap controls were totally inappropriate in light of the EECC's shift in emphasis away from active wholesale access products, and instead toward facilities-based competition based

where feasible on the use of passive wholesale access products.[927] And we also heard that "if there is the prospect of entry and a desire to encourage infrastructure competition, then detailed price regulation is inconsistent with that objective - that is where price flexibility can play a role when there is the prospect of entry."[928]

The introduction of new measures to prevent the SMP operator from introducing inappropriately low prices for wholesale access would appear, however, to be in line with the views that we heard at the workshop [929] (which we share) that the thrust of the EECC is to shift the focus to efficient facilities-based competition, based in many cases on CEI rather than on active wholesale products.

A number of Member States have firms that are deploying substantial volumes of VHCN, usually over limited geographic areas (as for instance in Italy or Ireland), often on a wholesale-only basis. They are typically competing with an SMP operator to offer wholesale services to network operators who will offer retail services to end-users. They face an uphill battle to establish themselves in the face of an established SMP operator with scale economy advantages and a significant installed base. The SMP operator may also have sufficient overall profitability to be able to offer low wholesale prices on a product or in a geography where it faces a competitive threat.[930]

Indeed, a recent paper by Prof Carlo Cambini on behalf of Open Fiber (a wholesale-only provider in Italy) provides useful insights for the case where a vertically integrated network operator competes with a wholesale-only provider in the same geographic area (or overlapping areas). The paper finds (1) that the analysis of competition should consider not only the coverage of wholesale competition, but also the relative market shares of any facilities-based competitors; (2) the analysis should be geographically differentiated; (3) the incremental willingness-to-pay (WTP) of consumers is important, but appears to be low; and (4) the elasticity of retail demand for VHCN services relative to their price increment versus the price of legacy services is crucial. Cambini finds that "in order to avoid potential behaviours which could reduce competition in the initial phase and slow down the investments necessary to have a more distributed network on the territory, the lower the fibre take-up rate, … the higher the minimum price (or floor) must be below which it is not possible to go down in the commercial negotiation phase by the wholesale operators."

This is a significantly different problem than the one that the classic price control approach of the current Recommendations were designed to deal with. Classic price control seeks to enable retail competition in a setting where wholesale competition is impractical; it consequently seeks to make wholesale access products available at low prices. Enabling head to head competition at wholesale level, which is contemplated in the EECC, however, implies the opposite – the need to ensure that the price of wholesale access products is not so low as to make it impractical for even an efficient competitor to achieve or maintain successful market

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[927] Tony Shortall of the consultancy TELAGE was particularly emphatic on this point. Shortall works for numerous clients, including the FTTH Council; however, he maintains that his remarks reflect his personal views, held over many years and presented in many different contexts, rather than those of any client. Edoardo Fagiolini of Open Fiber (Italy) also spoke of the fundamentally changed nature of competition.

[928] Felipe Florez Duncan of the consultancy Oxera. Oxera works in many sectors, and for a wide range of clients (see https://www.oxera.com/insights/reports/.)

[929] This thought was especially prominent in the comments of Felipe Florez Duncan of the consultancy Oxera.

[930] In one of our interviews, it was alleged that an SMP operator had made an offer to the NRA to sell access services in highly competitive regions "below cost", i.e. below the BU-LRIC calculated cost. Whether this is actually below cost is not entirely clear – highly competitive areas will tend to be dense urban areas with a lower-than-average unit cost to deploy. If the SMP operator were truly to price below cost, it would risk a competition law action alleging predatory pricing. But narrowly targeted prices might possibly be low enough to be problematic without necessarily constituting predatory pricing.

entry, for instance because it has not yet developed sufficient scale economies and cannot cross-subsidise from revenues derived from providing copper-based access.

The incentives of the SMP operator are crucial here. In creating pricing flexibility, it was assumed in the past that the SMP operator would be motivated to charge a higher price than it would have been entitled to under a cost orientation regime. In the face of wholesale competition, the SMP operator is motivated to limit the effectiveness of the competitor at the same time that it maximises its own profits. Following the basic logic that we know from predatory pricing in competition economics,[931] a firm with market power will typically be motivated to price predatorily only if either (1) it can do so on a tightly targeted basis so as not to forego too much potential revenue, or else if (2) it believes that it will be able to raise prices enough after having weakened or eliminated a competitor to be able to compensate for the revenue that it sacrificed by pricing predatorily.

The question remains as to whether some SMP operators in practice are charging inappropriately low wholesale prices for access products? In the course of our research, we heard only one well substantiated allegation, and even in that case there is room to debate whether the prices set by the SMP operator are in fact harmful in terms of societal welfare. So it is unclear whether this is a practical concern versus being only a hypothetical concern.

If one were to grant for the sake of argument that the problem is real and requires a response, then the logic of predatory pricing suggests that it might be appropriate to augment pricing flexibility (in Member States where this might be an issue) with measures that prevent the SMP operator from setting wholesale access prices that are too low. Possible measures include (1) prohibiting the SMP operator from offering geographically differentiated prices for access to wholesale services, or else limiting the degree to which those prices can differ from one another; or else (2) in more extreme cases, by an outright price floor on the price of some of the SMP wholesale access products.

Preventing the SMP operator from offering geographically differentiated prices for access to wholesale services (or alternatively requiring that the difference in wholesale prices cannot be greater than the difference in cost) might often be enough to address any real threats. Following the logic of predatory pricing, the SMP operator is most likely to be motivated to set inappropriately low prices for wholesale access if it can do so for only a small fraction of its customer base. The most obvious way for an SMP operator to do this is to offer lower prices for selected wholesale access products only in geographic areas where they perceive a threat from a facilities-based competitor.[932] Considerable nuance is needed here in order to distinguish cases where this is helpful from those where it is harmful. If the areas most subject to competition are dense areas or urban areas, then geographically differentiated pricing for wholesale access services may reflect legitimate differences in unit cost to the SMP operator. One can also argue that for the SMP operator to offer prices with lower mark-ups in areas where it is subject to competition is in line with Ramsey-Boiteux pricing principles, which are generally beneficial for societal welfare. But if geographically differentiated wholesale prices are so low as to preclude competitive entry, and especially if they are below the SMP operator's unit cost, then they are likely to be harmful on balance.

In the UK (which continues to follow the principles of the EECC in general), Ofcom recently prohibited the SMP incumbent from offering geographically differentiated wholesale prices

[931] We are making a general economic point here, not necessarily claiming that any firm is pricing predatorily today.
[932] This behaviour was alleged in one of our interviews.

altogether, except with explicit permission.[933] Ofcom was concerned that the UK SMP operator "may be able to deter large scale alternative network rollout (and therefore face reduced competition over a wider area) by reducing prices in relatively few local areas. [The SMP operator] intends to roll out FTTP on a large scale. Even if reducing prices locally results in lower returns in some areas, this may not be significant in the context of its overall FTTP investment."[934] In order to address concerns such as these, Ofcom "decided to restrict Openreach's ability to discriminate through geographically targeted price reductions by imposing a specific provision [that] makes it clear that [the SMP operator] is prohibited from charging different prices in different geographic areas for rental services, except where [Ofcom] otherwise consents. … The geographic discrimination prohibition … prevents differentiated prices and other pricing measures which might have the same effect."[935]

The Irish NRA ComReg likewise implements a restriction on the ability of the SMP operator to selectively set geographically differentiated prices for wholesale: "In exceptional circumstances only and subject to … pre-conditions, [the SMP operator] may be allowed, subject to ComReg's approval, to reduce the wholesale access price for FTTH based [virtual unbundled access] below its average costs provided that the price is not less than the lower of either: (a) Eircom's full deployment costs for the provision of FTTH based [virtual unbundled access] in the specific geographic area concerned; or (b) the FTTH based VUA price of an alternative operator (i.e., an alternative operator's retail price minus retail costs and relevant network costs)." The reasoning is in line with that in this section: "If the wholesale price is too high in areas where infrastructure investment is also unlikely to develop (as the deployment cost for each line is high i.e., in rural areas), this would not be desirable due to the detrimental long-term impact on end users arising from a lack of competition, as competition from operators acting as resellers may also be dampened while end users may pay too much for their broadband service. On the other hand the wholesale price should not be too low, especially in more densely populated areas, as it could deter investments in the long term."[936]

Prohibiting geographic discounts (or for that matter implementing a price floor) may tend in some cases to increase consumer prices. Any remedy that has the effect of increasing consumer prices needs to be undertaken with considerable care, since it effectively sacrifices static efficiency and consumer welfare to a limited degree in exchange for gains in dynamic efficiency, especially due not only to more extensive VHCN build-out, but also due to facilities-based VHCN competition. In the ideal case, the need for remedies would be time-bounded – once the facilities-based competitor were sufficiently well established, these obligations would no longer be needed, and there might even be a basis for the NRA to find that SMP is no longer present.

If a prohibition on geographic wholesale price differentiation were to prove to be insufficient to address a specific problem, an outright price floor on wholesale access services could be considered. Our feeling is that this is an extreme remedy that runs counter to the rationale for

[933] Ofcom (2021), "Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021 - 26: Volume 3: Non-pricing remedies", Chapter 7.
[934] In addition, Ofcom was concerned about "commercial arrangements such as loyalty discounts or pricing contingent on large volume commitments from wholesale customers, which penalise access seekers for moving volumes from Openreach to an alternative network operator."
[935] Idem., paragraphs 7.71 and 7.72.
[936] ComReg Ireland (2018), "Pricing of wholesale broadband services: Wholesale Local Access (WLA) market and the Wholesale Central Access (WCA) markets: Response to Consultation Document 17/26 and Final Decision", ComReg 18/95, Decision D11/18.

pricing flexibility. It should be considered only in extreme cases, if at all.[937] In most cases, restrictions on geographically differentiated pricing for wholesale access services (and on other discounts that have similar effect) are likely to be sufficient, less intrusive, and therefore more proportional.

It is not entirely clear whether measures such as there are permitted under the EECC. Under Art. 74 EECC: "A national regulatory authority may, in accordance with Article 68, impose obligations relating to cost recovery and price control, including obligations for cost orientation of prices and obligations concerning cost-accounting systems, for the provision of specific types of interconnection or access, *in situations where a market analysis indicates that a lack of effective competition means that the undertaking concerned may sustain prices at an excessively high level, or may apply a price squeeze, to the detriment of end-users* [emphasis added]".

Art. 74 EECC goes on to say: "In determining whether price control obligations would be appropriate, national regulatory authorities shall take into account the need to promote competition and long-term end-user interests related to the deployment and take-up of next-generation networks, and in particular of very high capacity networks. In particular, to encourage investments by the undertaking, including in next-generation networks, national regulatory authorities shall take into account the investment made by the undertaking." Investments made by a facilities-based competitor can presumably be relevant here, not only those made by the SMP operator.

It is also worth noting that the objectives identified in Art. 3 EECC include not only the promotion of "connectivity and access to, and take-up of, very high capacity networks, including fixed, mobile and wireless networks, by all citizens and businesses of the Union", but also the promotion of "competition in the provision of electronic communications networks and associated facilities, including efficient infrastructure-based competition".

These concerns are more likely to come into play (if at all) where:

- There is at least one viable, or potentially viable, facilities-based VHCN competitor to the SMP operator. The NRA should be able to judge this based on information that it gathers through the Art. 22 EECC geographic survey.
- Competition at the wholesale level is not (yet) sufficient to justify an overall finding of an absence of SMP.
- The competitor is either a wholesale-only facilities-based VHCN provider or else a provider that is at least heavily dependent on VHCN wholesale revenues.
- The SMP operator is active over large parts of the national territory, while any facilities-based competitors have a more limited physical presence.

[937] This is in line with Ofcom's findings. "We remain of the view that a prohibition on geographic discounts is a simpler and more proportionate means of addressing our competition concern than a price floor. A floor would continue to allow Openreach to target price cuts in areas where entry occurred at relatively low cost to itself. [A] floor set too high would risk artificially inflating prices, while a floor set too low might give Openreach more commercial flexibility, but would not be as effective at preventing Openreach from setting low prices selectively in specific areas."

Recommendation 10. In specific circumstances, an SMP operator might have the incentive to set (geographically differentiated) prices of wholesale access services at a low level that makes the success of facilities-based wholesale VHCN competitors unlikely in certain areas. This might possibly arise in Member States where facilities-based competition is emerging or is likely to emerge over a portion of the national territory (which the NRA will typically know based on Art. 22 EECC survey data).

Price regulation

Our survey work and case studies showed that the cost orientation modelling methodology put forward in the NDCM Recommendation is widely supported across stakeholders and countries, as explained in Chapter 5. The BEREC Regulatory Accounting Report for 2020[938] notes that NRAs generally follow this recommendation for the former Market 3a, while practice is more evenly split between LRIC/LRAIC and Fully Distributed Costs (FDC) (i.e. top-down analysis) for the former Market 3b; the use of a modelling approach appears to be increasing when compared to 2019 BEREC data. However, some comments suggested a possible need for improvements to the guidance on the valuation of the regulatory asset basis (RAB) and on the frequency of reviews of the parameters of cost models used.

We explored whether there might be insufficient clarity as to the circumstances that should lead either to a major revision of the cost model, or to a less extensive update of parameters. There is clearly a trade-off to be made between, on the one hand, ensuring stable prices with less frequent updates, and, on the other, reflecting current conditions with more frequent updates. A few issues were raised. In one instance, a market player complained that changes in consumer demand had not been adequately reflected. Overall, however, we did not identify any systemic problems.

We explored whether the approach currently recommended for legacy civil engineering assets that are reusable (i.e. valuation at the regulatory accounting value with adjustments to reflect depreciation already taken, plus appropriate CPI indexation) should be extended to other assets, and, if so, the criteria that such assets should fulfil to qualify for this valuation. The concern is that in instances where the SMP operator makes available CATV cables, or copper that has been sunk without ducts, NRAs generally value them on the basis of replacement costs according to BU-LRIC forward looking cost models. This results in a price that is arguably too high for an asset that has already been depreciated over a period of many years. We take this up later in this section.

Other areas where we considered possible revisions are (1) revision or elimination of the price band provisions of the NDCM; (2) refinements to the calculation of the (NGA) risk premium; and (3) other possible revisions to try to motivate more rapid VHCN deployment to regions that otherwise are only marginally profitable.

The price band

Points 41 through 43 of the NDCM anticipate that implementation of the recommended methodology would lead to "a Union average monthly rental access price for the full unbundled copper local loop within a band between €8 and €10 (net of all taxes) expressed in 2012 prices

[938] BEREC (2020), *BEREC Report: Regulatory Accounting in Practice 2020*, BoR (20) 210.

(the price band)" and then uses this price band as a transitory tool for NRAs partially diverging from the recommended methodology.

The provisions served a useful purpose at the time. The unbundled copper local loop served an important role in 2013 and constituted the anchor product for pricing flexibility. At a time when cost modeling methodologies were far from uniform among the Member States, the price band provided a simple benchmark for identifying Member States whose costing methodologies needed urgent attention.

Today, we question whether this provision is required at all in a successor recommendation. Indications of declining relevance include:

- The relevance of copper ULL is declining and its value as an anchor product in support of pricing flexibility is likewise declining.
- Nearly all of the NRAs that do cost modeling have updated their cost modeling approach in line with the NDCM approach. The need for an objective standard to identify NRAs whose cost models need urgent revision is not very relevant today.

The spread in wholesale prices among Member States is substantial; however, consistency of wholesale access prices across the Member States is not identified as an Art. 3 EECC general objective. We see neither an EECC requirement nor a public policy rationale for maintaining the price band.

Recommendation 11. A successor recommendation should no longer provide a price band for wholesale access products.

Pricing of SMP CEI

As noted earlier, our evidence base suggests that pricing is one of the reasons for low take-up of SMP CEI in some Member States (see Chapter 0). Consequently, prices should not be higher than justified.

As regards SMP CEI, the guidance in the NDCM Recommendation is complicated. For new CEIs, the NDCM Recommendation calls for "valuation of the assets of such an NGA network at current costs" (Point 33). For reusable existing SMP CEIs, however, the NDCM Recommendation says: "In the recommended costing methodology the Regulatory Asset Base (RAB) corresponding to the reusable legacy civil engineering assets is valued at current costs, taking account of the assets' elapsed economic life and thus of the costs already recovered by the regulated SMP operator. … Therefore, the initial RAB corresponding to the reusable legacy civil engineering assets would be set at the regulatory accounting value, net of the accumulated depreciation at the time of calculation and indexed by an appropriate price index, such as the retail price index." (Points 35 and 37 NDCM)

In some of the Member States, there is little or no reusable SMP CEI. Some NRAs do not make a distinction between new and reusable CEI.

As regards new SMP CEI, the guidance is in line with the typical current practice of NRAs for the rest of the network and is not problematic.

Recommendation 12. The guidance on costing methodology in Points 25 through 42 of the NDCM Recommendation continues to be relevant for new SMP CEI. This implies valuation based on the use of BU-LRIC modeling and current costs.

For legacy reusable SMP CEI, Recital 187 of the EECC is key: "National regulatory authorities should value reusable legacy civil engineering assets on the basis of the regulatory accounting value net of the accumulated depreciation at the time of calculation, indexed by an appropriate price index, such as the retail price index, and excluding those assets which are fully depreciated, over a period of not less than 40 years, but still in use."

It is important to note at the outset that the guidance on reusable SMP CEI *relates only to how the assets should be valued*. Our understanding is that common practice among the NRAs is to model the network as a whole using BU-LRIC models, in line with the NDCM Recommendation. This means in particular that the network design, including topology and routing, is derived from BU-LRIC models, notably including the number of miles of ducts involved. The reference architecture used for the BU-LRIC model should reflect the form of network than an operator would choose to build today, which will, in general, be an FTTH network. In other words, *the quantities are generated by BU-LRIC models, but not necessarily the asset values*.

This is appropriate and is consistent with the NDCM Recommendation and with Recital 187 EECC. The hypothetical topology that the BU-LRIC model calculates for active network components is clearly the same topology that must be assumed for the underlying CEI – it is, after all, the same network. To do otherwise would risk introducing mutual inconsistencies and anomalies between the different cost models.

When one works with a BU-LRIC model, however, one is dealing with a hypothetical network topology. The links generated by the model may or may not exist on the ground in the real world. It is not meaningful to say that one individual link is legacy reusable CEI, while another is new CEI.

The initial rationale for valuing reusable civil engineering as the NDCM does is explained in the portion of the Impact Assessment for the NDCM that compares options: "the valuation of all assets according to current costs, without the adjustment for civil engineering proposed in [the approach that we recommend], is likely not to provide the appropriate price signal in those circumstances where the entry and thus the deployment of an entire parallel access network (or important parts of it) is neither economically feasible nor desirable in the light of the huge fixed sunk cost which the new entrant would incur (compared to the incumbent operator), especially where existing assets still have spare capacity. Under those circumstances, the building option would not be relevant for those assets which are unlikely to be replaced, such as for example the civil engineering infrastructure, and more relevant for those assets which are replaced, such as, for example, active equipment and, eventually, the copper lines. An inflationary effect would therefore be expected if assets that will not be replaced and that have already, to a certain extent, been depreciated, would be priced at replacement costs." In other words, *reusable civil engineering is not valued at replacement cost because it is highly unlikely that it would be replaced in practice*.

How does this change the modeled cost of the reusable civil engineering assets? For these assets, the shifts in unit costs over time have been far less dramatic than for active network components. The price indexation can likewise be assumed not to have made a great deal of difference in recent years because the rate of inflation has been low. The key difference comes

from reflecting the degree to which the civil engineering assets have been depreciated. Given that the lifetime of civil engineering assets is long (on the order of forty years), and that a significant fraction of the civil engineering assets now in use in some Member States was installed a long time ago, this difference can be substantial.

This guidance has been taken over in Recital 187 EECC for the valuation of CEI.

Once again, irrespective of how civil engineering assets are valued, the volumes typically come from the same BU-LRIC models that are used to model the rest of the network. It is meaningless to speak of the age of individual ducts. It is, however, possible to take the number of miles of ducts, multiply by the fraction that are expected to represent reusable assets, and then to make straightforward adjustments to reflect the fraction of those that can be expected to be fully depreciated. For the rest, they can be valued based on the regulatory accounting base, with adjustments applied for the average depreciation of the SMP operator's civil engineering assets.

If it is impractical to establish a value using the regulatory accounting base (due, for instance, to poor record-keeping in the past by the historic incumbent), the current value should not be very different *provided that an adjustment for depreciation is still made*. In this case, no price index adjustment is called for since the prices are already current prices.

Where price indexation is appropriate, a price index or a mix of price indices should be used that are relevant to the deployment costs of CEI. A retail price index alone will typically not constitute an ideal metric of the evolution of these costs.

Average depreciation can be applied to the assets irrespective of whether they have been valued at current cost or at historic cost based on the regulatory accounting base. Irrespective of whether current costs or historic costs from the regulatory accounting base are used, it is important that the adjustment for depreciation is made. Otherwise, in line with the Impact Assessment document for the NDCM Recommendation, an "inflationary effect would be expected".

One knowledgeable interviewee recommended that NRAs use the annuity formula to amortise the capital cost. Key inputs in this case are the asset value (capital cost), the asset lifetime, and the interest rate (i.e. the WACC). This results in treating capital cost as a constant stream.

Interviewees also spoke of instances where an SMP operator sold CEI assets, either to another firm or to itself, in order to try to reset the depreciation already incurred and thus to be entitled to compensation for the CEI asset for its full lifetime rather than its nominal remaining lifetime. For purposes of valuation of SMP CEI assets, the total depreciation incurred since the asset was built should govern.

Recommendation 13. The guidance on costing methodology for reusable SMP CEIs that appears in the current Access Recommendations and in Recital 187 EECC continues to be broadly fit for purpose overall. NRAs typically use a BU-LRIC model to compute the topology and routing of the network, and thus the quantity of reusable civil engineering infrastructure, but not its valuation. The adjustments to the value in the regulatory accounting base that are called for in Recital 187 EECC to deal with (1) the average accumulated depreciation of SMP CEI, (2) the fraction of SMP CEI that is fully depreciated, and (3) the fraction of SMP CEI that is reusable, as well as (4) an adjustment based on a relevant price index continue to be appropriate and fully relevant for reusable SMP CEI. If it is impractical to use the regulatory accounting valuation, the current valuation can be used as a proxy, in which case the adjustments for depreciation are still required but not the application of a relevant price index. In this regard, we do not see a need for the successor recommendation to distinguish between reusable SMP CEI built for the legacy copper network versus reusable SMP CEI that was built for VHCN as regards costing and pricing methodology, as long as the CEI in question can be used for VHCN today.

Calculation of the (NGA) risk premium

The *Weighted Average Cost of Capital (WACC)* plays an important role in calculating the CAPEX costs of network infrastructure. Risk is an important component of the WACC, and is specifically reflected in the *Capital Asset Pricing Model (CAPM)* formula that all NRAs use to calculate the WACC.

The WACC is primarily an issue in the context of cost-orientation of wholesale access prices, as covered in this section; however, it is also relevant for the application of the Economic Replicability Test (ERT).

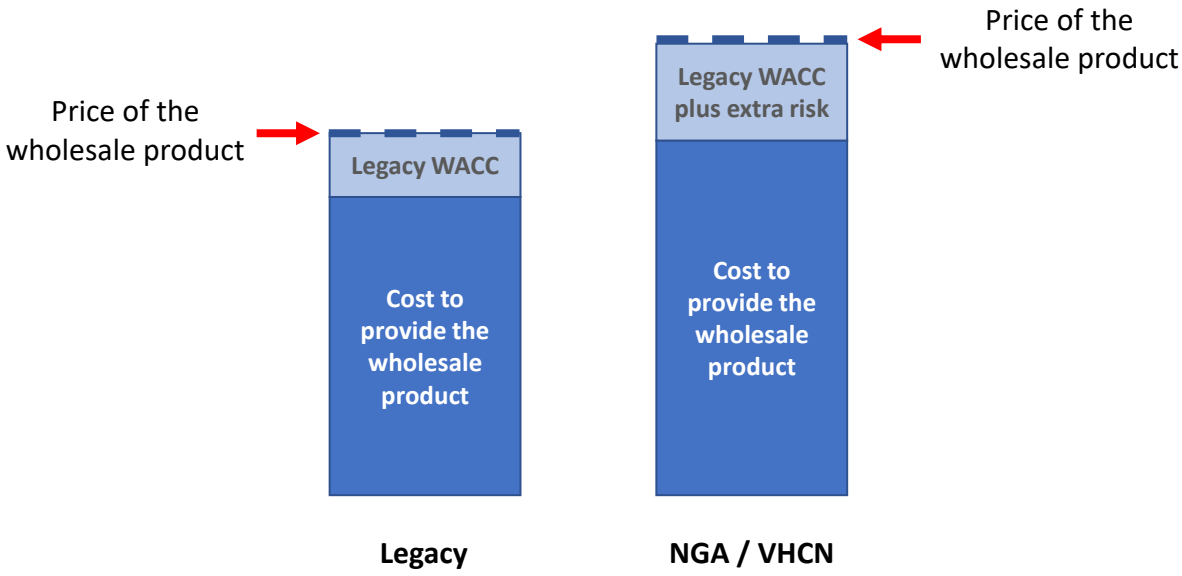
The NGA Recommendation recognises (point 23) that "costs of capital of the SMP operator for the purpose of setting access prices should reflect the higher risk of investment relative to investment into current networks based on copper."

Art 74(1) codifies this in part: "Where the national regulatory authorities consider price control obligations to be appropriate, they shall allow the undertaking a reasonable rate of return on adequate capital employed, taking into account any risks specific to a particular new investment network project."

The cost of fibre-based wholesale products will typically be greater than that of purely copper-based wholesale products for two main reasons. First, the underlying cost to provide fibre-based products is likely to be higher than that for copper-based wholesale products. Second, in cases where it is appropriate to apply an NGA/VHCN risk premium, the cost associated with the WACC (expressed as a percentage) can be thought of as being the product of two numbers, each of which is likely to be greater for fibre-based wholesale products than for copper-based wholesale products: the cost to provide the wholesale product multiplied by a WACC percentage (to which a risk premium has been added if appropriate), as is depicted in Figure 20.[939]

[939] For the moment, it is not necessary to distinguish whether a risk premium is part of the WACC versus being added to it. We return to this point shortly.

Figure 20. The legacy (copper-based) WACC and the NGA/VHCN (fibre-based) WACC plus risk premium (if any).



Source: Visionary Analytics.

NRAs seem to be reaching significantly different conclusions as regards the NGA/VHCN risk premium. Many NRAs do not apply a risk premium, or no longer apply one if they did in the past (see Chapter 5). We also note that SMP operators (who benefit from a high risk premium) and alternative operators (who are obliged to pay it) often have opposite views as to whether a risk premium is appropriate at this stage of NGA/VHCN deployment.

The Brattle report[940] recommends that only non-diversifiable (i.e. systematic) risk should be included in the WACC. Non-systematic risk should be taken into account, but not in the WACC (and they likewise argue that any "policy premium" not linked to non-diversifiable risk should not be included in the WACC). The Commission says the same in its 2019 WACC Notice[941], as does BEREC in its 2020 WACC Parameters Report.[942]

Point (25) of the NGA Recommendation urges NRAs to "… duly take into account additional and quantifiable investment risk incurred by the SMP operator when setting the price of access to the unbundled fibre loop. In principle, this risk should be reflected in a premium included in the cost of capital for the relevant investment as set out in Annex I." Annex I then goes on to say that the risk premium should take into account "inter alia … the following factors of uncertainty: (i) uncertainty relating to retail and wholesale demand; (ii) uncertainty relating to the costs of deployment, civil engineering works and managerial execution; (iii) uncertainty

[940] Dan Harris, Richard Caldwell, Lucia Bazzucchi, and Francesco Lo Passo (2016), *Review of approaches to estimate a reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization,* the Brattle Group. See especially pages 99-100.

[941] European Commission (2019), "Commission Notice on the calculation of the cost of capital for legacy infrastructure in the context of the Commission's review of national notifications in the EU electronic communications sector", 2019/C 375/01. Per Point (17): "In the CAPM framework, specific or diversifiable risks should not be taken into account to estimate the cost of capital. This is because in efficient capital markets investors should be able to reduce such risks by holding a diversified investment portfolio". Note however that the WACC Notice "does not address the applicability or the calculation of NGA risk premiums".

[942] BEREC (2020), *BEREC Report on WACC parameter calculations according to the European Commission's WACC Notice of 7th November 2019*, BoR (20) 116.

relating to technological progress; (iv) uncertainty relating to market dynamics and the evolving competitive situation, such as the degree of infrastructure-based and/or cable competition; and (v) macroeconomic uncertainty." In practice, the combined effect of the relevant factors, rather than their individual contribution to risk, should be reflected in the WACC – their individual contribution is not relevant.

Which of these five factors are systematic? This is not entirely clear. The last of the five (macroeconomic uncertainty) is clearly non-diversifiable and thus systematic. For an independent financial investor, the other four might be diversifiable in varying degrees. For the SMP operator, however, one might well question whether the risks are diversifiable, since a VHCN project will often be large enough to significantly influence the value of the firm. Firms can and do implement contingency plans to deal with the risks that they perceive, but they do not necessarily place sole reliance on diversification.[943] And the SMP operator, which ultimately serves its investors, might reasonably assume that its investors are fully diversified even if the firm itself cannot be.

In a formal sense, one could thus debate the degree to which any of these five elements should be directly incorporated into the WACC. In practice, this fine point does not change the permissible wholesale price, and does not appear to be leading to any difficulties. *The key consideration is that the incremental risk premium associated with VHCN deployment should, in the interest of clarity, be separately tabulated from the legacy WACC.*

Typical NRA practice today is to estimate a WACC for legacy services, and to treat any additional risk premium for fibre-based services as a separate value to be added to the WACC in computing the cost of fibre-based services. Many elements of the WACC are equally applicable to the firm as a whole, to both legacy and next-generation products. Treating the risk premium as a separate value to be added to the legacy risk premium (computed in accordance with the Commission's 2020 Notice) makes the differences explicit. We therefore think that adding the NGA/VHCN risk premium (i.e. a risk premium that is specific to the NGA/VHCN deployment project, in line with Art. 74 EECC which calls on the NRA to take into account "taking into account any risks specific to a particular new investment network project") as a separate number to the legacy WACC is a good practice that contributes to clarity and transparency.

Recommendation 14. In line with current guidance in the NGA Recommendation and elsewhere, and in the interest of clarity, any incremental risk premium associated with specific fibre-based deployment projects should continue to be separately tabulated from the legacy WACC. In computing the price of price-controlled wholesale access services, the risk premium should be added to the WACC.

There is considerable variation as to how different NRAs calculate the risk premium (see Chapter 5), and some stakeholders have argued that the risk premium has led to excessive margins (or has been set rather arbitrarily) in some Member States. In its consultation response, ECTA argued that a separate, higher risk premium for NGA was no longer warranted, but many other stakeholders felt that the guidance in the NGA Recommendation

[943] For a discussion of systematic versus non-systematic risk, see Dan Harris, Richard Caldwell, Lucia Bazzucchi, and Francesco Lo Passo (2016), *Review of approaches to estimate a reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization*, the Brattle Group.

continues to be valid in general[944]. Unsurprisingly, network operators that purchase wholesale access services have a different view than those that provide them.

The NGA Recommendation was enacted long before the EECC defined VHCN. It is natural, therefore, to ask whether the risk premium should apply to NGA versus VHCN. The NGA Recommendation in fact already deals with this question indirectly in Point 6 of Annex I when it says that criteria for a risk premium "… apply in particular to investment into FTTH. Investment into FTTN, on the other hand, which is a partial upgrade of an existing access network (such as for example VDSL), normally has a significantly lower risk profile than investment into FTTH, at least in densely populated areas. In particular, there is less uncertainty involved about the demand for bandwidth to be delivered via FTTN/VDSL, and overall capital requirements are lower. Therefore, while regulated prices for WBA based on FTTN/VDSL should take account of any investment risk involved, such risk should not be presumed to be of a similar magnitude as the risk attaching to FTTH based wholesale access products. When setting risk premia for WBA based on FTTN/VDSL, NRAs should give due consideration to these factors …" So the NGA Recommendation strove to promote deployment of FTTH, but did not rule out a risk premium for FTTN/VDSL.

On this, the EECC provides an explicit and roughly similar approach, albeit for VHCN/non-VHCN rather than for FTTH versus FTTN/VDSL. Art. 74 EECC obliges NRAs to "take into account the need to promote competition and long-term end-user interests related to the deployment and take-up of *next-generation networks, and in particular of very high capacity networks*. [emphasis added] In particular, to encourage investments by the undertaking, including in next-generation networks, national regulatory authorities shall take into account the investment made by the undertaking." The EECC thus puts the primary weight on VHCN, but it does not absolutely preclude the promotion of deployment and take-up of non-VHCN NGA.

Encouraging investment in non-VHCN NGA today would carry risks, even if done on only a very limited basis. At the stakeholder workshop that was held in support of this project on 9 June 2021, several participants[945] argued persuasively that the arrangements that NRA Ofcom had provided to the UK incumbent many years ago in support of NGA deployments (including the "fair bet" approach) were overly generous, and had the unintentional and unfortunate effect of locking the UK into VDSL networks for many years, thus stalling any prospect to upgrade to more modern and more capable FTTP/FTTH. This suggests that an NRA should not provide a risk premium for non-VHCN NGA if doing so risks delaying the deployment of VHCN. As a corollary, it suggests that any risk premium for non-VHCN NGA should be strictly bounded in terms of geography, and probably also in terms of time. In no case should a risk premium for non-VHCN NGA be as great as the risk premium for VHCN.

Taking into account all of this together, we recommend that the successor recommendation make it clear that the purpose of the risk premium today is to promote VHCN deployment and to compensate the SMP operator for the extra risks that it incurs in deploying VHCN.

Given that the EECC does not prevent the promotion of deployment and take-up of non-VHCN NGA, there is no need for the successor recommendation to do so. The promotion of non-VHCN NGA by means of a risk premium should however be viewed as an exceptional

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[944] See for instance https://ec.europa.eu/digital-single-market/en/news/access-recommendations-factual-summary-report-targeted-consultation-proposed-revision.

[945] Tony Shortall of consultancy TELAGE; Gita Sorensen of consultancy GOS Consulting; and Maurizio Mucci of Sky IT argued that there should be no risk premium for FTTC.

measure. As an example of circumstances that might justify a risk premium today for non-VHCN NGA, if the NRA judges that full coverage of the national territory with VHCN is unlikely in the medium term, but believes that a risk premium would increase coverage of hard-to-cover portions of the national territory with NGA services of reasonably good quality, a case could perhaps be made for a risk premium for non-VHCN NGA deployment.

Recommendation 15. The successor recommendation should emphasise that the purpose of the risk premium today is to promote VHCN deployments (including all forms that appear in the BEREC Guidelines) and to compensate the SMP operator for the extra risks that it incurs in deploying VHCN.

While price controls appear to be effective in enabling competition, there is nonetheless a question as to whether the functioning of price controls (for Member States that implement price controls in conjunction with the NGA risk premium) are enabling a fast enough deployment of VHCN. In the context of the current study, this boils down to two main questions:

- Are the prices that SMP operators are permitted to charge for wholesale access (reflecting price controls and the WACC), and the various wholesale and retail prices that flow from them, high enough to allow a profitable business case and therefore to encourage an appropriate level of efficient investment?
- Are procedures for periodically reassessing risk premia consistent with providing investors with incentives suitable to lead to an appropriate level of efficient investment?

As we are about to explain, a higher premium (however achieved) can be expected to increase the territory that an SMP operator subject to price control will cover, thus correspondingly reducing the territory for which coverage is possible only by means of public subsidy that is subject to State aid rules. Our feeling, however, is that it is appropriate to do so only when there is a clear justification that is linked to the risk that the SMP operator bears in light of the deployment of fibre-based broadband. Taking these points together implies that the implementation of these aspects of the EECC *should strive to fully compensate the SMP operator for all of the risks to which it is subject in regard to deployment of fibre-based broadband, but no more*.

Having said this, there are at least two significant elements of SMP operator risk in deployment of fibre-based broadband that typically are not (fully) reflected in current practice. The successor recommendation could provide guidance that would effectively add new tools to the toolkit of the NRAs.

We cover each of these in the sections that follow.

Analysis of a hypothetical "policy premium" sheds light on the functioning of the risk premium

Intuitively, it is natural to assume that greater expected returns on investments of the SMP operator are likely to lead to a more widespread deployment of VHCN. This was a key motivation for the NGA Recommendation to establish an NGA risk premium in the first place. As a thought exercise, it can be useful to explore whether returns even higher than those that could be justified under current practice might result in still faster VHCN deployment (which is in line with the objectives stated in Art. 3 EECC). Might doing so have negative impact on competition? Might doing so have negative impact on investments in VHCN on the part of alternative operators?

Our assessment is that the introduction of policy premium unrelated to risk should be avoided, for reasons that we explain in this section; however, exploring questions such as these is valuable to the extent that it can help to shed light on the functioning of the risk premium.

The Brattle report[946] mentions the possibility of a purely hypothetical *policy premium* that might be "granted to encourage or accelerate NGA investments for the purposes of achieving various policy goals, such as a minimum level of NGA network penetration", but they do not argue for such a premium. There is no apparent basis in the EECC for permitting such a policy premium, and we do not in fact advocate it, but it is still useful as a thought exercise to consider what the effects on deployment might be.

As noted in Chapter 2, Bourreau et al. (2020)[947] have studied these questions in some depth. They make a good argument that "the imposition of an additional margin [above standard access charges] just set high enough to make the incumbent invest in uncovered areas … can be set at a level that both makes the incumbent invest and safeguards some (though less) entry." Their analysis is expressed in terms of a risk premium, but the results could be expected to be the same irrespective of the rationale for granting the premium.

Bourreau et al. (2020) write that this extra margin, which functions similarly to the current NGA risk premium, could potentially be raised arbitrarily high.[948] Doing so however "then raises the incumbent's expected profits all the way up to the monopoly profit, which implies that by choosing [the premium] high enough any coverage level up to the monopoly benchmark can be achieved." This implies that the logic as regards the relationship between the premium and coverage can be expected to hold even for a hypothetical policy premium greatly in excess of the familiar risk premium.[949]

The hypothetical policy premium would be promising in terms of coverage, but it would come at a very substantial cost. Bourreau et al. (2020) note that "additional margins on top of the cost-based access charge, can restore coverage incentives [to the high levels that a monopolist would expect] even in the most costly areas. This comes at the price, though, of increasing the entrant's marginal cost, reducing ex post entry and consumer surplus in the newly covered areas."

Their analysis also suggests that a geographically differentiated approach would be appropriate for the purely hypothetical policy premium. They observe that in flat countries such as Belgium and the Netherlands, other approaches may be more effective than the hypothetical policy premium. In countries "where deployment costs increase steeply outside of urban areas (mountainous countries such as Italy and Switzerland), [alternatives] are not feasible (investment costs cannot be covered without adding an extra margin to the access price) and [policy] premia need to be used instead. In other countries that have both types of areas, such as France and Spain, the adoption of a mix of instruments is called for."

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[946] Dan Harris, Richard Caldwell, Lucia Bazzucchi, and Francesco Lo Passo (2016), *Review of approaches to estimate a reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization*, the Brattle Group. See especially pages 99-100.

[947] Marc Bourreau, Carlo Cambini, Steffen Hoernig, and Ingo Vogelsang (2020) "Fiber Investment and Access under Uncertainty: Long-Term Contracts, Risk Premia, and Access Options", *Journal of Regulatory Economics*.

[948] In fact, they write of a premium that "compensates the incumbent partially for the risk it is subjected to ex post by the uncertain entry decision." This would correspond to the real options value of "wait and see"; however, their economic analysis is not limited to this case.

[949] We confirmed our understanding of this point in private communication with the author.

From these considerations, it follows that the policy premium would be called for only in parts of the national territory where incentives with the existing approach to price regulation are not already sufficient to generate VHCN deployment. As Bourreau et al. (2020) have noted, there is no need to pay a policy premium for parts of the national territory that already have achieved (or predictably are going to achieve) sufficient VHCN coverage.

The key insight gained in this way is that a premium added to the cost-based access charge becomes a tool to reduce the fraction of the national territory for which a subsidy subject to State aid rules is needed. The greater the premium, the less territory must be covered by subsidisation under State aid rules. This insight is equally valid for the hypothetical policy premium and for the familiar risk premium.

It is also worth noting that the same argument about the premium being an alternative to subsidisation can be stated the other way around – depending on the specific circumstances, using a subsidy to achieve broader coverage rather than the VHCN risk premium might offer better results. But that discussion is out of scope relative to this study, and it is an option that in any case is generally not available to the NRA.

With that established, we now explain briefly why it is that we do not advocate the hypothetical policy premium. There are two main reasons that should be obvious at this point. The first is that there is no obvious objective basis on which to determine the size of the policy premium. To introduce a policy premium that is solely at the discretion of the NRA would potentially bring politicisation and lobbying into the regulatory process, and might potentially undermine the integrity and predictability of the regulatory process.

The second is that the hypothetical policy premium, if set at a level substantially in excess of risk, potentially leads to arbitrarily high prices, and to windfall profits for the SMP operator. Whether this represents a net loss of consumer welfare will depend on the specific circumstances – if the arbitrary policy premium were offered only in geographic areas that would otherwise be served with broadband with only limited capability, it is possible that the dynamic gains to consumers who enjoy better service might greatly outweigh any static loss in consumer welfare.

If the level of wholesale prices for SMP access products is insufficient to motivate the SMP operator to cover the full national territory, other tools may be needed, including tools that are outside of the scope of the EECC (such as for instance public subsidy subject to state aid rules).

Having established that a premium not related to risk would be ill-advised, there are two aspects of risk that are rarely addressed in current EU regulatory practice. The first has to do with ensuring that the risk to which investors were subject when they initially committed their investment is not prematurely disregarded the moment that the investment has been shown to be a success. The second relates to the "option value" to the SMP operator of delaying the investment, perhaps indefinitely, in order to wait for more information on risks to appear (which implies that the compensation for risk must be slightly higher than that required to obtain a zero return in the expected case, since the SMP operator must also be compensated for the value of the implicit option). Both of these are tied to real risk and both are quantifiable.

Compensation for downside risk being too quickly withdrawn

Point (6) of Annex I of the NGA Recommendation enumerates five elements of risk and goes on to note that they "may change over time, in particular due to the progressive increase of retail and wholesale demand met. NRAs should therefore review the situation at regular intervals and adjust the risk premium over time, considering variations in the above factors."

A strong argument can be made that the current approach of frequently updating the risk premium to reflect current market conditions, even though it is in line with the guidance of the NGA Recommendation, runs counter to the stated EECC goal of promoting efficient investment in VHCN.

- If the investment does better than expected, the risk premium can be expected to be adjusted downward not later than the next review cycle (currently five years). In Member States that review the WACC annually, it might be adjusted downward much sooner.[950]
- If the investment does worse than expected, investors have no obvious recompense. Prior to liberalisation, a state-owned monopoly operator might have expected to be bailed out by its government, but that is no longer the case.

In the UK, this concern was embodied in *fair bet* principles. "Where an investment is risky, there is a significant possibility that it will fail, and there is also a possibility that it will be more successful than had been expected. The 'fair bet' principle recognises that the firm needs to benefit from sufficient upside potential from any investment to offset the downside risk of failure. The alternative, where [the SMP operator] faces the full cost of failure, but has the rewards of success strictly capped by the regulator, is likely to deter any form of risky investment. To ensure investor confidence, it is important we honour the fair bet over time."[951]

It is important to note at the outset that *fair bet is not seeking to protect the investment that has been made*. It is instead trying to ensure that the *expectation* that the investor made at the time when he or she sunk the funds is not invalidated (e.g. by regulatory action) sooner than investors might reasonably have expected when they made the investment, taking into account both optimistic and pessimistic scenarios.

Ofcom considered investments to be risky where they (1) involved a significant step change in capability compared to products available in the market today (e.g. 1Gbit/s services), potentially leading to significant uncertainty on network deployment costs, consumer demand, and the prices that consumers will pay; (2) required a single, upfront commitment rather than allowing more incremental and cautious investment; and (3) resulted in 'sunk' capital costs, where the assets have no alternative uses following deployment.[952]

Ofcom sought to implement fair bet in a way that is generally in line with EECC goals. They sought (1) to preserve the investment incentives faced by the SMP operator; (2) to preserve the investment incentives faced by competitors to the SMP operator; (3) to protect retail competition where necessary, based on access to the SMP operator's network; and (4) to protect consumers against the risk of high prices.

Fair bet is appealing as a general principle, and is generally in line with EECC goals, but challenging to apply in full in practice. Notably, NRAs are not well equipped to assess or

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[950] For an example from the literature in a case where a price cap had been contractually committed, consider Laffont and Tirole (2000), *Competition in Telecommunications*, page 5. "Large rents are politically hard to sustain. A case in point is the 1995 breach of the price cap contracts with the U.K. regional electricity companies, when Professor Steve Littlechild, a designer of price cap regulation in the 1980s who had become the U.K. electricity regulatory, had to yield to intense political pressure and reduce the caps substantially because the companies were making large profits."

[951] UK Ofcom (2016), "Making communications work for everyone: Initial conclusions from the Strategic Review of Digital Communications", pages 41- 42.

[952] UK Ofcom (2016), "Making communications work for everyone: Initial conclusions from the Strategic Review of Digital Communications".

quantify in advance the full probability distribution associated with the SMP operator's downside risk of failure, nor, for that matter, the full probability distribution associated with its upside prospects for success. What is needed here in principle is not a handful of numbers, but rather the full probability distribution of expected outcomes.

Unlike classic *rate of return regulation* (which we discuss elsewhere in this chapter), *the fair bet in and of itself neither caps nor guarantees the SMP operator's returns on capital investment.*[953] *Fair bet seeks only to provide predictability and some sense of "fairness" on the likelihood of returns.*

The UK implemented fair bet primarily by granting the SMP operator flexibility in setting its wholesale prices, starting from 2008. By 2015, there was already a debate as to whether the fair bet commitment had been fulfilled and could be retired. Unsurprisingly, different stakeholders argued for or against maintenance of pricing flexibility based on their individual commercial interests. The SMP operator argued for maintaining pricing flexibility, while an alternative operator argued that the SMP incumbent could not have expected more than eight years of pricing flexibility when it made the initial investment.[954] Meanwhile, it is challenging to compare the profits that the SMP operator made over those eight years to the profits that they might have made in the absence of pricing flexibility (i.e. comparison to the counter-factual), and impractical to compare those profits to the risk of losses had the investment gone badly. In other words, whether the benefit granted truly resulted in a fair bet for the SMP operator and its investors remains purely conjectural.

There is, however, a possibility to address the concern that motivated the fair bet approach in a different and more practical way.

The normal functioning of the risk premium would tend to lead to a reassessment of the risk premium at "regular intervals", which might be annual or might be once per review period (see Figure 21).[955] As a general rule, when an NRA reviews the WACC and the NGA/VHCN risk premium in view of updating wholesale access prices, the new price applies not only to new access requested to the SMP operator's network, but also to existing access agreements. This tends to imply multiple revisions over the lifetime of a typical VHCN deployment project.

There is a strong argument to be made that a frequent downward revision of the risk premium after investments have been sunk, and after the risks and rewards are known, encourages the NRA to reduce the risk premium too soon and thus runs counter to providing consistent incentives for investors. The investments will have been made *ex ante* (in advance), at a time when the downside risks were unknown, but adjustments to the risk factor come *ex post*, after

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[953] UK Ofcom decided in 2018 to continue to implement fair bet principles, and decided at the same time to apply price caps to VULA services; however, the price caps are treated as a separate matter from fair bet, and the Ofcom decision demonstrates that there has been considerable debate as to whether price caps are compatible with fair bet principles. See UK Ofcom (2018), "Wholesale Local Access Market Review: Statement – Volume 1: Markets, market power determinations and remedies." In Section 9.19, they say: "In relation to preserving BT's investment incentives, we are required when setting charge controls to consider the extent of investment by the dominant provider in the matters to which the pricing remedy relates. We have considered this issue by reference to the 'fair bet' principle; that is, whether BT has had a fair opportunity to earn a reasonable return on its original FTTC investments, taking account of the risks at the time the investment was made. … [We] find that BT has had a fair bet on its FTTC investments and so our decision to impose price regulation on BT's VULA 40/10 services is consistent with safeguarding BT's incentives to invest."

[954] UK Ofcom (2016), "Making communications work for everyone: Initial conclusions from the Strategic Review of Digital Communications", page 41. See also UK Ofcom (2017), Wholesale Local Access Market Review – Volume 1: Consultation on the proposed market, market power determinations and remedies".

[955] Per point (6) of Annex 1 of the NGA Recommendation: "These factors [of uncertainty] may change over time, in particular due to the progressive increase of retail and wholesale demand met. NRAs should therefore review the situation at regular intervals and adjust the risk premium over time, considering variations in the above factors."

the risks are known. The investor has effectively been invited to place a bet at a roulette table that is slanted away from him.

Figure 21. Frequency of update of the WACC

MS	Fixed Market (Year of Adoption)											
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AT		X			X			X				
BE	X		X					X				X
BG						X			X			
CY				X				X		X	X	X
CZ									X			X
DE				X						X	X	X
DK								X	X	X	X	X
EE												
EL						X		X		X	X	
ES		X				X			X	X	X	X
FI		X				X				X		
FR					X		X		X		X	
HR						X			X			
HU								X	X	X	X	X
IE		X					X					
IT			X					X				X
LT								X			X	X
LU									X			
LV												
MT					X							X
NL					X				X			
PL										X	X	X
PT								X	X	X		X
RO						X						
SE											X	X
SI							X					X
SK						X			X		X	X

Source: BEREC (2020), "BEREC Report: Regulatory Accounting in Practice 2020", BoR (20) 210, Chapter 5.
Note: For a cell to be green means that a review of WACC parameters was conducted. An "X" in a cell means that the review is in the BEREC database.

The UK experience suggests that investment decisions need certainty for a longer period than one year, and probably for a longer period than a market review cycle, particularly when one considers that the investment decision will not necessarily have been taken at the very beginning of a five year market review cycle.

There is, however, a trade-off here. Too short a period of reassessment discourages investment. Too long a period of reassessment, on the other hand, is negative relative to consumer welfare to the extent that potential benefits of competition are deferred (i.e. prices are typically higher than is justified toward the end of the reassessment period). The SMP operator is arguably not entitled to a higher risk premium forever. At some point in time, the SMP operator has been adequately compensated for the initial risk that was taken when the investment was made and committed.

The UK example is again instructive. Ofcom (the UK NRA) said that in deciding when to move away from pricing flexibility, they would take account of factors including "the date on which investors originally expected 'payback' on the investment. This is not the same as actual

payback i.e. whether the investment delivered on the original expectations or not; and whether returns earned to date and potential future regulated returns are sufficient to compensate for the original risk of failure…".

As part of this UK process, the consultancy Oxera prepared a report on behalf of the UK SMP operator, assessing whether Ofcom's planned regulatory approach was in line with the fair bet principle of "giving investors at project inception the opportunity to earn the project-specific cost of capital, on an expected basis."[956] We have no quarrel with their analysis, but we question whether any NRA is in a position to do this analysis on a regular basis in practice.

In principle, one could envision a rule that empowers the NRA to make credible commitments not to change the VHCN risk premium for investments for a pre-defined number of years after the investments have been made (and thus sunk). The number of years committed could reflect discussions with the SMP operator and broader consultation, ideally as part of the market review cycle. The commitment would relate only to risky investments in VHCN, not to all investments of the SMP operator.

This does not align with the process that the NRAs need to follow in practice in setting the prices of wholesale products. The NDCM put in place pricing based on a BU LRIC+ methodology (points 29 and 30), and there were good reasons that continue to be valid for this choice. The WACC and the associated risk premium will thus be added, not to historical costs incurred in the past, but rather to a single forward-looking estimate of incremental cost if the VHCN were implemented today using Modern Equivalent Assets (MEAs). The result in each case will be a single price for each wholesale product offered by the SMP operator (not only for newly acquired wholesale access products, but also for products already acquired under existing contracts), and that price will take effect and remain in effect nationwide until the next review. At any given point in time, prices will reflect one WACC and one NGA/VHCN risk premium that are both in effect nationwide.

There is the further complexity that investments in VHCN are made not all at once, but may be potentially spread out over a period of many years.

Our sense is that this implies the need for a pragmatic heuristic approach that reflects the need to strike a balance between the risk profile at the time investments were undertaken (both upside and downside), and the risks that are currently present.

We believe that a judicious use of *smoothing techniques* could provide a simple and pragmatic approach quantitative approach that would have roughly the right properties. Rather than being reassessed every year, or every review period, *the risk that was relevant when the investments were made should continue to have some influence on the price that the SMP operator is permitted to charge, but that influence should gradually decline over time*.

Mathematical and engineering tools for smoothing are well developed. The succession of WACC calculations made over a succession of years can be viewed as a *time series*. A number of techniques have been developed over the years to provide insight into time series'. Noteworthy among these is a family of techniques known as *autoregressive integrated moving average (ARIMA)*. The techniques are *autoregressive* in the sense that the value in previous periods influences the calculated value for the current period. ARIMA is a generalisation of the *autoregressive moving average (ARMA)* model.

[956] Oxera (2017), *Does Ofcom's approach in the WLA market review honour the fair bet principle?*

Exponential smoothing is a simple, well known form of ARMA, and we use it here for purposes of exposition; however, we do not rule out the possibility that other ARIMA/ARMA algorithms might be better. Exponential smoothing of the VHCN risk premium would appear to have the right general properties. The VHCN risk premium in each period would be calculated as a simple weighted average of the current VHCN risk premium and the most recent exponentially smoothed VHCN risk premium, where a *smoothing factor* (α) would be used as the weight. The choice of an appropriate smoothing factor allows the value to converge quickly, or more slowly, to the most recent value.

The net effect would be to provide some "stickiness" in the VHCN risk premium. The understanding of both upside and downside probabilities at the time of the initial investment would continue to influence the VHCN risk profile indefinitely, but it would play a declining role over time. With a high smoothing factor, the importance of the initial risk assessment and its associated risk premium would play a stronger role for more review periods.

This approach has several positive properties.

- The risks as viewed in each successive period continue to have weight – the risk premium does not instantly snap to the current year's value.
- The risk premium likely is not fixed at the historic value, but gradual converges to reflect current realities.
- The smoothing factor provides a control knob between the two.
- The process reduces the risk of abrupt changes in the profitability of the investment; however, if smoothing is applied only to the VHCN risk premium, it does not avoid the risk to investors that the price of wholesale products changes abruptly for some other reason (e.g. a shift to a different Modern Equivalent Asset).

With this approach, the frequency of review plays only a secondary role. The smoothing factor could be chosen such that the speed of convergence (i.e. the *time constant*), measured in years, is roughly the same irrespective of whether the reassessment of the VHCN risk premium is done annually versus every five years.

In principle, smoothing could be applied either only to the risk premium, or else to the sum of the WACC plus the risk premium. For a number of reasons, our sense is that it is better to apply it only to the VHCN risk premium. Notably, the WACC is already designed to provide compensation for overall systematic risk and there is a risk of "double counting" if investors are provided with a second level of protection.

A practical challenge is that, in principle, one might want the VHCN risk premium in the years when the largest investments in VHCN were made to play the largest role. It is not immediately clear how to do this methodologically.

Guidance permitting the application of ARIMA-style smoothing methods to the VHCN risk premium would be fully in line with Art. 74 EECC, including not only the portion that calls on NRAs to "national regulatory authorities shall take into account the need to promote competition and long-term end-user interests related to the deployment and take-up of next-generation networks, and in particular of very high capacity networks", but also the portion that calls on NRAs to "take account of the benefits of predictable and stable wholesale prices in ensuring efficient market entry and sufficient incentives for all undertakings to deploy new and enhanced networks."

If smoothing is not used, we would suggest aligning the calculation of the risk premium with the five year market review cycle in order to provide some limited smoothing effect. (This will also tend to necessary if the NRA chooses to use a real options approach as described in the next section inasmuch as the calculation is likely to be demanding.) Note that the cycle for reviewing the risk premium need not be the same as the cycle for reviewing the WACC.

Recommendation 16. Instead of requiring review of the VHCN risk premium at regular intervals with the implication that the new VHCN risk premium immediately supersedes the old, a successor recommendation might acknowledge the permissibility of the use of a smoothing algorithm so as to reduce the risk to investors that the expectation of return on capital employed disappears too quickly. In the event that smoothing is not employed, then reviewing the risk premium every five years in line with the market review should be preferred in order to provide some limited smoothing effect.

Compensation for the "option value" of deploying now rather than waiting

In the past, it was generally assumed that investors would choose to invest as soon as the expected revenues from an investment exceeded the expected cost. Better economic theory has made clear that the investor often has the option to wait for more information, which potentially reduces the risk of the investment. A series of books and papers have expanded this view into the concept of *real options*. It was quickly recognised that the value of these real options for investment or deferral of investment could be valued using techniques similar to those used to value options (puts and calls) in financial markets, including the *Black-Scholes* method.

Dixit and Pindyck (1994)[957] explain that, in the absence of consideration of these considerations, economists had assumed that the investment decision was simple: "First, calculate the present value of the expected stream of profits that this factory will generate. Second, calculate the present value of the stream of expenditures required to build the factory. Finally, determine whether the difference between the two - the net present value (NPV) of the investment - is greater than zero. If it is, go ahead and invest." This further implies that one should continue to "invest until the value of an incremental unit of capital is just equal to its cost."

They argue that this view is simplistic to the extent that it "it assumes that either the investment is reversible, that is, it can somehow be undone and the expenditures recovered should market conditions turn out to be worse than anticipated, or, if the investment is irreversible, it is a now or never proposition, that is, if the firm does not undertake the investment now, it will not be able to in the future." For most investments (including, in our view, most investments in VHCN, as we shortly explain), these conditions do not in fact hold.

Dixit and Pindyck (1994)[958] go on to argue that "a firm with an opportunity to invest is holding an 'option' analogous to a financial call option-it has the right but not the obligation to buy an asset at some future time of its choosing. When a firm makes an irreversible investment expenditure, it exercises, or 'kills,' its option to invest. It gives up the possibility of waiting for new information to arrive that might affect the desirability or timing of the expenditure; it cannot

[957] Avinash Dixit and Robert Pindyck (1994), *Investment Under Uncertainty*, at https://msuweb.montclair.edu/~lebelp/DixitPindyck1994.pdf. For the convenience of the reader, we are citing from a concise online version rather than the well-known book.
[958] Ibid.

disinvest should market conditions change adversely. This lost option value is an opportunity cost that must be included as part of the cost of the investment. As a result, the NPV rule 'invest when the value of a unit of capital is at least as large as its purchase and installation cost' must be modified. *The value of the unit must exceed the purchase and installation cost, by an amount equal to the value of keeping the investment option alive.*" [emphasis added]

In other words, the compensation that the SMP operator would require before embarking on an NGA/VHCN investment is a bit higher than traditional models have assumed. *Compensating the SMP operator for the cost of surrendering its option to defer investment would be a reflection of legitimate, quantifiable risks to which the SMP operator is subject.* It should not be viewed as an arbitrarily set "bribe" to the SMP operator.

It is important to note that the "wait and see" option that the SMP operator holds may or may not have value. The option to "wait and see" might be worthless if the SMP operator is under substantial competitive pressure to deploy in order not to lose the 'first mover' advantage; in other cases, however, it might represent a meaningful cost for which risk is directly relevant.

These potentially important economic considerations have not found widespread implementation in EU regulatory practice as regards electronic communications, but they have been studied at some length in the UK, and have been in place in Italy since 2015.

Ofcom consulted[959] on the principle that an adjustment to conventional NPV methods might be appropriate where (1) there is a meaningful option to wait and see – i.e. investments are not now-or-never (as might be the case if there is serious risk of a competitor moving first); (2) net returns are uncertain; and (3) investments are irreversible. These criteria are very much in line with Dixit and Pindyck (1994).

In Ofcom's public consultation, "incumbents tended to be in favour of the use of real options theory in regulation, whilst [access seeker] competitors were opposed". It was not unexpected that incumbents who sold SMP wholesale access products favoured high prices for the products, while competitors who bought them favoured low prices. With that in mind, Ofcom made it clear in their Final Statement that Ofcom's goal in any implementation of real options would be "seek to reflect the conditions that would prevail under competition, not to underpin the investment decisions and returns of a dominant firm."[960]

In the end, Ofcom concluded that its analysis "should take account of the value of real options where appropriate", and they proposed "to assess the value of real options on a case-by-case basis, and [encouraged] stakeholders to make submissions to Ofcom on this subject in cases where they [felt] that wait and see options have a significant value."[961] In practice, they never explicitly incorporated a real options approach into their regulatory practice.

The significant technical challenges in implementing a real options approach presumably played a significant role in Ofcom's decision not to immediately incorporate real options into their regulatory practice.

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[959] UK Ofcom (2005), "Ofcom's approach to risk in the assessment of the cost of capital: Final statement".
[960] Ibid.
[961] Ibid.

In Italy, AGCOM implemented a real options approach, and documented specifics of their implementation.[962] Their work can serve as a useful reference to any NRA that seeks to implement a real options approach.

In line with Dixit and Pindyck (1994)[963], AGCOM began by explaining that investments in NGA, FTTH or FTTC networks are characterised by irreversibility, uncertainty, and an implicit option to delay the investment.

They then assessed two distinct options held by the SMP operator: a *wait and see* option and a *flexibility* option. (In real options theory, it is clear that the investor may simultaneously hold multiple options, including the option to sell the entity in which the investment was made.) The wait and see option is familiar from basic real options theory. In the interest of brevity, we will not cover the flexibility option here.

Several different methods are commonly used for evaluating real options today. The Black-Scholes method is widely used for financial options, but not so much in practical assessment of real options. *Binomial lattice* models are preferred by some practitioners, first because they depend on straightforward algebra rather than calculus as with the Black-Scholes method, and second and relatedly because they can easily be adapted and customised since they can be implemented using normal Excel spreadsheets.[964] A range of *Monte Carlo simulation techniques* have also been used by practitioners.

As a benchmark in assessing the value of their SMP operator's real options, AGCOM used both the Black-Scholes method and the binomial method. The Market Asset Disclaimer (MAD) approach was used to get around the limitation that the fibre-based deployment project was not yet built, and was not traded on the market (i.e. no established market value) – with MAD, simulated values are used instead of true market values.

In developing the MAD values, AGCOM assumed that the three main risk factors relevant to investment in NGA networks were (1) the take-up rate, (2) the average revenue per customer (ARPU), and (3) capital expenditure (CAPEX). In the case of CAPEX, their focus was on estimating the level of irreversible CAPEX as it would tend to be viewed by an investor, which is different than the LRIC cost that is estimated by conventional bottom-up models. For each of these, they used Monte Carlo methods to estimate the impact on the probability distribution of returns on relevant real options.

AGCOM has briefly documented[965] the modelling assumptions that they used as regards (1) the duration of the NGA/VHCN deployment project; (2) the technology used; (3) the expected useful lifetime of infrastructure deployed; (4) the parts of the national territory likely to receive FTTH versus FTTC deployment during the relevant time period; (5) their assumption that building wiring costs are borne by the investor, not the customer; and (6) which customers are likely to have a sufficient willingness to pay (WTP) for the new services going forward. The analysis was based solely on consumers, not on business customers, and it ignored any negative impact on the SMP operator's legacy business.

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[962] Italy AGCOM (2015), "The calculation of the Risk Premium for investments in NGA, FTTH and FTTC", Annex E to Resolution No 623/15/CONS.
[963] Dixit and Pindyck (1994).
[964] Tom Copeland and Peter Tufano (2004), "A Real-World Way to Manage Real Options", *Harvard Business Review*.
[965] Italy AGCOM (2015), "The calculation of the Risk Premium for investments in NGA, FTTH and FTTC", Annex E to Resolution No 623/15/CONS.

On this basis, AGCOM estimated the value of the wait and see option and the flexibility option. They then treated the combined risk premium as a function of the two (not quite the sum) taking into account both the duration of contracts between the SMP operator and an alternative operator, and the percent of contract value that is paid in advance (both of which reduce risk for the SMP operator).

This is an interesting real world application of real options; however, the degree to which this approach might be useful in other Member States is unknown, and the analysis would surely have to be adapted to Member State specificities. Nonetheless, we believe that it represents an important proof of concept. Other NRAs that hope to use real options to objectively estimate the cost of this risk factor for regulatory purposes might benefit from studying AGCOM's approach.

In employing real options methodology, AGCOM based its risk calculation on the hypothetical willingness of the SMP operator to deploy fibre over the different geographic areas in Italy, with their different risk profiles. However, the SMP operator concentrated its deployment in lower risk areas, allegedly leading to a discrepancy between the risk calculated by the NRA *ex ante* based on real options methodology in comparison with the risk actually incurred by the SMP operator[966]. It might be prudent to integrate any future application of real option methodology with concrete plans or commitments of the SMP operator to deploy VHCN, which will typically be known to the NRA thanks to the Art. 22 EECC process.

We caution that real options is a complex approach, and that it is likely labour-intensive. It is probably more suited for NRAs with a large staff than for NRAs with only limited staff. If a sufficient number of NRAs were to implement the approach over time, however, it might be feasible for less well staffed NRAs to use the calculations of better-staffed NRAs as a benchmark.

Recommendation 17. The use of real options techniques in calculating the NGA/VHCN risk in order to quantify additional risk-based costs to which the SMP operator is subject, notably for relinquishing its implicit option to wait and see, may be appropriate in some circumstances. Real options are typically inappropriate however if the SMP operator is forced by competitive factors to deploy immediately, inasmuch as the option value of waiting in that case is negligible. If more experience in the use of the technique is accumulated over time, it might be appropriate for NRAs that choose to do so (for instance, those that are less well staffed) to use the real option calculations of comparably situated NRAs as a benchmark and as an alternative to doing these complex calculations themselves.

Other possible revisions that might be considered in order to accelerate VHCN deployment

Two other alternative approaches to price regulation could be considered: *fair and reasonable pricing*, or a return to *rate of return regulation*.

[966] Sky Italy, stakeholders' workshop 9 June 2021.

Fair and reasonable pricing does not appear in the Access Recommendations, but it appears at many points in the EECC (notably Art. 61(2), Art. 61(3), Art. 76, Art. 79, and Art. 80). It is well established in the regulatory practice of the NRAs, and rightly so.

In Chapter 5, we found that only a few NRAs imposed fair and reasonable pricing obligations on SMP operators for wholesale broadband access products or in conjunction with symmetric access obligations. The meaning attached to the term by each of them in each of these cases is different.

BEREC confirms this in its response to the targeted consultation for the Access Recommendations (see also the discussion of Germany, Poland and the Czech Republic in see Chapter 5)[967]. We therefore tend to share BEREC's view, as stated in their consultation response, that merely requiring wholesale prices to be fair and reasonable would not properly substitute for providing a more detailed cost standard for wholesale products in the former Markets 3a and 3b in cases where price regulation is truly required.

The real merit of a fair and reasonable pricing standard for SMP wholesale access services, in our view, would tend to be in a limited number of cases where strict price controls are not required (i.e. some form of pricing flexibility has been granted), but where the NRA still needs to have the ability to intervene if prices are set at levels that appear to be inappropriate or abusive.

Recommendation 18. The use of fair and reasonable pricing is well established in the EECC and in the corresponding practice of the NRAs; however, its meaning is heavily dependent on the nature of the regulated service. As regards SMP wholesale access services subject to price control obligations, the ability of fair and reasonable pricing to substitute for a concrete standard for price controls in cases where an objective quantitative standard is truly required is questionable. Fair and reasonable pricing may nonetheless have value in a limited number of cases where strict quantitative price controls are not required (i.e. some form of pricing flexibility has been granted), but where the NRA still needs to have the ability to intervene if prices are set at levels that appear to be inappropriate or excessive.

In the past, rate of return regulation was the dominant method used to regulate monopolies in many network industries. Laffont and Tirole (2000)[968] provide a succinct summary: "The regulated firm was allowed to charge prices that would cover its operating costs and give it a fair rate of return on the full value of its capital. If costs moved out of line with those prices, the firm would ask for a new set of prices. The main value of this 'regulatory contract or compact' was to guarantee that the company would recover its costs. The absence of risk could attract capital at a low price. However, this method did not give incentives to keep its costs down."

Like fair bet, rate of return regulation tries to provide safety for investors; however, it does it in a different and nearly opposite way. The fair bet tries to provide some protection to the expected profitability of an investment; however, fair bet as implemented by Ofcom in the UK neither caps profits in case the investment earns more than expected, nor does it protect the

[967] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169.
[968] Jean-Jacques Laffont and Jean TIrole (2000), *Competition in Telecommunications*, MIT Press.

firm from losses in case the investment does worse than expected. The firm is therefore subject to incentives to earn as much as possible, and to avoid needless losses.

Rate of return regulation practically eliminates investment risk, but it also leaves little scope for better-than-expected profits. Incentives for the firm to innovate, to strive for high customer satisfaction, and to perform efficiently, are consequently weak. It is mainly for these reasons that rate of return regulation has largely been abandoned in developed countries as a means of regulating electronic communications.

The Netherlands implemented a form of rate of return regulation for fibre roll-out in 2008, and it appears to have worked reasonably well in the context of the specific circumstances of that place and time; however, we do not view a return to rate of return regulation as an attractive overall model for the EU today.

We do not rule out the possibility that there might be individual cases where rate of return regulation is justified for SMP wholesale access products, but we have not identified any specific instances.

c. Non-discrimination obligations

As noted in Section 11.b, non-discrimination obligations serve in multiple roles.

According to Recital (12) of the NDCM: "One of the main obstacles to the development of a true level playing field for access seekers to electronic communication networks is the preferential treatment of the downstream businesses, for example the retail arm, of a vertically integrated operator with significant market power (SMP operator) through price and non-price discrimination (for example, discrimination regarding quality of service, access to information, delaying tactics, undue requirements and the strategic design of essential product characteristics). In this respect it is particularly difficult to detect and address non-price discriminatory behaviour through the mere application of a general non-discrimination obligation."

As noted in Chapter 6 and discussed at greater length shortly, Recital 185 EECC treats Equivalence of Input (EoI) as "the surest way of achieving effective protection from discrimination". The recital, however, adds that "higher compliance costs should be measured against the benefits of a more vigorous competition downstream, and of the relevance of non-discrimination guarantees in circumstances where the undertaking designated as having SMP is not subject to direct price controls".

Balancing costs and benefits from imposing EOI is a challenging task. The Italian NRA has observed that (1) for the SMP operator, EOI requires adoption of new databases, new delivery systems, and possibly internal reorganisation of the firm; (2) for alternative operators, it can likewise require substantial modification of operational support systems, and (3) for all, it takes time and energy. They estimate some eighteen months from approval to implementation, during which time many meetings with the NRA and stakeholders are called for.[969]

The EECC and the Access Recommendations deal with non-discrimination as a means of ensuring effective competition. Some of the NRAs have recognised, in response to concerns expressed by competitive operators, that *equality of access alone does not ensure high quality*

[969] Italy AGCOM (2021), "Non-discrimination obligations in Italy: EoI , EoO and KPIs", presentation.

access. Some NRAs, notably including Italy[970], use the same mechanisms (the Reference Offer, KPIs, SLAs, and SLGs) to ensure that wholesale offerings have sufficient quality to meet market needs.

Based on the surveys and case studies described in Chapter 6, it has become clear that successful and robust implementation of effective non-discrimination requires sustained attention on the part of the NRA over a period of years. It has also become clear that effective non-discrimination imposes significant costs not only on the SMP operator, but also on the competitors.

We have identified a number of issues that might merit attention in a successor recommendation. These include (1) whether the preference for EoI over EoO in the current Recommendations is warranted in comparison with measures to make EoO more effective; (2) how to deal with the co-existence of EoI and EoO in Member States that implement both for different products; (3) the process by means of which KPIs, SLAs, and SLGs are set, including the role that commitments by the SMP operator can play in that process; (4) the process by means of which KPIs, SLAs, and SLGs are monitored and enforced, including the Reference Offer, and any penalties that the NRA might impose; (5) the degree to which the same mechanisms used to ensure non-discrimination can or should be employed to ensure that wholesale services are offered at a quality sufficient to meet market needs; (6) how to deal with potential commercial agreements where an SMP operator and an alternative operator would like to put in place service of a higher quality than that covered in current reference offers, and (7) whether anything more could be done to deal with long-standing gaps in making "Chinese walls" fully effective.

In the following sections, we take each of these up in turn.

Choosing EoI versus EoO

"In order to address and prevent non-price related discriminatory behaviour," per Recital 185 of the EECC, "equivalence of inputs (EoI) is ***in principle*** [emphasis added] the surest way of achieving effective protection from discrimination."[971] In the course of our interviews and workshops with NRAs and with stakeholders, however, we often heard that a well implemented equivalence of outputs (EoO) could ***in practice*** be as effective, or nearly as effective, as EoI in protecting against discrimination. Other stakeholders have argued, however, that non-discrimination is exceedingly difficult to enforce when the SMP operator does not consumer the same wholesale access product as competitors – KPIs, for instance, cannot truly be cross-comparable.

Recital 185 goes on to note that "providing regulated wholesale inputs on an EoI basis is likely to trigger higher compliance costs than other forms of non-discrimination obligations. Those higher compliance costs should be measured against the benefits of more vigorous competition downstream, and of the relevance of non-discrimination guarantees in circumstances where the undertaking designated as having significant market power is not subject to direct price controls. … national regulatory authorities should also consider whether obligations are proportionate for affected undertakings, for example, by taking into account

[970] Ibid.

[971] Consider also Point 13 of the NDCM Recommendation: "The Commission considers that equivalence of inputs (EoI) is in principle the surest way to achieve effective protection from discrimination as access seekers will be able to compete with the downstream business of the vertically integrated SMP operator using exactly the same set of regulated wholesale products, at the same prices and using the same transactional processes. In addition, and contrary to an Equivalence of Output (EoO) concept, EoI is better equipped to deliver transparency and address the problem of information asymmetries."

implementation costs and weigh up possible disincentives to the deployment of new systems, relative to more incremental upgrades, in the event that the former would be subject to more restrictive regulatory obligations."[972]

This is the crux of the matter. To the extent that EoI might provide alternative operators with better protection against discrimination for a particular wholesale access product, how do any gains measure up against any incremental costs? Viewed in this light, is the imposition of EoI proportionate in a particular case?

As noted in Chapter 6, in determining whether the imposition of EoI would (not) be proportionate, few NRAs do a rigorous cost-benefits analysis.

What has become increasingly clear over the course of many years of experience with non-discrimination mechanisms is that implementing EoI for existing wholesale products where processes are already in place that do not embody EoI imposes costs not only on the SMP operator, but also on the alternative operators.[973] A rigorous cost-benefits analysis could thus potentially become a labour-intensive exercise for the NRA.

At the same time, costs incurred by the NRA are also relevant to the cost-benefits analysis. As previously noted, a number of NRAs expressed the view[974] that non-discrimination provisions are more self-enforcing under EoI than under even a well implemented EoO regime. EoI also benefits the NRA to the extent that EoI tends to mitigate information asymmetries between the SMP operator and the NRA.

As new wholesale offerings appear, implementation of EoI for the new offerings might not be more difficult than implementation of a robust EoO approach. For existing services, however, it is often the case that the SMP operator has made substantial investments in a range of interconnected operational support systems (OSS). Comprehensive revision of these OSS can be time-consuming and expensive.

Given that EoI implementation for an existing service is typically more difficult and thus more expensive than implementation of EoO, the degree of take-up of the wholesale service also plays a role. For a wholesale service that is not much used, the extra cost of implementing EoI (both for the SMP operator and for alternative operators) may not be warranted.

Our interviews, case studies (see Chapter 6), and the feedback from NRAs in the BEREC workshop (see Annex 3) all suggest that EoO, if conscientiously applied, can be nearly as effective as EoI. For both EoO and EoI, effectiveness is heavily dependent on (1) the quality of the Reference Offer, (2) the degree to which KPIs, SLAs and SLGs are comprehensive, effective, and reflect the real needs of alternative operators; and (3) the effectiveness of monitoring and enforcement of non-discrimination obligations on the part of the NRA. The adoption of EoI makes this entire process more automatic and self-enforcing, but it also entails costs, and is not in and of itself a panacea.

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[972] The operative language of the EECC does not specifically require EoI. Art. 70 EECC requires "that the undertaking applies equivalent conditions in equivalent circumstances to other providers of equivalent services, and provides services and information to others under the same conditions and of the same quality as it provides for its own services, or those of its subsidiaries or partners", but it does not specifically require EoI. Art. 74 EECC conditions the granting of pricing flexibility on "effective and non-discriminatory access".
[973] Italy AGCOM (2021), "Non-discrimination obligations in Italy: EoI , EoO and KPIs", presentation.
[974] At a workshop with BEREC members conducted in support of this project on 15 April 2021.

This implies that the choice between EoO and EoI depends heavily on a Member State's circumstances, including the market structure and specificities of the particular wholesale access service involved.

If an NRA is considering applying EoO to some wholesale products and EoI to others, it might be appropriate to consider a more nuanced approach where different inputs to the wholesale products (some of which might be used by more than one wholesale product) are dealt with using EoO versus EoI; however, this analysis will tend to be highly case-specific. It also implies that in many cases, strengthening the implementation of EoO can be nearly as effective, and possibly more cost-efficient and thus more proportionate, than implementing EoI.

Recommendation 19. Equivalence of inputs (EoI) is in principle the surest way of achieving effective protection from discrimination; in practice, however, its advantages over EoO will vary considerably from one Member State to the next, and from one wholesale access product to the next. A well-crafted EoO regime, with good enforcement and suitable KPIs/SLAs/SLGs, can in many cases approach the effectiveness of an EoI regime. EoI provisions are largely self-enforcing, whereas EoO can be challenging to enforce in cases where the SMP operator does not itself consume the same wholesale access product that it offers to competitors. The successor recommendation should therefore continue to call for a case by case proportionality assessment of EoI versus EoO, in line with current practice. Both costs and benefits should be considered not only from the perspective of the SMP operator, but also from the perspectives of alternative operators and of the NRA.

Recommendation 20. In general, NRAs should duly justify their choices between EoO and EoI on a wholesale product by product basis, taking Member State characteristics and market characteristics into account. If however a single wholesale input is used in multiple wholesale products, then the decision should be made on an input by input basis.

The crucial role that Key Performance Indicators (KPIs) play

For many different reasons, KPIs play a key role in ensuring effective non-discrimination.

KPIs are set by the NRA, and monitored by the NRA. Where infractions are noted, the NRA plays the key role in imposing any penalties. The NRA is thus in a substantially different role than is the case for SLAs and SLGs, which typically are agreements between two undertakings, two private firms.

KPIs should be sufficient to ensure effective non-discrimination, but nonetheless proportionate. They should not be so numerous or so complex as to be needlessly burdensome.

As BEREC notes in its consultation response,[975] a minimal list of KPI and SLAs/SLGs that should be contained in a reference offer[976] is provided in its 2019 Guidelines: "SLAs should be available for ordering, delivery, service (availability) and maintenance (repair), including specific time scales for the acceptance or refusal of a request for supply and for completion,

[975] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, page 15.
[976] BEREC (2019), *BEREC Guidelines on the minimum criteria for a reference offer*, BoR (19) 238.

testing and hand-over or delivery of services and facilities, for provision of support services (such as fault handling and repair). Reference offers should also include the quality standards that each party must meet when performing its contractual obligations, including the specification of KPIs with respect to SLAs, as well as SLGs for ordering, delivery, service (availability) and maintenance (repair). In the Guidelines KPIs, SLAs and SLGs – applied in both equivalence of access concepts (EoO or EoI) – are addressed adequately to remain further on effective tools to enforce and monitor the non-discrimination obligation."

The KPIs implemented by AGCOM in Italy for VULA FTTC, bitstream and WLR shared access under NRA Decision 395/18/CONS (Equivalence+)[977] reflect many years of practical implementation experience and can provide an additional useful input for a list that could appear in the successor recommendation. They are:

Provisioning

- KPI 1.1 --% not workable orders (TIM responsibility)
- KPI 1.2 migration average time
- KPI 1.3 activation average time
- KPI 1.4 DAC/DRO migration average time control indicator
- KPI 1.5 DAC/DRO activation average time control indicator
- KPI 1.6 first appointment average time
- KPI 1.7 processing time for out sourcing of services
- KPI 1.8 single queue average time
- KPI 1.9 --% of postponed order (DAC postponed)
- KPI 1.10 --% of early faults within 14 days from activation

Maintenance

- KPI 2.1 fault: repair average time
- KPI 2.2 degradation: repair average time
- KPI 2.3 crossing time disaggregation KPI
- KPI 2.4 % fault re occurred within 14 days
- KPI 2.5 % repaired faults in 2 working days (after submission)

The wholesale CRM system

- KPI 3.1 System availability
- KPI 3.2 CRM performance Index

Backlog

- KPI 4.1 —% of orders not executed at the agreed deadline

[977] Italy AGCOM (2021), "Non-discrimination obligations in Italy: EoI , EoO and KPIs", presentation.

The process by means of which KPIs, SLAs, and SLGs are set

NRAs will not necessarily have the detailed knowledge needed to set the provisions required for the KPIs, SLAs, and SLGs. *Our perception is that non-discrimination has been most effective in Member States where the setting of KPIs, SLAs and SLGs is done through a broad multi-stakeholder process involving the SMP operator and alternative operators, and then monitored and enforced using effective mechanisms and adequate penalties.*

The NDCM Recommendation notes the need for public consultation in imposing EoI in Recital (18) and Point (51). As regards KPIs, Point (23) says in part: "In order to enhance transparency and foster market confidence, NRAs may facilitate through appropriate industry fora the agreement between the SMP operator and third-party access seekers on the detailed KPIs and ensure that such KPIs are audited and published in a manner that allows for the early detection of potential discriminatory behaviour. The KPIs should be related to the key activities in the provisioning cycle, covering all its stages i.e. the ordering process, the delivery or provision of the service, the quality of service including faults and fault repair times, and migration by access seekers between different regulated wholesale inputs." Point (24) NDCM says that "NRAs should be closely involved in the development of SLAs, for instance, by approving the SLAs developed by the SMP operator as part of a regulatory reference offer."

In its consultation response,[978] as previously noted, BEREC observes that they have already provided guidance on the question of minimally adequate KPI and SLAs/SLGs as criteria for a reference offer[979]. "The Guidelines stress that SLAs should be available for ordering, delivery, service (availability) and maintenance (repair), including specific time scales for the acceptance or refusal of a request for supply and for completion, testing and hand-over or delivery of services and facilities, for provision of support services (such as fault handling and repair). Reference offers should also include the quality standards that each party must meet when performing its contractual obligations, including the specification of KPIs with respect to SLAs, as well as SLGs for ordering, delivery, service (availability) and maintenance (repair). In the Guidelines KPIs, SLAs and SLGs – applied in both equivalence of access concepts (EoO or EoI) – are addressed adequately to remain further on effective tools to enforce and monitor the non-discrimination obligation."

Based on our interviews and case studies, our assessment is that the NDCM is right to promote discussion and agreement between the SMP operator and third-party access seekers, but it deserves more attention than it receives in the NDCM Recommendation. In particular, the successor recommendation would do well to replace the "may facilitate" with language that indicates that the NRA "should" promote this kind of discussion and agreement.

This observation is fully in line with Orange's response to the Commission's public consultation in which they observe: "Regular meetings with all the stakeholders, under the supervision of the NRA, could be used in order to fine tune each item and adapt it, if necessary, to the environment and the technical or marketing evolutions, as well as explaining the perimeter, the

[978] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, page 15.
[979] BEREC (2019), *BEREC Guidelines on the minimum criteria for a reference offer*, BoR (19) 238.

differences and evolution of the compared KPIs. This method has often proven to bring progress and the right level of transparency."[980]

It will often be efficient and practical to empower the SMP operator itself to offer detailed commitments, subject to comment or negotiation with alternative operators. Variants of this approach have been used for instance in Italy and Germany. We think that this approach is promising and is not sufficiently developed in the current Access Recommendations.

The Italian NRA decided against imposing EoI on the SMP operator in 2015 because it considered that the benefits were not commensurate with costs; that improvements in non-discrimination were needed to promote VHCN deployment more quickly that the time frame in which it would be feasible to implement EoI; that the regulatory burden would not have been substantially reduced; and that EoI would not in and of itself solve long-standing problems with the quality of the SMP operator's wholesale offerings. They instead invited the SMP operator to propose an approach to improving non-discrimination. The SMP operator proposed a voluntary switch to EoI for LLU, SLU, and VULA FTTH/FTTB, and an enhanced EoO for other wholesale services. Among the improvements proposed and approved was the strengthening of a supervisory board internal to the SMP operator, the Organo di Vigilanza (created in 2008 to monitor TIM commitments), to assist the NRA in monitoring and enforcing the various non-discrimination measures. The resultant New Model of Equivalence (NME) is accompanied by a comprehensive set of KPIs, SLAs, and SLGs that reflect extensive discussion between the SMP operator and the alternative operators. Agcom approved the new equivalence model in multiple proceedings and made it binding.[981]

In our survey of NRAs, the ILR (the Luxembourg NRA) made similar observations. "ILR opted for a 'contributive' way to implement [equivalence], meaning that all the market players were required to contribute to this process and also adhere to the result. Therefore, the ILR set up on a regular basis working groups where the SMP operator had to present the progress made with the implementation of EOI. This way, the access seekers understood the process and were able afterwards to understand how the EOI rules were implemented. During these meetings, alternative operators were supported by their consultants." They go on to note the importance of periodic reports and of periodic external audits of the effectiveness of the implementation of equivalence.

The German NRA achieves a somewhat similar outcome in a different way, in a process that centres around approval of the Reference Offer. There is a two-step procedure that begins with the publication of a draft Reference Offer by the SMP operator, and a request that access seekers provide comments. The NRA's ruling chamber (Beschlusskammer 3) examines the draft Reference Offer, holds a public hearing, and may make comments. In a second round, a revised Reference Offer is published, further comments are solicited, a second hearing is held.

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[980] Orange also observes that "… non-discrimination is a foundation of the regulation. Transparency and KPIs are effective tools for this aim in the case of EoO. For EoO, Orange believes that reliable and public KPIs are very efficient tools for achieving nondiscrimination and agrees with the necessity of setting up a list of efficient KPIs at the national level to be monitored and published by SMP operators. Performance results must be regularly updated and KPIs must be assessed from time to time in order to take into account the evolution of access products and the reality of the market. It is definitely important to focus KPIs on processes that are effectively used by the managers on the field. … It is important that, when appropriate, real and comparable KPIs are established, including provision effectiveness and failure ratios, as well as overall and partial provision and repair times. KPI indicators depend on SMP operator criteria regarding its responsibility as to the cause of failure or of the delay. In this regard, comparison with data provided by the operators could be used by the NRA to better understand the differences between wholesale process and self-provision by SMP."

[981] Italy AGCOM (2021), "Non-discrimination obligations in Italy: EoI , EoO and KPIs", presentation.

The process culminates with publication of an approved Reference Offer that includes service specifications, price lists, the ordering process, and procedures for fault repair and monitoring. As in Italy, there is a comprehensive set of KPIs, SLAs, and SLGs reflecting this multi-stakeholder process. The NRA is of the view that the process avoids placing needless restrictions on the SMP operator, engages alternative operators fully, and generates a degree of market consensus.

Our assessment is that collaborative multi-stakeholder processes such as these, where the SMP operator and alternative operators seek to achieve consensus, can potentially generate better and more flexible outcomes in many cases than the pure imposition of regulation by an NRA. It might also be appropriate for interested user advocacy groups such as BEUC or INTUG to be involved. Approaches like these merit serious consideration by NRAs, taking account of national circumstances.

A collaborative process has value only if it leads to a timely and meaningful agreement, which in general must be embodied in binding commitments. These are typically reflected in the reference offer of the SMP operator.[982] Today, Art. 79 EECC offers an additional tool by means of which commitments of the SMP operator could be made binding. SMP operators "may offer to the national regulatory authority commitments regarding conditions for access, co-investment, or both, applicable to their networks in relation, inter alia," a range of situations. The named situations include cooperative arrangements, co-investment in VHCN, and voluntary separation. There is a mention of "effective and non-discriminatory access", but it is in the context of voluntary separation. In principle, these provisions could empower NRAs to make SMP operator commitments binding and to impose penalties when necessary, both of which are essential to effective implementation.

A not-fully-resolved question is the degree to which these provisions can be applied in cases that do not involve cooperative arrangements, co-investment in VHCN, or voluntary separation. We would argue that the "inter alia" in the EECC implies that the listed instances are not intended to be exhaustive, and that Art. 79 should be applicable in this case.[983]

Recommendation 21. The successor recommendation could encourage NRAs to consider enabling the SMP operator to offer comprehensive commitments in order to implement effective non-discrimination, subject to a consultation and approval process designed to seek consensus with alternative operators and overseen by the NRA. The potential advantages of such a multi-stakeholder process are obvious.

Recommendation 22. The frequency with which KPIs are updated (and SLAs and SLGs where appropriate) should be set by means of the same multi-stakeholder process described in Recommendation 21. A cycle shorter than the market review cycle is likely to be appropriate.

[982] See also *BEREC (2019), BEREC Guidelines on the minimum criteria for a reference offer*, BoR (19) 238.
[983] The NRA should however verify that the transposition of "inter alia" into national law in its Member State has provided a sufficiently clear empowerment to enable it to make commitments binding, or to impose penalties when necessary.

Point 24 NDCM says that "In order to fully ensure non-discrimination, KPIs should be complemented by SLAs and SLGs". However, the NDCM has little to say about regulatory tools to preserve Quality of Service (QoS) of regulated wholesale products. This reticence is understandable in light of long-standing concerns among regulatory authorities in developed countries that regulation of QoS can sometimes have the unwanted effect of leading to "gold plated" offerings, and of driving lower quality services that some consumers want out of the market.

Non-discrimination is crucial, but our case studies suggest that merely assuring equality of access is not sufficient in all cases – even ideal non-discrimination could sometimes lead to treatment that is *equally bad* for the SMP operator and the alternative operators.

The Italian NRA AGCOM recently noted that a key reason why they rejected a non-discrimination scheme based solely on EoI, but instead encouraged the SMP operator to provide a more comprehensive solution, was that they found that full equivalence of access would not have guaranteed per se a higher QoS (Quality of the Service), which is a major issue for the competitors, especially while investing in NGA. They argue persuasively that many of the mechanisms that are used to ensure non-discrimination can also be profitably be employed to ensure suitable QoS in wholesale products by NRAs who perceive the need to do so. "KPIs are useful not just for non-discrimination but for quality performance monitoring."[984]

This concern is also in line with a 2016 observation by BEREC: "In the UK [which was a Member State at the time], the NRA has imposed minimum quality of standards for the provision of WLR, LLU and Ethernet leased lines as it found that EoI alone was insufficient to improve QoS. It found that performance levels from the SMP operator were not reflective of a competitive market and that the incumbent had insufficient incentive to improve under a general EoI framework."[985]

We suggest that the same consensus-driven multi-stakeholder process that is used to set KPIs, SLAs and SLGs (see Recommendation 21) could be used to ensure that competitive market needs for QoS are met.

Recommendation 23. When designing or refining the non-discrimination framework, the NRA should consider utilising the same consensus-based multi stakeholder process described in Recommendation 21 to establish KPIs, SLAs and SLGs to ensure that the Quality of Service of wholesale products is in line with competitive market needs in the Member State.

The process by means of which KPIs, SLAs, and SLGs are monitored and enforced

Our observations about the means by which KPIs, SLAs and SLGs are set apply fully to their monitoring and enforcement as well. A multi-stakeholder process that involves both the SMP operator and the alternative operators will sometimes lead to better outcomes than a direct

[984] Italy AGCOM (2021), "Non-discrimination obligations in Italy: EoI , EoO and KPIs", presentation.
[985] BEREC (2016), *Monitoring implementation of the BEREC Common Positions on Wholesale Local Access (WLA), Wholesale Central Access (WCA) and Wholesale High Quality Access at a Fixed Location (WHQAFL): Phase 3*, BoR (16) 219, page 8.

imposition of obligations by the NRA. NRAs should consider this possibility in light of national circumstances.

Our evidence base makes clear that effective non-discrimination does not happen overnight. It requires sustained attention on the part of the NRA; comprehensive and well-crafted KPIs, SLAs, and SLGs; and effective monitoring and enforcement.

Indeed, while BEREC has made clear that NRAs require KPIs, SLAs and SLGs in most of the cases where they should,[986] their publications shed only limited light on the crucial question of whether KPIs, SLAs, and SLGs as implemented are enforceable and effective in practice.

Under Point 26 of the NDCM Recommendation, where "the results of the KPIs indicate that the SMP operator may not comply with its non-discrimination obligation, the NRA should intervene by investigating the matter in more detail, and where necessary enforce compliance. NRAs should make public, for example on their website, their decision to remedy non-compliance". Nonetheless, our case studies suggest that NRAs do not always make clear how they will monitor KPIs, or how they will respond when KPI standards are not met. In particular, we suggest that the current "should make public, for example on their website" language is too loose and too vague. Once again, these process details can be important in achieving good outcomes.

Our cases studies indicate that the penalties imposed by SLGs and by NRAs in cases of consistent non-conformity with KPIs are too small in some Member States to be dissuasive. If the fine is too small, the SMP operator may simply view it as a cost of doing business, and may continue its abusive practices.

According to Point 29 of the NDCM Recommendation, "The level of such penalties [i.e. SLG payments] should be sufficiently dissuasive to ensure that the SMP operator complies with its delivery obligations." It appears that current practice does not fully adhere to this guidance.

The Italian association of Internet providers (AIIP) reported in its response to the Commission's public consultation, for instance, that despite recent improvements implemented by the NRA, "penalties approved … are yet not effective: often below the mandatory (according to the same NRA) indemnities due by providers at the retail level for the same (consequent) delay/malfunctioning; their application is complicated and without automatisms, therefor rare (especially for SME providers)."

The NRA plays a different and more limited role in SLAs and SLGs, however, than in KPIs. The NRA has primary responsibility for establishing and enforcing KPIs as a key tool for monitoring compliance with the non-discrimination remedy, but SLAs/SLGs are primarily agreements between two private parties. The NRA should however be involved in the process of establishing SLAs and SLGs where they are explicitly reflected in the referenced offer, as is called for in the BEREC Guidelines.[987] Among the BEREC minimum criteria for the reference offer is that it should include "service level guarantees (SLGs) for ordering, delivery, service (availability) and maintenance (repair), including the amount of compensation payable by one party to another for failure to perform contractual commitments as well as the conditions for eligibility for compensation."

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[986] See for instance BEREC (2016), *Monitoring implementation of the BEREC Common Positions on Wholesale Local Access (WLA), Wholesale Central Access (WCA) and Wholesale High Quality Access at a Fixed Location (WHQAFL): Phase 3*, BoR (16) 219, Tables 22, 23, and 24 and the related text.
[987] BEREC (2019), *BEREC Guidelines on the minimum criteria for a reference offer*, BoR (19) 238.

As a practical matter, stakeholders tell us that courts are reluctant to enforce large penalties for SLG violations. In practice, KPI penalties imposed by the NRA are more likely to be effective, especially where they are indicative of discrimination on the part of the SMP operator.

NRAs will also be involved in setting SLGs to the extent that they are established by means of a collaborative process (as in Recommendation 21) to reflect effective access needs by alternative operators required to provide retail products, but once again in a legal sense they are agreements between two commercial parties.

In the previously cited AIIP consultation response to the public consultation, the AIIP urged the Commission to "…confirm and strengthen its recommendation to National Regulatory Authorities to impose strict obligations on SMP operators, with regard to SLAs/SLGs and empower the NRAs to directly impose dissuasive penalties on SMP operators where they are found not to comply with SLAs/SLGs. On this regard AIIP points out that: (1) the system of SLA and penalties (aimed at ensuring compliance with the SLAs) should be such as to allow easy verification and the automatic payment of penalty due; on this regard it is very important to ensure 100% parameters; (2) it is important to ensure consistency between the wholesale penalties included in the [reference offer] by SMP operator according to its wholesale obligations and the indemnities that are imposed by the same NRA at the retail level; (3) the amount of penalties should be "progressive" as to exclude recidivism by the SMP operator, and the right to greater damages should remain unaffected."

Recommendation 24. It is important that the process of monitoring KPIs is fully transparent. The successor recommendation should make clear that the NRA "shall" make public on its website any decision to remedy non-compliance.

Recommendation 25. Penalties related to KPIs must be proportional, but should be large enough to be dissuasive. In Member States where it is feasible to do so, the NRA should encourage the SMP operator and the alternative operators to establish in advance a level of SLG penalties that are likewise proportional but dissuasive. In assessing whether the level of wholesale penalties is sufficiently dissuasive, the NRA should bear in mind that a breach of wholesale obligations on the part of the SMP operator may cause the alternative operator that uses the wholesale access product to be subject to indemnities imposed by the same NRA for problems at the retail level – the wholesale penalty should be large enough to cover the retail indemnity.

Recommendation 26. If the NRA identifies a pattern of repetitive breaches of non-discrimination obligations (as demonstrated for instance by means of monitoring of KPIs) on the part of the SMP operator, the NRA should consider imposing periodic penalty payments as referred to in Art. 29 EECC in order to motivate the SMP operator to refrain from repeating the breaches. Penalties that progressively increase in response to a pattern of repeated infractions could be appropriate in some circumstances.

In some instances, the processes are essentially appropriate, but much too slow. As Nineteenth Century UK Prime Minister Gladstone, said, "Justice delayed is justice denied." Put differently, if regulatory remedies are too slow, competitive entry is impossible – that is in fact the reason why we have *ex ante* regulation in the first place, rather than placing sole reliance on *ex post* competition law.

This reality is in contrast to many of the stated or implicit goals of the Access Recommendations. The guidance in Annex II, point 6 NGA Recommendation for instance calls on NRAs to ensure that "a fast-track ex-post procedure is available to settle disputes" relating to reference offers for access to CEI. Point 29 of the NDCM Recommendation seeks to ensure prompt payment of SLG penalties: "NRAs should ensure that SLG payments are, in principle, made among the operators without undue delay and through a pre-established process for payment and billing."

Periodic (e.g. annual) NRA reporting on the magnitude of penalties that it imposes, and the duration from complaint to payment where relevant, would appear to be reasonable in order to permit at least first-order monitoring.

In most Member States, SLG penalties are imposed and/or adjudicated by the courts rather than by the NRA. Other penalties, notably those associated with failure to satisfy KPIs or with discriminatory treatment as evidenced by the KPIs, may be more under control of the NRA and the Member State.

We see little prospect for a successor recommendation to solve the problem of the apparently slow administrative and judicial process in some Member States. We perceive a slow process in the imposition and adjudication of penalties related to non-discrimination as indeed constituting a problem in Member States such as these, but it is a problem that could only fully be addressed by the Member States in question.

We do, however, see at least one possibility for substantially accelerating the dispute resolution process. According to BEREC Guidelines, the reference offer should include "a dispute resolution procedure to be used between the parties".[988] It is quite possible that a clause in the reference offer committing to use a fair but accelerated dispute resolution procedure – for example, an agreement in advance to resort to use some form of *alternative dispute resolution (ADR)* such as *binding arbitration* in the event of SLG penalties and/or other payment disputes, rather than recourse to the courts – might save time and avoid legal needless expense, to the benefit of all parties. It is perhaps not possible under EU law to prevent parties from taking disputes to the courts if they so choose, but it might nonetheless be possible to establish an alternative, less burdensome mechanism for the majority of cases.

This is not a particularly radical proposal. In the context of access to SMP CEI, Point 6 of Annex II of the NGA Recommendation already calls for this: "… NRAs should ensure that a fast-track ex-post procedure is available to settle disputes."

[988] BEREC (2019), *BEREC Guidelines on the minimum criteria for a reference offer*, BoR (19) 238.

Recommendation 27. The successor recommendation could urge the NRA, for payment of penalties that are largely under its control (such as repeated discrimination as identified by KPIs), to strive to ensure that dissuasive payments are made without undue delay through a pre-established process for payment and billing. It could also require the NRA to report on the level of penalties that it has imposed and on the delay, where relevant, from complaint to payment of the penalty. The NRA should consider the promotion of alternative dispute resolution provisions (e.g. in the reference offer) that seek to accelerate the dispute resolution process.

Recommendation 28. We encourage Member States to monitor any delays in payment of penalties so as to ensure that their dissuasive effect is not lost. To the extent feasible, Member States should design administrative and/or judicial enforcement procedures related to the payment of penalties (for instance, SLGs) so as to avoid unreasonable delay.

The Technical Replicability Test (TRT)

Point 20 of the NDCM Recommendations tells us that the goal of the Technical Replicability Test (TRT) is "to ensure that alternative access seekers can technically replicate the retail offer of the SMP operator on the basis of the regulated wholesale input they receive."

Points 11 through 18 of the NDCM Recommendation define a Technical Replicability Test (TRT), but Points 48 and 49 of the NDCM Recommendation make it a precondition of pricing flexibility only "when EoI is not yet fully implemented". If however the successor recommendation takes on board our suggestion to permit pricing flexibility under conditions of effective non-discrimination, not necessarily synonymous with equivalence of input (see Recommendation 1), then the TRT regains its importance for pricing flexibility, and not just as a transitional measure.

The EECC makes only limited reference to technical replicability and does not explicitly reference the TRT by name; however, it seems clear that a TRT or equivalent assurances of technical replicability are essential to ensuring the "effective and non-discriminatory access" that is required as a precondition for pricing flexibility under Article 74.

We are discussing the TRT here primarily in conjunction with pricing flexibility, but the TRT is also important as a general nondiscrimination tool in order to ensure that alternative access seekers can technically replicate the full range of regulated services that comprise the retail offer of the SMP operator on the basis of the regulated wholesale inputs that they receive (see Recital 20 of the NDCM Recommendation).

For purposes of pricing flexibility, technical replicability can be presumed to be ensured where EoI is in place, so a TRT is not required as a prerequisite for pricing flexibility for regulated services for which EoI is in place.

As regards timing, the logic of the NDCM Recommendation still holds. Points 21 and 22 of the NDCM state in part that "[w]hen carrying out the technical replicability test or assessing the results of the test carried out by the SMP operator, NRAs should also take into account the risk of monopolisation of the downstream market through the new offer and the impact on

innovation. For example, the relevant wholesale access product should be available to access seekers within a reasonable time prior to the launch of a corresponding retail offer by the SMP operator to avoid any undue timing advantage for the SMP operator taking into account the need for an efficient alternative operator to develop and adapt its own systems and processes in order to be able to offer a competitive new retail service. Given the importance for competition of ensuring technical replicability, *it is crucial that the regulated SMP provider ensures technical replicability of new retail offers before their launch and at all times thereafter*."[989] [emphasis added]

If a TRT is performed before the launch of the new SMP operator retail offering, it may be desirable (but need not be required) that the ERT is performed at the same time, and this is envisioned as a possibility in Point 66 of the NDCM Recommendation. Point 66 states that the NRA "may run the [ERT] test before the launch of a new retail offer by the SMP operator, e.g. if the NRA considers it appropriate to align the timing of the economic replicability test with the technical replicability test if also undertaken before launch."

Recommendation 29. The TRT should serve to ensure that alternative access seekers can technically replicate the retail offer of the SMP operator on the basis of the regulated wholesale input they receive. In the interest of proportionality, it need not be required for minimal changes to an existing retail offer of the SMP operator that prima facie do not imply a risk to technical replicability (such as for instance changes to price or to contract duration). Where a flagship retail product is a bundle that includes both regulated and unregulated elements, the TRT should be applied only to the regulated elements.

Recommendation 30. The TRT should continue to be implemented in advance, wherever feasible, of the SMP operator launching a new retail offer that depends on a new relevant wholesale input being available. If the TRT is conducted in advance of the launch of the SMP operator's new retail offering, it is desirable (but not required) that the ERT be conducted at the same time.

How to deal with potential commercial agreements where an SMP operator and an alternative operator would like to put in place a service at higher quality than that covered in current reference offers

We know from our interviews and case studies (see Chapter 6) that there have been instances where an alternative operator has wanted to deliver a service at a better or higher level of quality than that currently possible under existing Reference Offers, and where the SMP operator was willing to offer the necessary wholesale product on commercial terms that were mutually acceptable.

Business services that used to be offered as Market 4/2014 services are a case in point. Local branch banks generally require faster repair service (i.e. *Mean Time to Repair*, or *MTTR*) than

[989] But Point 22 of the NDCM goes on to say: "Consequently, a technical replicability test may be carried out prior to and after the launch of a new retail offer, depending on when the NRA finds it appropriate. For example, when an NRA's ability to make public the SMP operator's business data is limited by confidentiality rules under its national law, the NRA may choose to conduct the technical replicability test after the launch of the retail services."

residential consumers. Under the 2020 RRM, the broadband services that they employ are likely to be classified as Market 1/2020 services. An overly rigid implementation of non-discrimination might actually interfere with the ability of the SMP operator to provide services for which there is legitimate demand.

Requirements such as these can be very diverse from one business to the next, and the administrative burden of creating a Reference Offer can be substantial – it is not practical to require a Reference Offer for every conceivable variant.

One can envision circumstances where an SMP operator might use the ability to offer services with QoS different from (better than) that of the standard residential consumer-oriented offer for discriminatory purposes, but our assessment is that this risk is fairly remote. The presence of Reference Offers that correspond to the most common services needed by residential consumers provides good protection against abuse of these special offers reached outside of the Reference Offers.

There is a trade-off here. Regulation should not prevent the introduction of new services for which there appears to be market demand.

Recommendation 31. Commercial agreements between the SMP operator and alternative operators to offer additional wholesale access services with QoS beyond that covered by existing Reference Offers should not be prohibited. The SMP operator should be encouraged to meet reasonable requests for such services.

How to deal with information asymmetry

Point (7) of Annex II of the NGA Recommendations already obliges the NRA to ensure that the SMP operator does not use information about the deployment plans of alternative operators for its own competitive advantage. “The incumbent has prior knowledge of third-party access seekers’ deployment plans. To prevent such information from being used to gain undue competitive advantage, the SMP operator in charge of operating the civil engineering infrastructure should not share such information with its downstream retail arm. NRAs at a minimum should ensure that those persons involved in the retail arm activities of the SMP operator may not participate in company structures of the SMP operator responsible, directly or indirectly, for managing access to civil engineering infrastructure.”

Our case studies suggest that this is a real problem in some Member States (including France, Lithuania, and Italy – see Chapter 6), not only for CEI, and that the NRAs recognise that this is an area that needs further work.

These information asymmetries are of much less concern where the SMP operator is wholesale-only, and might be of only limited concern where EoI has been fully implemented.

The guidance in the NGA Recommendation continues to be appropriate and necessary, but it does not appear to be sufficient to fully address the underlying problem. Enforcement in some (non-EoI) Member States appears to be inadequate.

We suggest, at a minimum, that the SMP operator should be obliged to annually submit a short report documenting its practices to avoid misuse of its knowledge of the plans of alternative operators. The report should include any alleged violations that have been reported, and any

corrective actions that the SMP operator has taken. The reporting obligation might not be necessary in cases where the risk of misuse of information is low, as for instance in the case of a wholesale-only SMP operator.

Recommendation 32. In crafting non-discrimination plans, NRAs should be sensitive to the need to ensure that the SMP operator does not use information about the deployment plans of alternative operators for its own competitive advantage. In particular, NRAs should ensure that the retail arm of a vertically integrated SMP operator is not informed in advance of network deployments and/or the evolution of competitors in cases where this knowledge might provide the SMP operator with a competitive advantage. We recommend that the successor recommendation oblige SMP operators (except for those where the risk of abuse of information is low, such as wholesale-only operators) to provide an annual report documenting its practices in this regard, any known allegations of violation, and any corrective actions that it has taken. Beyond this, NRAs must have both the authority and the responsibility to investigate any allegations that the SMP operator has improperly used information about the plans of competitors for its own competitive advantage, and to impose dissuasive penalties if and as appropriate.

d. Access to Civil Engineering Infrastructure

The need for access to Civil Engineering Infrastructure (CEI) has been a long-standing challenge in EU electronic communications policy. Given that the deployment of new fibre typically relies on civil engineering that tends to be very expensive, cost-effective deployment of new NGA and VHCN networks (and mobile networks as well) is heavily dependent on the ability to access civil engineering assets of the SMP operator, or assets of other network operators or of entirely different infrastructure such as electricity. Responsibility for deploying civil works if further complicated because responsibility for the granting of necessary permits in the Member States is typically delegated to public authorities that are not responsible for electronic communications, and is often delegated down to the regional or municipal level.[990]

Our overall sense is that current guidance in the Recommendations as regards access to SMP CEI subject to cost orientation remains broadly fit for purpose. Nonetheless, our interviews and case studies have shown that implementation faces a great many challenges, and these limit the actual effectiveness of the measures. This suggests that there are opportunities for further refinement in a successor recommendation.

The new provisions in Arts. 72-73 EECC to the effect that SMP CEI "can be used as a self-standing remedy for the improvement of competitive and deployment dynamics in any downstream market", provide NRAs with important, valuable new tools. How broadly this is applicable absent definition of a relevant market for physical infrastructure (PIA) remains to be seen. Nonetheless, the call in Recital 187 EECC for access to SMP CEI "to be considered before assessing the need to impose any other potential remedies, and not just as an ancillary

[990] J. Scott Marcus, Ulrich Stumpf, Peter Kroon, Stefano Lucidi, Lorenz Nett, Veronica Bocarova, Philippe Defraigne, Peter Dunn, Christian Hocepied, Hervé Jacquemin, and Robert Queck (2017), *Substantive issues for review in the areas of market entry, management of scarce resources and general end-user issues*, Final Report, study for the European Commission, at https://ec.europa.eu/digital-single-market/en/news/substantive-issues-review-areas-market-entry-management-scarce-resources-and-general-end-user-0.

remedy to other wholesale products or services" might prove to be quite important in the long term.

There are essentially three mechanisms at EU level for enabling network operators to access the civil infrastructure of other firms:

- Regulated access to the CEI of the SMP operator (see Art. 72 EECC)
- Regulated symmetric access (see Art. 61 EECC) and
- Access to civil engineering of a range of different infrastructures under the Broadband Cost Reduction Directive (BCRD).

These provisions co-exist, but their objectives are different. The goal of Art. 72 EECC is primarily to address competition problems, while that of the BCRD is to reduce the deployment costs for new broadband networks. Art. 72 EECC applies only to operators of electronic communications networks who have been found to possess SMP, while the BCRD applies not only to all operators of electronic communications networks, but also to providers of other infrastructures (electricity, water, sewage, …) to the extent that they possess infrastructure that may be of interest to network operators. Recital 187 EEC expands on the Access Recommendations to note the need "to ensure that access to such assets can be used as a self-standing remedy for the improvement of competitive and deployment dynamics in any downstream market, to be considered before assessing the need to impose any other potential remedies, and not just as an ancillary remedy to other wholesale products or services", in line with Art. 72(2) EECC. A further difference is that the imposition of SMP CEI access must be based on an assessment of proportionality, while the BCRD does not require a proportionality assessment.

Another major difference is that SMP access to CEI is on a cost-orientation basis, while access under the BCRD is based on fair and reasonable prices (and often significantly more expensive in consequence).

Regulated access to SMP CEI is robust in some Member States, but weak in others. Reasons can include (1) limited availability of ducts and other CEI; (2) mismatch between the capabilities of existing CEI and the requirements of network operators; and (3) pricing and other access conditions (see Chapter 0).

A clear finding is that restrictive labour practices on the part of the SMP operator sometimes inflate the price of access to SMP operator CEI (see for instance the statement of the Polish NRA in Chapter 0).

An assessment of the BCRD is out of scope for this study. In this study, we take the BCRD into account to the extent that it interacts with the provisions of the Access Recommendations in general and their CEI access provisions in particular, but we refrain from making any recommendations about the BCRD.

We have identified a number of areas where refinement of current practice in regard to access to CEI through the Access Recommendations might be improved in a successor recommendation. Changes that might be considered include (1) dealing with failures of the SMP operator to undertake work on CEI or to expand capacity on behalf of the alternative operators in a timely fashion; (2) refinements to pricing such as volume discounts; (3) expanding the scope of elements of CEI to which alternative operators could gain access; (4) improving the quality of databases and ordering processes; and (5) dealing with interactions between the Access Recommendations and the BCRD.

We consider each of these in turn.

Effective access to legacy ducts and other SMP CEI

This section is written primarily in terms of ducts, but most aspects are equally applicable in principle to all forms of CEI.

In this section, we consider first the elements of CEI to which alternative operators should be able to gain regulated access; then the technologies for which alternative operators should be able to use SMP regulated access; and finally the options that should be available to alternative operators in the event that the SMP operator "drags its heels" as regards performing necessary repairs or renovation to regulated CEI, or to an expansion of capacity.

Expanding the scope of elements of SMP CEI to which alternative operators could gain access

Some NRAs impose CEI access only to limited portions of the CEI controlled by the SMP operator.

One NRA emphasised the importance of providing access to ducts in the curb section (from just outside the private property to inside the private property).[991] This appears indeed to be a best practice to follow.

Imposing an access obligation where proportionate for ducts beyond the central office and the local loop on the operator that has been found to have SMP in market 1/2020 under Art. 72/73 EECC is not excluded in principle but may raise legal difficulties in practice, in particular in countries where ducts from other utilities might potentially be available. In that case, the NRA may wish to examine the opportunity to define a separate market for access to physical infrastructure as envisioned in Points 25 through 28 of the Recommendation on Relevant Markets (RRM) of 2020 instead of imposing the access remedy under Art. 72/73 EECC.

Recommendation 33. The successor recommendation should urge NRAs to assess whether mandating SMP operators to provide access to all sections of their civil engineering that may be needed in order for alternative operators to deploy their fibre network between their ODFs and their end-users would be proportionate to address the market power of the SMP operator, taking into account the feasibility for alternative operators to use alternative civil engineering infrastructure such as ducts. Where relevant, NRAs should also identify different points of delivery at which the physical infrastructure could be accessed. Such an access obligation could where appropriate and proportionate also encompass ducts of the backhaul networks, and shelters susceptible to host operators' passive and active equipment, to the extent that such related facilities have enough capacity. Where the conditions are met, the NRA might find it appropriate to define a separate market for access to physical infrastructure as envisioned in the 2020 RRM rather than attempting to impose the access remedy under Art. 72/73 EECC.

Expanding the technologies for which alternative operators could use SMP CEI access

Another issue is whether the SMP operator should grant access only for the deployment of fibre networks. In the case of France, while acknowledging that scarce available space must

[991] An NRA response to the online survey.

be utilised in the most efficient and future proof way, the Commission nonetheless invited the NRA "to ensure that the scope of the access obligation is technologically neutral by extending it to deployments of networks other than fibre, unless such access request would objectively lead to exhaustion of available space for future fibre deployments on that specific route".[992] Expanding the guidance in this way seems appropriate, and might be of particular use to cable operators. It would seem to be appropriate to recall this principle in the successor recommendation.

Recommendation 34. In line with the principle of technological neutrality, under a successor recommendation, the SMP operator should not be allowed to refuse access solely because the access seeker intends to use the access to deploy VHCN based on technologies other than FTTH unless such access would objectively lead to exhaustion of available space for future fibre deployments on that specific route. The burden of proof should be on the SMP operator.

Expanding the options of alternative operators if the SMP operator fails to undertake repairs or renovation on CEI or to expand capacity in a timely fashion

As already noted, an absence of ducts, poor quality of ducts, or a mismatch of CEI characteristics with market needs are a major impediment to the use of these CEI access provisions in many Member States. BEREC's comments are to the point: "Aging, damaged or no longer used infrastructures, as well as infrastructures with no longer available space or capacity can impede the deployment of new and enhanced networks, in particular VHCN."[993]

But BEREC goes on to emphasise that it is sometimes possible to rehabilitate decrepit CEI, and they note that the needs of all network operators should be considered (in a symmetric fashion) when renovating CEI. They also note the possible importance of ancillary or associated facilities to CEI as conventionally defined.

The SMP operator may be slow to respond to requests to provide access to CEI – perhaps wilfully, perhaps due to lack of sufficient motivation, or perhaps due to poor process or insufficient staff. In these cases, it might make sense for the alternative operator to be empowered to undertake the work itself, using well-qualified staff and authorised procedures.

BEREC argues that when an SMP operator needs to repair or renovate its own civil engineering infrastructure, or needs to free up more space or capacity in its infrastructure for its own VHCN rollouts, the non-discrimination obligation should entail the same possibility for any infrastructure user deploying VHCNs. "This can be fulfilled appropriately if a non-discrimination obligation (primarily EoI) is imposed (…) When the SMP operator has the obligation of granting reasonable access requests to physical infrastructure, the NRA can also impose on the SMP operator an obligation to grant reasonable requests of renovation of infrastructure elements necessary to deploy new and enhanced networks, in particular VHCN. Therefore, a reasonable request for renovation of regulated civil engineering infrastructure has to be assessed in terms of its technical and financial complexity, proportionality and of its expected outcome for the concerned undertakings. In order to ensure transparency and non-

[992] Commission Comments of 26.11.2020 concerning Cases FR/2020/2277-2278-2279-2280, p.20.
[993] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169.

discrimination and pursuant to the adopted principle of EoI or EoO, the modalities of renovations' requests, processes and appreciation, should be clear and should apply to all undertakings deploying new and enhanced networks, in particular VHCNs (…). Otherwise, the SMP operator may have the incentive of prioritizing the available capacities for its own needs, and thus unduly restrict alternative undertakings' access to the existing physical infrastructure"[994]. BEREC suggests that, in principle, interventions to make space available, where possible, should be undertaken by the SMP operator. However, the need to rely on timely intervention by the staff of the SMP operator, or from its subcontractors, could be a delaying factor for the deployment of fibre by access seekers.

The approach followed by the Italian, Spanish, Portuguese and UK NRAs are therefore worthy of consideration in Member States where the SMP operator is consistently unable or unwilling to provide timely repairs and renovation to CEI. In these countries, access seekers can "undertake decongestion work themselves after informing the incumbent, or request the incumbent to undertake such work. In Spain, alternative operators must first request the incumbent to reorganize cables but can proceed to undertake the work itself if the incumbent has not carried out the decongestion within 12 days" [995].

Rather than having the alternative operator do the maintenance itself, it will typically be less intrusive (and therefore more proportionate) to oblige the SMP operator to identify and certify a list of third party contractors that are competent to do the necessary work, and to empower alternative operators to choose among the certified contractors, at least in cases where the SMP operator cannot or will not perform the work promptly. In Italy, for instance, "(w)ith a decision of 2017, Agcom imposed on TIM some obligations to permit alternative operators to choose their preferred network technicians' company (the so-called "System") to provide provisioning and assurance services for their customers. An [alternative operator] may choose its preferred System in a list of authorized companies (by the SMP operator]. Systems may provide specific customised additional services to the [alternative operators]. An [alternative operator] may decide if a specific wholesale order has to be or not be outsourced. When an order is out sourced, TIM is responsible only of dispatching the order to the right System company. For such orders, only the processing time for dispatching which is under control of [the SMP operator] wholesale division has to be measured by a specific KPI."[996]

At a stakeholder workshop held on 9 June in support of this project, however, consultant Gita Sorensen[997] claimed that there has been good experience with alternative operators having their own people authorised to repair or renovate SMP CEIs. This led to some debate (with a representative of Orange) as to whether the incentives of the SMP operator and the alternative operators in ensuring that repairs and renovation are of good quality are sufficiently aligned. It was also noted (by CETIN) that if delays are caused by a general shortage of qualified staff, that empowering alternative operators will not necessarily solve the problem (since alternative operators are likely to be dependent on the same contractors as the SMP operator).

If the third party contractor is truly independent of the SMP operator (a key consideration that the NRA should carefully reflect on), it should be motivated both to please the alternative operator that pays for the work, and to do the work to the satisfaction of the SMP operator.

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[994] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q23.
[995] WIK-Consult (2017), *Best practice for passive infrastructure access*, 19 April 2017, p.39-40.
[996] Italy AGCOM (2021), "Non-discrimination obligations in Italy: EoI , EoO and KPIs", presentation.
[997] Sorensen is an independent consultant who represents a wide range of clients.

Similar considerations apply in cases where it is technically and economically feasible and practical to enable an alternative operator to reuse a currently crowded duct, and where the SMP operator is not motivated to undertake the work in a timely fashion. Note that Point 3 of Annex II of the NGA Recommendation says that the SMP operator "should include measures aimed at de-congestioning currently used ducts." If SMP operator ducts are crowded with copper wires, it would seem to make sense to oblige the SMP operator to remove the copper so as to make room for fibre. More generally, given the important role that access to SMP operator CEI plays in some Member States, it seems to be worthwhile to have a robust procedure in place that the SMP operator cannot easily block.

In Member States where the NRA chooses to follow the procedure outlined above, the NRA will need to set rules as to who pays for improvements that were requested by an alternative operator, and who owns the results of that work. Possible best practices are the UK, France and Spain, where (1) the SMP operator or (2) a contractor approved by the SMP operator builds a branch or bypass to avoid a saturated section at the request of an alternative operator, "the alternative operator must meet the cost, and it is clear, at least in the case of the UK, that the new duct section becomes the property of the incumbent following construction and is incorporated into its network"[998]. Any detailed rules along these lines are likely to be Member State specific and case specific.

Recommendation 35. In Member States where there is history of unsatisfactory responses by the SMP operator (a) to reasonable requests for renovation, repair or bypass of SMP CEI, or (b) to reasonable requests request to expand the capacity of a duct, pole, or other similar element of CEI; and to the extent that it is deemed to be proportionate, the successor recommendation should encourage NRAs to require SMP operators (1) to establish procedures for the certification of qualified workers or subcontractors authorised to make such interventions; and (2) to define the procedure to be followed for such interventions. At a minimum, the SMP operator must be informed of all work undertaken in this way. Where work is undertaken on behalf of an alternative operator, the NRA will need to set rules to who pays for work, and who owns the resultant infrastructure (typically the SMP operator), in instances where (1) the SMP operator or (2) a contractor approved by the SMP operator makes improvements to the SMP operator's infrastructure at the request of an alternative operator.

As noted earlier, restrictive labour practices on the part of the SMP operator sometimes inflate the price of access to SMP operator CEI (see for instance the statement of the Polish NRA in Chapter 0). For example, the Portuguese NRA ANACOM reports that their SMP operator "supervises in general ALL the cable installations, even the ones where supervision couldn't be required". This appears to be an abusive practice that the NRA should prevent, but it is not clearly addressed in Annex I NGA Recommendation which asks NRAs to "estimate the incremental costs required to provide access to the facilities concerned" including the cost of "provisioning of access to civil engineering infrastructure", but does not specify to limit these costs to those of indispensable interventions. More generally, the NGA Recommendation is silent on the assessment by the NRA of the opportunity of interventions by the SMP operator. In practice, such an assessment should take place on the occasion of the review of the reference offer, and the future access recommendation should likely recall this, since no such

[998] WIK-Consult (2017), *Best practice for passive infrastructure access*, 19 April 2017, p.39-40.

reminder is included in the BEREC guidelines on the minimum criteria for a reference offer[999] of June 2019.

Recommendation 36. NRAs should be vigilant against unreasonable SMP operator labour practices that require SMP staff to be present, and paid for, even where their presence is superfluous.

Improving the quality of databases and ordering processes

Point 17 of the NGA Recommendation states that NRAs should work with other authorities with a view to establishing a database containing information on geographical location, available capacity and other physical characteristics of all civil engineering infrastructure which could be used for the deployment of optical fibre networks in a given market or market segment. Such a database should be accessible to all operators.

Our case studies suggest that better online directories of the CEI of SMP are needed in some Member States. The interviews and case studies addressed in Chapter 7 make clear that this database is not always available, and that even if it is, the quality often leaves much to be desired. Interviews in several different Member States suggested that it was not terribly unusual for an order for CEI to be place and accepted, but in the end the promised duct or pole does not exist.

This appears to have been a long-standing concern. In 2016, BEREC observed: "Regarding the setting up of a civil infrastructure database, the record is mixed with some NRAs requiring the setting up of a civil infrastructure database containing information on the ducts of the SMP operator while the majority do not."[1000]

As yet another example, in the Czech Republic, civil engineering "is not used in practice as it is set rather ineffective. Mostly the lack of information about existing and or build infrastructure make its use difficult along with wide options for gaining exemption from this obligation based on non-transparent criteria."[1001]

There are likely to be practical limits to what can be achieved. If the SMP operator's CEI database contains incorrect information (due, perhaps, to poor bookkeeping decades in the past), it might well be the case that the error is not discovered until an attempt is made to order the CEI in question. But the NRA should nonetheless seriously reflect on what is realistic and proportionate.

There are Member States where orders for SMP CEI are rare. If the lack of a good database is a major contributor to the lack of orders, then measures to improve the quality of the database are likely to be warranted and proportionate. If the lack of orders is not remediable by database improvements, for instance because little or no reusable SMP CEI exists, then efforts to improve the quality of the database might not be proportionate or appropriate.

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[999] BoR (19) 95

[1000] BEREC (2016), *Monitoring implementation of the BEREC Common Positions on Wholesale Local Access (WLA), Wholesale Central Access (WCA) and Wholesale High Quality Access at a Fixed Location (WHQAFL): Phase 3*, BoR (16) 219, page 7.

[1001] Deutsche Telekom response to the Targeted Consultation, Q23.

Recommendation 37. The provisions on the quality of databases and ordering processes that are already visible in Point (17) of the NGA Recommendation should be strengthened so as to substantially increase the likelihood that the database of SMP CEI is fully current and up to date. The expected updating of the BCRD might already address this; if not, the successor to the Access Recommendations should do so. The NRA should however consider the causes of any defects in the current database (taking into account the number of orders for SMP CEI currently placed, and the number that could be expected if the database were improved) in order to assess whether more effort invested would be proportionate and warranted.

A few of our alternative operator interviewees indicated dissatisfaction with the fact that the database of CEI was available only to potential access seekers in their Member State, but not to the general public.

Our perception is that the issue is a bit more complicated than this. It might well be appropriate to make more information about CEI available to the public than is visible today (and doing so would be broadly in line with the goals of EU law as regards Public Sector Information), but not all. There is a valid public interest in ensuring that certain characteristics of infrastructure not be disclosed. For instance, the location of central offices might be of interest to terrorists.

At a stakeholders' workshop held in support of this study on 9 June 2021, CETIN expressed the view that making more information about SMP CEI might be seriously counter-productive in some of the eastern Member States. They worry about competitors using their CEI without a contract and without compensation. To the extent that this concern can be substantiated, we would tend to view it as more of a civil law problem than an electronic communications regulation problem; nonetheless, it would be necessary for any guidance to take the concern into account.

Recommendation 38. A successor recommendation for the Access Recommendations should provide principles-based guidance as to which elements of the public database on SMP CEI should be publicly visible.

In Germany, the need for end-to-end provisioning rather than segment-by-segment was raised during some interviews[1002]. If requests must be made segment by segment, it is often the case that CEI is available for some stretches but not for others, but the alternative operator discovers this only after having invested time and effort. This is a slightly different problem than the lack of a reliable database, but the issues are interrelated – both reflect weaknesses in the operational support systems (OSS) that underlie the ordering process for SMP operator CEI.

[1002] Case study interviews.

Recommendation 39. The successor recommendation should reinforce the importance of providing end-to-end ordering of CEI such as ducts where proportionate, as a complement to any point-to-point ordering processes that may already exist. Those Member States that currently have CEI ordering procedures that allow only point-to-point orders potentially waste time and effort, and consequently depress take-up of SMP CEI. The same legal and implementation considerations that were raised in Recommendation 37 are also relevant here.

Aligning the successor to the Access Recommendations with the BCRD

There are instances where the legal provisions that provide regulated asymmetric access to the CEI of the SMP operator (notably under national law transposing Art. 72 EECC), regulated symmetric access to building wiring or outside wiring up to the concentration point (notably national measures adopted under Art. 61(3) EECC), and regulated access to civil engineering infrastructures under the BCRD or the national framework regarding broadband networks that benefitted from State aid potentially relate to the very same infrastructure. In Poland, the SMP operator reports having to publish two different reference offers for access to the same infrastructure, while in Spain, the SMP operator says it receives access requests from alternative operators for the same infrastructure both under its regulated MARCo offer and under the Spanish transposition of the BCRD[1003].

In principle, one would think that this should not be happening. Recital 12 of the BCRD already establishes that, in line with the *lex specialis* principle, the BCRD should be without prejudice to the Regulatory Framework for Electronic Communications and thus by extension with the EECC. We presume that any successor to the BCRD will carry this principle forward.

Nonetheless, these isolated instances appear to exist. They create the possibility of inconsistencies or inefficiency, and may invite access seekers to engage in "forum shopping" that might be counter-productive.

Recommendation 40. A successor recommendation should reinforce the principle that CEI that is subject to an SMP access obligation should not simultaneously be subject to the national transposition of the BCRD or its successor. This is primarily a matter for the successor to the BCRD to consider, but those drafting the successor to the Access Recommendations should be cognizant of the issue.

It goes without saying that the successor to the Access Recommendations and any successor to the BCRD will need to be closely aligned with one another.

[1003] Case study interviews.

e. Cooperative arrangements and other structural arrangements

There are a range of structural solutions in this category, including wholesale-only networks and a range of other cooperative arrangements that may reflect some but not all of the elements envisioned in Art. 76 EECC and therefore fall outside of its scope.[1004]

There are many examples of wholesale-only networks, including municipal fibre networks in Sweden, SIRO in Ireland (a joint venture between Vodafone and an electric utility firm), and Open Fiber in Italy (a joint venture created by ENEL and the CdP which now seeks to bring the Italian SMP operator into the partnership). A number of these arrangements appear to be functioning well.

Separation arrangements and wholesale-only arrangements seek to solve the need for non-discrimination, and for avoidance of favouring the SMP operator's own retail operations, either by not having a retail operation at all or else by ensuring that coordinated conduct is not possible. Many of the new networks built in rural areas using state aid may also fall in this category to the extent that they operate solely as wholesale providers. Arrangements such as these can provide a basis for much lighter regulation than would otherwise be possible for an SMP operator.

NRAs have been able to reflect cooperative agreements reasonably well to date, and to apply the logic of the EECC and the Recommendations and of the new EECC (which has only been in force since December 2020). The EECC provides a number of additional tools to the NRAs, including the ability to accept "commitments regarding conditions for access, co-investment, or both" from the SMP operator in cases that for instance involve cooperative arrangements, co-investment (Art. 76 EECC), or voluntary separation (Art. 78 EECC). The NRA is thus empowered to make the commitments wholly or partially binding.

Consistent with our approach in Chapter 8, we consider long term commitments and volume purchase agreements to fall within the scope of cooperative arrangements only in cases where they represent substantially more than an agreement in price. This is in line with the focus in Art. 76(1) on SMP operators that open up VHCN deployment "by offering co-ownership or long-term risk sharing through co-financing or *through purchase agreements giving rise to specific rights of a structural character* by other providers of electronic communications networks or services."

In this report, we do not address co-investment agreements in the sense meant by Art. 76 EECC, and we make no recommendations in relation to them. They do not fall within the requested scope for this study, and the BEREC Guidelines[1005] to foster the consistent application of the conditions and criteria for assessing new very high capacity network elements (Article 76 (1) and Annex IV EECC) already deals with them comprehensively in any case.

Going forward, we see the possibility for a future recommendation to provide more comprehensive guidance as to (1) the conditions under which the NRA should consider granting a degree of regulatory relief to the SMP operator, (2) the conditions under which an out-of-cycle review of the obligations of the SMP operators is warranted, and (3) NRA

[1004] Functional separation and voluntary separation have somewhat similar effect as well, but we are treating them as being out of scope for this study.
[1005] BoR (20) 232.

engagement in the process of forming cooperative arrangements. We address these in the sections of the report that follow.

The conditions under which the NRA should consider granting a degree of regulatory relief to the SMP operator

There is a huge degree of variation among cooperative arrangements; however, principles-based guidance to market players would appear to be positive as a means of promoting certainty in the market. There appear to be opportunities to provide guidance both at EU and at Member State level.

At EU level, Art. 79 EECC envisions a procedure where the SMP operator offers commitments relating to "cooperative arrangements relevant to the assessment of appropriate and proportionate obligations pursuant to Article 68", where Art. 68 EECC relates to the imposition, amendment or withdrawal of obligations on undertakings that have been found to have SMP. Further, Art. 68(6) EECC goes on to say that NRAs must "consider the impact of new market developments, such as in relation to commercial agreements, including co-investment agreements, influencing competitive dynamics." We view these provisions as representing the bedrock of any guidance at EU or Member State level. In essence, *cooperative arrangements are relevant to asymmetric regulatory obligations on the SMP operator only to the extent that they influence competitive dynamics*.

A successor recommendation might perhaps provide more extensive guidance; however, it is important that the NRA have considerable freedom to adapt any guidance to national circumstances.

The conditions under which an out-of-cycle review of the obligations of the SMP operators is warranted

How to handle cooperative arrangements that come into force outside of the planned review cycle is not clear. In their consultation response, BEREC notes that there is no experience with non-routine review of cooperative arrangements or long term commitments; moreover, not every cooperative arrangement would warrant a re-evaluation. BEREC also expresses concern that some cooperative arrangements might be problematic – they might lead to the emergence of multi-SMP operator environments.[1006]

A key concern is that out-of-cycle reviews risk introducing regulatory uncertainty, which runs counter to the objective of promoting efficient investment in VHCN.

BEREC is correct in observing that not every cooperative arrangement will "change competitive dynamics" (in the sense meant by Art. 68 EECC) in such a way as to significantly change the position of the SMP operator. For instance, cooperative arrangements to which the SMP operator is not a party will not necessarily change its competitive position.

This implies that, in deciding whether out-of-cycle action is warranted, the NRA will need to make a reasoned judgment following good process as to whether competitive dynamics have changed enough to warrant out-of-cycle action. In doing so, the NRA would be well advised to remember that not every claim made by the SMP operator can be assumed to be entirely plausible or credible, and the same is true for the claims made by its competitors.

[1006] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169.

BEREC suggests that, where a cooperative arrangement with large impact is anticipated at the time of a market review, the NRA would be well advised to signal in advance how it might deal with such a cooperative arrangement, and whether changes to remedies are likely before the next scheduled market review.

BEREC raises a fair point, but it arguably places far too little emphasis on the General Objectives embodied in the EECC, as expressed in particular in Art. 3(4)(d): NRAs and other competent authorities shall "promote efficient investment and innovation in new and enhanced infrastructures, including by ensuring that any access obligation takes appropriate account of the risk incurred by the investing undertakings *and by permitting various cooperative arrangements between investors and parties seeking access to diversify the risk of investment*, [emphasis added] while ensuring that competition in the market and the principle of non-discrimination are preserved …" Depending on where the Member State is in its five year review cycle, the next cycle might be far in the future – far enough away to eliminate any immediate incentive for undertakings to enter into a cooperative arrangement. This delay might hinder or prevent cooperative arrangements that might otherwise have had positive impact on societal welfare.

In all of these aspects, the process followed could be similar to that followed for out-of-cycle revision to geographically differentiated remedies. With that in mind, we return to this theme in Section 11.f.

Recommendation 41. Where a proposed cooperative arrangement is credibly expected to lead to a noteworthy change in competitive dynamics in line with Art. 3(4)(d) EECC, the NRA should consider whether regulatory changes are warranted outside of the normal market review period. In assessing the possible need for out-of-cycle changes, the NRA should also consider the importance of fostering regulatory predictability. Where an anticipated cooperative arrangement that is expected to lead to a noteworthy change in competitive dynamics is known at the time of a market review, the NRA should signal whether it considers an out-of-cycle adjustment likely, and how it intends to proceed to assess the arrangement.

In revising remedies, the NRA should align the criteria used in the market analysis with those used to determine the remedies required; however, it will often be the case that a cooperative arrangement that does not fundamentally change the finding of SMP is nonetheless sufficiently significant to warrant a lighter application of remedies (see Chapter 0). This observation is fully in line with Art. 68(6), which says in part: "National regulatory authorities shall consider the impact of new market developments, such as in relation to commercial agreements … influencing competitive dynamics. If those developments are not sufficiently important to require a new market analysis …, the national regulatory authority shall assess without delay whether it is necessary to review the obligations imposed on undertakings designated as having significant market power and amend any previous decision, including by withdrawing obligations or imposing new obligations …"

Recommendation 42. In conducting an out-of-cycle review of remedies (whether in the context of a new cooperative agreement or an updating of geographically differentiated remedies), the NRA should take a consistent view in its assessment of the market and its imposition of remedies. There will be instances where changes in market dynamics are insufficient to support a finding that SMP is no longer present, but sufficient to justify differentiated remedies. NRAs may wish to offer prospective guidance as to how they expect to interpret anticipated changes in the competitive environment.

NRA engagement in the process of forming cooperative arrangements

As noted in Chapter 8, the NGA Recommendation provides (limited) guidance as to how the NRA should respond to cooperative arrangements; however, Art.(3)(4)(d) EECC goes beyond this and encourages the NRA to "[permit] various cooperative arrangements between investors and parties seeking access to diversify the risk of investment." The successor recommendation must reflect the new language in the EECC.

The NRA has a legitimate interest in ensuring that stakeholders are well informed as to likely impact of any proposed major arrangement, but *it is not the function of the NRA to encourage or discourage transactions among commercial parties*. The Member State *government* (e.g. ministry) may have a valid industrial policy interest in a particular cooperative arrangement, which can be permissible in light of its political role. The NRA must steer clear of this in order to avoid possibly having political or commercial considerations interfere with its perceived or actual objectivity and neutrality.

It is however entirely appropriate and desirable for an NRA to proactively meet or engage with parties to a prospective arrangement and with other interested parties to discuss how it might possibly react to such an arrangement (but not to advise the parties on how to structure the arrangement). If the NRA has already issued prospective guidance (in line with Recommendation 37), this task might be greatly simplified. All of this is in line with the NRA *permitting* cooperative arrangements that are in line with the objectives of Art.(3)(4)(d) EECC.

In doing so, the NRA should be appropriately attentive to all interested parties, potentially including the SMP operator, other participants in the cooperative arrangement, competitors to participants in the arrangements, consumer advocacy groups, and more.

Recommendation 43. In the interest of promoting regulatory predictability, the NRA should proactively engage in a balanced way with stakeholders if a cooperative arrangement with large impact on competitive dynamics is anticipated. NRAs may wish to offer prospective guidance as to how they expect to interpret anticipated changes in the competitive environment.

f. Geographic differentiation

In the past, it was common to define markets that corresponded to an entire Member State; however, it was always possible to define markets at a more granular level, and the Commission has provided guidance in various Recommendations. The tendency in regulation is to focus on supply side differences, but demand side differences can sometimes be equally important for geographic differentiation (see Chapter 2).

The use of geographic differentiation by NRAs has been limited to date, and their implementation approaches differ substantially; however, differentiation is arguably more important for VHCN than it was in the past due to greater diversity of circumstance from region to region, and from urban to rural, within many of the Member States.

A key practical question for an NRA is whether it is more appropriate under a particular set of circumstances to define geographically differentiated markets accompanied with differentiated remedies or to differentiate remedies within the same geographical market. Differentiating remedies within the same geographic market tends to be simpler to implement than delineating distinct market geographic markets, but each has its domain of applicability.

Moreover, as we note in Chapter 0, stakeholders advocate a cost/benefits assessment before implementing geographic segmentation of remedies, because segmentation is likely to increase administrative costs and to reduce predictability for access seekers.

Point 50 and Annex II[1007] NDCM Recommendation provide some examples of the ways in which differences in geographical areas can be addressed at the remedies stage. They say among other things that NRAs should differentiate remedies within geographical markets, which includes removing price control, in cases where only in certain areas of the national market has retail competition emerged from the effective infrastructure-based competition, or EoI been implemented by the SMP operator.

There are a few opportunities to improve the clarity of this guidance of the NDCM Recommendation in a successor recommendation: (1) guidance among the multiple sources as to the relative applicability of market definition versus differentiated remedies could be consolidated with a particular focus on the challenges that VHCN poses for geographic differentiation; and (2) the conditions under which an out-of-cycle revision is warranted could be clarified. The out-of-cycle issues for geographically differentiated remedies have some commonality with possible out-of-cycle reviews due to cooperative arrangements, a fact that we have attempted to capture in our Recommendations.

The methods to be used for geographically differentiated market definition versus differentiated remedies

As previously noted, there is no shortage of current guidance from the Commission and BEREC. Notably, the Commission Staff Working Paper accompanying the 2020 Recommendation on Relevant Markets[1008] states that "differentiation at the level of remedies should be limited to less significant or less stable variations of competitive conditions (…). It might for instance be used by NRAs for a periodical or punctual update of remedies, in accordance with Article 68(6) of the Code. The market review may foresee such reviews and the criteria to be used for that purpose." The 2018 SMP guidelines[1009] and the BEREC

[1007] More specifically, Annex II which deals with the economic replicability test, states that NRAs may need to adapt the test according to the differences in the competition conditions detected at geographical level, e.g. to take into account the fact that what is deemed to be the most relevant NGA access input needed to perform the test may be different in rural and densely populated areas.

[1008] See in particular p.19. The guidance in the relevant section relates nevertheless mainly to the criteria to be used for operating the geographic segmentation in order to assist NRAs in proceeding to a robust market definition.

[1009] "If regional differences are found, but not considered to be sufficient to warrant different geographic markets or SMP findings, NRAs may pursue geographically differentiated remedies (43). The stability of the differentiation — specifically the degree to which the boundary of the competitive area can be clearly identified and remains consistent over time — is the key to distinguishing between a geographical segmentation at market-definition level and remedy segmentation", OJ C159 of 7.5.2018, p.8, point 50.

Common Position on geographical aspects of market analysis (definition and remedies) of 5 June 2014[1010] also provide guidance.

However, as reflected in Chapter 0, none of these documents deal with the issue of the respective methods to be used for the geographic differentiation of remedies and definition of separate markets. There would be merit in having the successor recommendation provide a clear and current position on this, drawing on all of the previous work and integrating it, with a specific focus on VHCN (where regional and urban-rural differences within the Member States tend to be greater than with legacy networks in the past).

Recommendation 44. The successor recommendation should summarise the circumstances under which differentiated market definition versus differentiated remedies should be preferred, with a specific focus on VHCN.

The conditions under which an out-of-cycle revision is warranted

The use of differentiated remedies enables the NRA to incentivise investments that are not yet implemented (and may never materialize in the absence of the perspective of remedy differentiation). It consists in providing in its market reviews that remedies imposed will be reviewed in case certain parameters are fulfilled in certain geographic areas during the time between market reviews (which is now five years instead of the previous three); however, this comes with some risk of causing regulatory uncertainty for access seekers.

Dramatic geographically differentiated changes during the five year cycle will nevertheless seldom occur, because it takes years before VHCN deployment alters competitive dynamics in retail markets, while positive or negative economic shock that dramatically alters willingness-to-pay (WTP) for broadband in a portion of the national territory are not frequent.

These issues are very similar to those posed by the emergence of a new cooperative arrangement, and are amenable to nearly the same treatment.

Recommendation 45. In the interest of fostering VHCN investment by means of predictability, NRAs should refrain from adjusting geographic differentiated remedies out-of-cycle unless the geographically differentiated changes in competitive dynamics are substantial. If a substantial shift is known at the time of a market review, the NRA should signal whether it considers an out-of-cycle adjustment likely, and how it intends to proceed.

Updates should always require at least the explicit confirmation by the NRA that the criteria have been fulfilled, i.e. an administrative decision susceptible to appeal by stakeholders concerned.

[1010] In particular in Point 165 "(…) where the available evidence suggests that the scope of the relevant market is national (any differences in the conditions of competition between geographical areas are not yet sufficiently stable or sustainable to justify the definition of regional or local markets), market power will have to be assessed within this national market. In case of geographical variations in competitive conditions within this national market, it may be appropriate to vary remedies within that national market, despite the fact that an operator is found to have SMP throughout the entire territory".

At the same time, a specific timing of the NRA assessment whether criteria are fulfilled is desirable. For example, Telecom Italia, invoking regulatory certainty, suggests that "it would be better that the criteria are set in the market analysis and applied at least annually in order to review/withdraw remedies accordingly"[1011].

g. Migration from legacy infrastructure

Points 40 and 41 of the NGA Recommendation deal with migration from legacy infrastructure. They deal with notice to alternative operators that may depend on legacy infrastructure that is going to be decommissioned, and on transparency as regards planning. The NGA Recommendation has brought about a degree of consistency in the overall approach to migration; however, implementation is highly diverse among the Member States, primarily due to huge differences in the degree to which regulated SMP operators are prepared to migrate to NGA or VHCN in the various Member States.

Art. 81 EECC provides general requirements for migration in order to safeguard competition and the interest of end-users, including notification to the NRA of plans to decommission existing infrastructure, "including legacy infrastructure necessary to operate a copper network". It requires "a transparent timetable and conditions, including an appropriate notice period for transition, and establishes the availability of alternative products of at least comparable quality providing access to the upgraded network infrastructure substituting the replaced elements if necessary to safeguard competition and the rights of end-users." It also provides conditions under which the NRA may lift existing asymmetric obligations to which the SMP operator is subject.

The opportunities that we see where possible refinements to the Access Recommendations might be considered include (1) clearly delineation of fibre-based services that are roughly equivalent to the legacy services that are being de-commissioned; (2) revising and shortening the recommended five-year notice period that the SMP operator is supposed to give to alternative operators before shutting down a legacy Main Distribution Frame (MDF), together with possibly closing the MDF to new customers (i.e. commercial closure) prior to requiring the removal of legacy facilities that serve existing customers; (3) whether it is appropriate to depart from the principle of cost-orientation for legacy services to hasten the migration; and (4) the degree to which the NRA needs to oversee the migration process.

Once again, we consider each of these in turn. We benefit in particular from the experience of the French NRA ARCEP because the French SMP operator has already committed to a fairly fast migration, ARCEP has developed a comprehensive set of plans for dealing with the migration, and their plans are well documented.

Delineation of fibre-based services that are roughly equivalent to the legacy services that are being decommissioned

Where legacy facilities are phased out, the replacement fibre-based capabilities are expected to be much better in general, but the substitution will not be one for one. In many cases, services that are more or less functionally equivalent will be offered as replacements for discontinued legacy wholesale services. Art. 81 EECC empowers the NRA to withdraw obligations on the SMP operator, thus permitting facilities to be decommissioned or replace, only after having ascertained inter alia that the SMP operator "has established the appropriate

[1011] Telecom Italia response to the Targeted Consultation, Q41.

conditions for migration, including making available an alternative access product of at least comparable quality as was available using the legacy infrastructure enabling the access seekers to reach the same end-users".

The migration from copper to fibre is not as simple as replacing a small diameter pipe with a larger diameter pipe. Quality of Service is more complicated than that.

In its response to the Commission's Targeted Consultation, BEREC[1012] recommended that a *wholesale service substitution matrix* be drawn up before the migration process starts (see Chapter 10). For each wholesale legacy service (such as LLU, Shared Access, analogue leased lines, and DSL copper bitstream), the matrix would identifying the corresponding wholesale fibre-based NGA service. BEREC identified[1013] the following parameters as possibly relevant:

- downstream and upstream bandwidth speeds;
- SLG/SLA parameters and KPIs such as provisioning time, service availability and repair time;[1014]
- the details of operational processes in the reference offers concerned, e. g. elements referred to migration from legacy products and infrastructure; and
- locations of Points of Handover (PoHs) of the new services.

The French NRA ARCEP expanded on this framework to indicate the number of alternative operators that must make use of the wholesale product; the minimum number of consumer customers that must be served by the replacement wholesale service (not counting the SMP operator's own retail customers); and that at least one such FTTH offer must be available for all connectable premises in the area.[1015]

Art. 81 EECC appears to be adequate on this point. NRAs that are facing a migration from a legacy copper-based network to a fibre-based network would be well advised to take note of the examples of best practice identified in this section.

Re-thinking the recommended five-year notice period

Point (39) of the NGA Recommendation put in place a default notice period for de-commissioning of legacy facilities. "In the absence of [an agreement reached on an appropriate migration path between the SMP operator and operators currently enjoying access to the SMP operator's network], NRAs should ensure that alternative operators are informed no less than 5 years, where appropriate taking into account national circumstances, before any de-

[1012] BEREC (2020), Response to the Targeted Consultation, BoR (20) 169, Q35.
[1013] BEREC (2020), *BEREC Response to the Targeted consultation on the revision of the Commission's access recommendations*, BoR (20) 169, Q35.
[1014] BEREC provides the example of Layer 2 wholesale access products on market 4/2014 (now 2/2020), which are used for retail business services. In that case, relevant QoS parameters apart from the bandwidth are Frame Loss Ratio, Frame Delay and Frame Delay Variation and regarding SLAs provisioning time, service availability and repair time. BoR (20) 169, p.54.
[1015] Decision n° 2020-1446 of 15 December 2020 portant sur la définition du marché pertinent de fourniture en gros d'accès local en position déterminée, sur la désignation d'un opérateur exerçant une influence significative sur ce marché et sur les obligations imposées à cet opérateur à ce titre, p.168.

commissioning of points of interconnection such as the local loop exchange. This period may be less than 5 years if fully equivalent access is provided at the point of interconnection."

In most cases, the SMP operator can be expected to be strongly motivated to bring the migration to a successful conclusion once it has begun; otherwise, the SMP operator must bear the cost of maintaining two networks in parallel. There is also a societal rationale for favouring quick rather than slow closure, in addition to the more obvious ones: Operating the two networks in parallel presumably represents a larger carbon footprint than operating a single VHCN network, and is thus less ecologically appropriate.[1016]

The five year notice period plays a positive role in protecting alternative operators from stranded investments, but it represents a very long delay in a fast-moving industry. As mentioned in Chapter 0, more NRAs agreed (13) than disagreed (8) with the proposition that a five-year period, set as the notification period by default in the NGA, should be shortened[1017]. To date, there is a substantial spread among the notice periods implemented, with the recommended five year default notice period lying at the upper end of the range that actually came into force.

In 2019, BEREC held a workshop to discuss the experience of six NRAs that had fairly well developed practice as regards migration to fibre. The report summarising the results[1018] lists the following default notice periods (in the absence of an explicit agreement on an appropriate migration path reached between the SMP operator and operators currently enjoying access to the SMP operator's network) in each of the six European countries (see also Table 32 and Table 33 in Chapter 0):

Estonia

- 6 months

Italy

- Conditions: subject to the SMP operator having achieved:
    a) 100% NGA coverage and
    b) 60% retail take-up:
- 18 months in areas with copper LLU, copper SLU and VULA
- 12 months in areas with only bitstream

Norway

- 3 years' notice of changes in its access network in cases that result in the loss of accesses used by access seekers
- 6 months if a relevant replacement product is supplied

Portugal

- 5-year notice period for total switch-off of a MDF, a local exchange or an access point/connection with co-located operators

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[1016] Cf. comments of consultant Tony Shortall at the 9 June 2021 workshop conducted in support of this project.
[1017] Online survey data.
[1018] BEREC (2019). *BEREC summary report on the outcome of an internal workshop on "Migration from legacy infrastructures to fibre-based networks".* BoR (19) 236.

- 3-year notice period if fully equivalent WBA is provided

Spain

- 5 years if ULL
- 1 year if bitstream
- 6 months if no wholesale
- After the notice period, there is a six month guard period

Sweden

- 5 years (subsequently shortened to 18 months)
- Orderly winding down of consumer arrangements

A few key observations are in order. First, none of these six NRAs is currently maintaining a five year notice period for all services in practice. Second, the degree to which high speed broadband has already been made available and adopted in the area served by the MDF can be an important factor here. Third, de-commissioning can be greatly accelerated for MDFs where no services have been sold to alternative operators, or where the SMP operator has reached a commercial agreement with the alternative operators that purchase services from it. Fourth, in three of the six countries, the notice period is much longer for ULL than for bitstream services. This last point is logical when one considers that a key motivation for the notice period is to reduce the risk of stranded investment on the part of alternative operators – this risk is far greater for a traditional ULL service (where a DSLAM might very well be sitting in a location that is about to be de-commissioned) than for bitstream services.

Recommendation 46. A successor recommendation should envision a shorter notice period than five years, and should allow for more differentiated treatment to reflect areas where a no-longer needed location serves alternative operators who purchase ULL, VULA, or bitstream. A shorter notice period could be possible where suitable alternatives are promptly available, where the deployment is high in the area served by the MDF, and especially where the wholesale offerings that have been sold are centralised products such as bitstream rather than product that require local infrastructure such as ULL. We suggest that the default notice period be set to two years in light of Art. 105 EECC, which prevents most contracts concluded between consumers and providers of publicly available electronic communications services from imposing a commitment period longer than 24 months.

The approach undertaken by the French NRA ARCEP also included implementing commercial closure of an MDF (i.e. not accepting new orders for sale of wholesale broadband services) in advance of closing the MDF for existing customers. In 2020, ARCEP changed the notice period for the SMP operator from the previous five years to an 18 or 36-month notification period for residential products and a 36-month notification period for business products, except in areas where the 4 main commercial operators are yet present on the FTTH network. In those areas, the SMP operator may proceed to the commercial closure of the corresponding copper lines with a 2-month notification period for residential products and a 6-month notification period for business products.[1019]

[1019] See the Commission Comments in Case FR/2020/2284, p.6.

In the stakeholders' workshop held in support of this study, some participants expressed the concern that the SMP operator might continue to use the legacy copper network to provide services (e.g. alarm services and backup services to business customers) long after the legacy network has been technically closed. We think that this is a valid concern as it relates to SMP services other than mass market consumer broadband (i.e. Market 1/2020); however, we are not convinced that it is appropriate for any non-SMP services that might be delivered using the copper network.

Recommendation 47. In revising the notice period that the SMP operator must give prior to de-commissioning legacy facilities, the successor recommendation should envision commercial closure of an MDF (i.e. not accepting new orders for legacy wholesale services) prior to point in time at which the MDF is closed for all existing SMP services.

Possible departure from the principle of cost-orientation for legacy services

There have been proposals by the French NRA ARCEP (and also by the UK NRA Ofcom) to possibly depart from cost orientation for legacy copper wholesale services in an attempt to accelerate the transition to fibre-based services and the shutdown of the legacy copper-based network. As we explain in Section 10.i, the French NRA envisioned the possibility[1020] of increasing the price cap on the unbundling monthly fee where the SMP operator comes up with a detailed plan for the switch-off of its copper network[1021]. The UK NRA decided to remove price controls[1022] on LLU from June 2023 onwards in areas where FTTH was completed and within minimum two years from the stop sell date[1023], which will likely lead to price increases.

The debate over the impact of changes in regulated prices for wholesale broadband on the take-up of high-speed broadband, whether NGA or VHCN, has been intense and has been going on for many years. We summarise some of the main papers in Section 10.i, but with a focus on prices for legacy access products in the steady state. (Prices for legacy wholesale access products during migration has not been studied nearly as much.)

The proposals over the years to change the price of legacy copper-based SMP wholesale access products in the steady state, where VHCN and copper-based legacy services co-exist over an extended period of time (and in the absence of an ongoing or imminent migration from copper-based to fibre-based services), have not been convincing. The economic analysis is not definitive one way or the other, and stakeholder opinions are divided. A shift in this direction would have to be viewed as being somewhat radical and risky.

[1020] In the 2019 public consultation, the NRA suggested that either the SMP would be subject to a "non-excessive" pricing obligation or defining price caps which could be expressed in dependence of cost-based calculations in form of mark-ups. In addition, a maximum yearly increase percentage of LLU fees would be implemented.
[1021] Decision n° 2020 1446 of 15 December 2020 states however that the NRA " ne dispose toutefois pas à ce stade d'éléments permettant de démontrer l'efficacité d'une éventuelle modulation géographique du tarif pour inciter à une migration vers la fibre ou au vidage du réseau cuivre. La migration du cuivre vers la fibre optique accélère alors même que le tarif du dégroupage n'a subi ces dernières années que des variations modérées. (…) Néanmoins, l'Autorité se réserve la possibilité de reconsidérer sa position, y compris au cours du cycle d'analyse de marché, si la situation venait à évoluer ou en cas d'obtention de nouveaux éléments à ce sujet. »
[1022] Except where FTTP is not available.
[1023] OFCOM, Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26, Volume 1: Overview, summary and structure, 18 March 2021, p.18.

In the same vein, there have been proposals over the years to accelerate the switch from copper-based services to fibre-based services by forcing the SMP operator to shut down the copper network. Once again, we view this approach as radical, and uncertain in its impacts. The SMP operator is better positioned to decide when to shut its copper network down than is the NRA or the government. In the course of the public workshop on 9 June 2021, we likewise heard calls for the NRA to determine in which portions of the national territory the SMP operator should be obliged to upgrade its network, but the wisdom of doing so seems dubious.

Returning to the question of the price of copper-based legacy services for a legacy SMP network that is in the process of being phased out, there are valid arguments that can be made for and against de-regulating the price. One can argue that the impact on competition is limited if three conditions are met: (1) If commercial closure of the legacy network has already been announced, (2) if the SMP operator's VHCN network has already been rolled out, and (3) if alternative operators have realistic prospects to offer service over the SMP operator's VHCN network (which can be expected to be the case if permission to switch off the copper network has been granted pursuant to Art. 81 EECC). In this case, the transitory price signal would accelerate the migration without harming competition. Moreover, cost-oriented unit prices for the legacy copper-based network would likely increase anyway as the remaining and unavoidable costs of the legacy network would be spread among fewer and fewer users.

Conversely, if the SMP operator were forced to continue to offer copper-based wholesale access services at a significantly lower price than VHCN-based counterparts, alternative operators might be motivated to maintain the old services for as long as possible, thus potentially putting the migration at risk and undermining the business case for the SMP operator to invest in VHCN.

At a stakeholder workshop in support of this project that was held on 9 June 2021, this led to a lively debate, with some participants warning of serious consequence for alternative operators if prices are deregulated during the migration. The concern is valid, as far as it goes; however, if these products are going to be discontinued in any case, then an increase in the wholesale price for these SMP legacy wholesale access products could be necessary in any case due to declining usage. The NRA should be able to manage any competitive concerns by establishing suitable conditions and timeframes.

Guidance to the NRA as to how best to do this might be counter-productive due to the wide variety of Member State circumstances as regards the migration.

Recommendation 48. There have been suggestions over the years that the SMP operator should be forced to shut down its copper network in order to accelerate migration to a fibre-based infrastructure. Even though the proposals are well-meaning, doing so would appear to be ill-advised. In particular, the SMP operator should be free to build or to decommission where it sees fit. Other than in the context of a migration from copper-based to fibre-based services, artificially raising or lowering the price of copper-based wholesale access services likewise seems inadvisable. The successor recommendation should, however, permit the NRA to deregulate (or allow for an increase of) the wholesale price of legacy copper services as a transitory measure until the copper switch off takes place and when sufficient safeguards against abuse are present, such as (1) commercial closure of the legacy network has already been firmly committed, (2) the SMP operator's VHCN network has already been rolled out, and (3) alternative operators have realistic prospects to offer services over the SMP operator's VHCN network.

The degree to which NRAs should oversee the migration process

The NGA Recommendation provides only minimal guidance as to the process that an NRA should follow in regard to stewardship of the process of migration from copper-based services to fibre-based services. Point (40) of the Recommendation says that "NRAs should put in place a transparent framework for the migration from copper to fibre-based networks."

As with many other policy areas, our perception is that NRAs should be encouraged to play a proactive role in the migration process, encouraging dialogue between the SMP operator, alternative operators, and other stakeholders including, for instance, consumer or user advocacy organisations (e.g. BEUC, INTUG), in order to promote a harmonious migration.

Recommendation 49. The successor recommendation could encourage NRAs to engage in the migration process by proactively promoting a multi-stakeholder process that seeks to ensure that alternative operators are well aware of the plans of the SMP operator and that stakeholders have ample opportunity to find solutions to the challenges of the migration that are in line with overall societal welfare. As in other aspects of broadband policy, the potential advantages of such a multi-stakeholder process are obvious.

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ANNEX 2: SUMMARY OF NRA WORKSHOP

Study on regulatory incentives for the deployment of Very High Capacity Networks
NRA workshop
April 15, 2021
Summary of key discussion points

Introduction

The NRA workshop was opened by the representatives of DG CONNECT and the Contractor, opening floor to the day of discussions on four topics:

- Approaches towards price regulation
- Non-discrimination obligations
- Access to civil engineering infrastructure (CEI)
- Migration from copper to fibre

The summary below provides the main points discussed and the views expressed by the participants. All discussed views were expressed by individual participants and do not constitute official positions of the NRAs.

Approaches towards price regulation

The discussion on approaches towards price regulation focused on several issues ranging from risk premium and WACC to pricing flexibility. First, concerns were expressed regarding the applicability of the 'fair bet' approach. It was noted that adding a policy premium would create methodological risk. A 'policy premium' mixes the market-based and cost-based approaches, leading to a mix of cost-orientation with policy instruments. This could give the regulators the role of 'guessing the market' and acting as investors, which should not be their function. It was also noted that predictability is a key factor for investment. It is possible to maintain predictability and take into account for changes in the market and technology.

Furthermore, a suggestion was raised that pricing flexibility could be granted only if ERT is used a competitive safeguard. Relating to ERT, it was noted that factoring in long-term pricing into the ERT may create challenges for smaller operators and new entrants, because it is mostly large operators that have volume discounts or long-term pricing.

The discussion then turned to noting more specific points. Firstly, to address possible incentives for non-efficient operators if a rate-of-return regulation is applied, a principle of efficiency (of the operator) could be applied where non-efficient costs are adjusted by the regulator. Secondly, that the NDCM Recommendation discusses the assumptions for competition used for market analysis. However, the guidance can be seen as being at a disadvantage when setting scale adjustments to EEO, as the regulators are limited in terms of the minimum number of market players.

More time was spent discussing the portfolio and product-by-product approaches. The portfolio approach was noted as having certain advantages, such as leaving market participants more flexibility in setting prices. Meanwhile, the product-by-product approach could create problems due to the number of products or varying prices of the same SMP operator's product for different types of consumers. It was discussed that initially, when a new product enters the market, it could possibly be assessed individually, but later incorporated into the portfolio test.

Nonetheless, it was also noted that national circumstances might dictate whether a product-by-product or a portfolio approach is more appropriate. Where competition is higher, the latter approach may be more suitable, while the existence of a strong incumbent could favour the former approach. Finally, while these approaches are mainly discussed in terms of retail products, they may also be relevant for wholesale products under ERT (e.g. mirroring it against the flagship product or different tariff variants). In this case the Recommendations provide no guidance so far.

The topic of 'cooper anchor' was also addressed. It was noted that there likely is a need to replace the 'copper anchor' with a more relevant definition. The concept of an 'anchor' itself might still be relevant even if copper is less important and needs replacement by something that is not purely fibre. It would allow to define a better and more relevant competitive constraint.

Finally, it was noted that the Recommendation should apply to all markets, since the EECC applies to all markets and not just the current Market 1. Any mismatches between the EECC and the Recommendations create difficulties for the NRAs.

Non-discrimination obligations

The discussion on non-discrimination obligations began with an exchange of views on the boundary between EoI and EoO, which may be difficult to define. For example, the requirement to have the same systems and processes could imply that all same interfaces are used or that a special ordering interface could be enough. This openness for interpretation leaves the issue less clear. One way to approach this could be by starting with EoO and transitioning towards EoI, if problems with discrimination remain. However, the flexibility to use EoO or EoI is key, furthermore not everyone is convinced that the link between EoI and price flexibility should be made.

It was noted that since EoI might be disproportionate in some cases, an even stricter approach to non-discrimination might be problematic. Retrofitting systems to introduce EoI may create high costs and burden for both SMP operators and access seekers, as systems require investments by both of these groups. The SMP operator needs to invest as per regulatory requirements, while the access seekers may be reluctant to invest to change their legacy systems despite the benefits.

It can be considered that in the majority of cases EoO is enough, but it depends on the circumstances. It is also important to consider safeguards for quality that may prevent misinterpretation of EoO. Sanctions accompanied by effective monitoring should also be in place to encourage compliance. A more active monitoring is especially important in the case of EoO. It was also noted that Quality of Service could be improved overall by requiring the SMP operator to apply better QoS to all access seekers if it negotiates better QoS with a particular access seeker (similar to a Most Favoured Nation type of clause). This could also stop the SMP operators from favouring specific operators.

Relating to the EECC, it was noted that the provisions of Art. 79 envisioning SMP operator's commitments to the NRA could be a helpful instrument to ensure effective non-discrimination, especially in the case of separation of an SMP operator.

Access to CEI

During the discussion on access to CEI, it was noted that regulation of access to CEI is often built progressively and refined over the years. Access to information is key for effective access

to CEI. The SMP operator must have the information and must be obliged to share the information. Arguments may arise along the way on what information should be shared and which not so that the environment is not discriminatory. Thus, the changes take time, especially since the market develops and regular improvements are needed. It was also noted that the prices of access to the information system may be separate from the prices of access to CEI, because it could be argued that the creation/maintenance of the database has costs that are too distinct from other components comprising the access price to be included into the price of access to CEI.

There have also been several more specific points made in relation to access to CEI. Firstly, the criteria used to determine whether access to CEI could be used as a stand-alone remedy should be country-specific, as CEI varies from one Member State to another. Secondly, the differentiation of pricing of new and legacy ducts could be interesting, because it relates to incentivising operators to leave sufficient duct space for other operators to use. In relation to duct space, it was noted that keeping unused copper cables in the duct segment is an issue, as it may limit capacities for new roll out in these segments, and there should possibly be obligations to remove unused cables. Thirdly, the wording of Art. 72 EECC (on access to CEI) is such that it likely makes it possible to include infrastructure that is beyond MDF/ODF only if it is parallel to access infrastructure. It was also noted that access to CEI will remain relevant in the context of 5G, since ducts and poles can play a role there as well. Finally, one more take-away is that a shift from covering urban areas with VHCN to extending VHCN coverage of rural areas might imply the need to shift emphasis from ducts more to poles.

Migration from copper to fibre

The final part of the workshop focused on migration from copper to fibre. The discussion here was shorter and more focused. One of the discussed issues related to migration was how to be not too intrusive at the retail level, since closure of legacy networks leads to migration to NGA services. However, it was also noted with market development it could be that these issues will be also limited.

ANNEX 3: SUMMARY OF STAKEHOLDER WORKSHOP

Study on regulatory incentives for the deployment of Very High Capacity Networks
Stakeholder workshop
June 9, 2021
Overview of main inputs provided relating to key points of the current recommendations

Approaches towards price regulation

Where is Pricing flexibility appropriate?
What can be done to achieve wider use by NRAs of these arrangements instead of cost orientation for NGA/VHCN wholesale products?

Luc Hindryckx (ECTA) questions the objective to push for pricing flexibility. He argues that precedents of fixing wholesale prices based on the level of retail prices created lots of problems in the past (e.g. for the regulation of access to cable networks). Such pricing regulation finds no support in fundamental principle of corporate finance. Moreover, linking access prices to retail prices will bring about higher retail prices by preventing ANOs to pass on part of the producer's surplus to the consumers and impact negatively overall welfare. Consequently, he pleads to give priority to cost orientation. Cost orientation means also that incumbents have a return in line with their risk profile. He challenges the view that pricing flexibility would foster investments. Competition drives investment. ANOs invest relatively more than incumbents: Iliad 37% of revenues, Fastweb – 25%. ERT is not able to address the access needs for the B2B segment. In this segment, transparency is limited. **Boris Schmidt (1&1)** concurs that strict cost orientation is important.

Maurizio Mucci (Sky Italy) also warns against pricing flexibility. The interest of new entrants is to have stable and predictable regulatory conditions. Pricing flexibility is based on the assumptions that it will boost investment, while in reality, it is infrastructure based competition that is the triggering factor for investment in widespread VHCN coverage. This was also recognised by BEREC in its study on the determinants of investment into VHCN.

Felipe Florez Duncan (Oxera) argues that pricing flexibility can work alongside price controls. The NRA does not give up the possibility to impose cost orientation. Pricing flexibility can be a commitment to experimentation. Moreover, pricing flexibility goes together with some constraints (anchor, other network based competition) and NRAs can allow it the period of a single market review to allow investors to deal with risks and uncertainties. The NRA can then look at the outcome, when uncertainties have cleared up and replace pricing flexibility by cost controls, if there was a negative impact on competition.

Edoardo Fagiolini (Open Fibre) pleads for geographic differentiation. Pricing flexibility is appropriate in monopoly situation. Seeking to facilitate competition by making retail prices replicable, however, boils down to reduce wholesale prices which on its turn impacts negatively investment incentives from new operators, including wholesale only operators, in areas where infrastructure competition is feasible. While pricing flexibility may provide investment incentives for the SMP-operator, it may remove incentives for others to invest. The SMP operator should, in those areas, never be allowed to apply wholesale access prices below cost level + sufficient margin to remunerate investment risk. **Tony Shortall (TELAGE consultancy)** supports this view recalling that the two recommendations were written at a time when the focus of the EU policy was access-based competition. Now it is infrastructure competition. The risk of

maintaining the old approach is to crowd out investment in alternative networks. **Felipe Florez Duncan (Oxera)** adds that when dominance is being challenged at the wholesale level, then there may be less need for an ERT. He advocates therefore geographically differentiated ERTs, where wholesale competition is less likely. **Tony Shortall (TELAGE)** warns that this should not concern areas where there is a credible threat of entry competition.

Is there a need for a wholesale margin squeeze test?

Felipe Florez Duncan (Oxera) says that the guidance should distinguish between pricing flexibility to price higher vs. pricing flexibility to price lower. Today, the ERT constrains the SMP operator only as regards pricing higher. But one could envisage price flexibility enabling to price relatively high at the start (when risk is highest) if there is retail replicability but complemented with price floors to avoid the risk of predatory or discriminatory pricing which could affect infrastructure rivals. Ofcom has adopted an approach based on these principles when it prohibited Open Reach from offering geographic discounts on its superfast broadband wholesale services and required to give at least 90 days' notice of the introduction of certain commercial terms (such as volume discounts) that might prevent retail ISPs from using competing networks, so stifling investment, allowing Ofcom to assess those deals before they take effect. **Roel van Kessel (Eurofiber)** also considers that price floors are an underused tool to promote infrastructure competition

Should the current ERT parameters be reviewed?

Chiara Catini (Fastweb) considers that the economic replicability test plays a fundamental role in ensuring effective and non-discriminatory access. Wholesale access services prices based on a Bottom-up Long-Run Incremental Cost (BULRIC) model based on the replacement costs for an efficient operator; still leaves room for the incumbent to discriminate. At the same time, **Gita Sorensen (GOS Consulting)** considers that there is need for new guidelines to assist NRAs to achieve a more consistent approach to applying the ERT/MST. GOS Consulting has reviewed how different NRAs have applied ERT and there is a very wide range of application methods, sometimes alongside cost-orientation.

Jana Hays (CETIN) considers that wholesale only providers should not be subject to ERT. Wholesale only operators have no power over flagship products and very little control over what kind of bundles are offered in the retail market. Moreover, she flags the high workload for NRAs if they have to define ERTs for multiple SMP operators in a geographically segmented market.

Gonzalo (Telefonica) warns that the current guidance leaves too much margin for discretion for NRAs on the implementation of the ERT. The outcome of the test is not predictable, due among other to the lack of transparency (ex ante) of the model and the data that will be eventually used. As was the case for the WACC calculation, where the Commission issued detailed calculation guidance, the new recommendation should define the parameters of the ERT in detail. **Maria Cristina IETTO (TIM)** says that prior information notification requirement are hampering 'time to market'. Time periods should be very short. Could be disproportionate in areas where there is infrastructure competition, by stifling the ability of the regulated infrastructure operator to compete with its competitor(s). **Volcy Lesca (Orange)** says that testing individual products is likely to be excessive. She favours instead an 'arena of competition' test, encompassing the products that are important for entry and exit decisions (portfolios of products). Moreover, the time period considered should be longer than the lifetime of the customer. The duration of the amortisation of investment should be considered. For bundles, the test should include all incremental costs and revenues, while sunk costs and shared costs should be excluded from calculation. **Maria Cristina IETTO (TIM)** adds that when

ERT entails prior information notification, this will in some cases hamper flexibility in retail markets.

Luc Hindryckx (ECTA) says that the ERT is focussed on flagship products and limit the ability of access seeker to launch innovative product based on the same inputs, but with a different structure of pricing. Also as regards the WACC to be used for discounting purposes, he considers that using the SMP parameters is methodologically wrong.

Maurizio Mucci (Sky Italy) says the ERT should be undertaken technology-by-technology. Otherwise, ANOs are forced to follow the mix and the commercial strategy of the incumbent and .e.g. an operator willing to focus only on FTTH, would be a struggling to replicate SMP pricing and remain competitive on market. This would negatively affect VHCN take-up.

How to adjust scale when applying ERT?

Chiara Catini (Fastweb) says the Equally Efficient Operator approach favours the SMP operators because the latter have often lower costs than ANOs. Adjustments is therefore a very important topic on which she will follow up with written observations.

Are there circumstances not contemplated in the recommendations justifying pricing flexibility?

Maria Cristina IETTO (TIM) says that when effective non-discrimination is ensured and EoI implemented, pricing flexibility should be granted, even in the absence of ERT.

Implementation of price control

Is the guidance on the calculation of the NGA risk premium in the NGA rec still fit for purpose?

Tony Shortall (TELAGE) says that both the use of risk premiums and option values presume that there is no meaningful prospect of entry. That's not really consistent with the code, or the BCRD or the other actions being undertaken. He asks whether we want to (1) encourage entry or (2) to strictly price control a single infrastructure. The EECC/BCRD and everything the Commission is doing says we go for option 1. The NGA and NDCM are too much focussed on option 2 and need to be updated. **Felipe Florez Duncan (Oxera)** agreed on the fact that if there is the prospect of entry and a desire to encourage infrastructure competition, then detailed price regulation is inconsistent with that objective. The challenge is if entry doesn't materialise, and the NRA needs to regulate. The new recommendation should set out the framework for how to do so - e.g., at what point to intervene, at what level to intervene, how to recognise the risk that competition may have materialised but didn't? That is where the concept of the fair bet comes in and provides a framework to answer these questions (the objective is to ensure returns are equal to the WACC in expected terms)

Yves Blondeel (T-REGS) pleads for distinguishing between the notion of risk and the ability to exploit market power.[1024] A real question to examine is the actual extent to which there is risk. **Luc Hindryckx (ECTA)** adds that the pandemic has demonstrated that the risk might be much lower than one thought.

[1024] Blondeel is an independent consultant who frequently represents alternative operators.

Felipe Florez Duncan (Oxera) says that this is an empirical question. If the evidence is that there is no risk, then a risk premium or price flexibility wouldn't be warranted. But where there are downside risks, then regulatory framework needs a tool to recognise that. Particularly when currently regulation through price controls imposes a cap on the upside – this brings about an asymmetric risk.

Tony Shortall (TELAGE) however considers that Ofcom's risk premium approach has not yielded good outcomes to date in terms of VHCN investment: the UK has one of the worst outcomes in EU27+UK (though it is picking up now). **Gita Sorensen (GOS Consultancy)** also considers that the fair bet principle applied by Ofcom for FTTC investment, is one of the reasons why the UK is so far behind on FTTP deployment. When an NRA applies a risk premium or fair bet, it is important that the NRA would have a strategic perspective on how it is doing it. What we see in the UK is potentially it being applied in a manner that could be seen to have been counterproductive for the long-term interest of the sector. **Felipe Florez Duncan (Oxera)** replies that this is partly because BT have been 'waiting and seeing' how this will end. In theory, he expects the UK climbing up the rankings quickly. **Tony Shortall (TELAGE)** however repeats that where there is a prospect for meaningful entry, any price regulation will undermine ANO's incentives to invest. At the same time, if ANOs invest in infrastructure, the option value calculation for the incumbent will yield different outcomes (first mover advantage). The risk premium debate does therefore make no sense in potentially competitive areas. The BCRD revision, the connectivity toolbox, the EECC, all refer to infrastructure-based competition. The existing recommendation are still about managing access to a monopoly infrastructure and preserving access competition (MST, etc.). We're in new paradigm, which is about driving infra based competition and it driving VHCN investment. The new recommendation needs to take that into account. **Maria Cristina Ietto (TIM)** agrees that in the presence of infrastructure competition. Price controls should be removed and that in such case risk premia would no longer be relevant. She also acknowledges that the need for a risk premium is reduced in case of co-investment, but adds that in such situation also the need for cost orientation must be revisited.

Luc Hindryckx (ECTA) warns that applying a risk premium on top if the WACC might distort the investment market and reduce the ability for altnets to get capital. When NRAs artificially increase return on investment (RoI) of SMP operators, they distort the capital markets. Indeed, potential investors can choose between investing in (i) wholesale only operators (low risk probably, based on RoI they are low), (ii) invest in an SMP operator – with the same risk but where one can expect higher RoI as a consequence of the risk premium and (iii) invest in an alternative operator of which the margin will be reduced due to higher access prices in the areas where the ANO does not control own infrastructure. Where RoI is similar – the investor will prefer investing in the SMP operator, which bears lower costs.

He also points to the difficulty for any operator that is quoted on the stock market. If one estimates share price by discounting all expected future dividends, the risk premium will only lead to higher share price valuation of the SMP operator. Investors have a preference for short term incomes, not for CAPEX that yield revenues in the medium term. If an ANO changes its investment policy, its share price drops. However, SMP operators can explain CAPEX to investors when they are facing the risk of competitors acquiring a first mover advantage. **Luc Hindryckx (ETNO)** adds that the concept of reasonable rate of return does not exist as concept in corporate finance.

On the other hand, **Volcy Lesca (Orange)** argues that there is currently underestimation of Weighted Average Cost of Capital (WACC) for legacy assets referring to the ETNO Statement

on the WACC Notice of the European Commission of January 2021[1025]. If you have an incorrect WACC, having a risk premium will not solve the problem. Moreover, the Commission should consider different WACC for different areas, to reflect the potential different risks in deploying new networks. She also pleads that the Ofcom's fair bet and risk premium approach should be followed for all pricing obligations over the lifetime of the project. Pricing conditions should be transparent and clear from beginning, stable over the lifetime of the investment. Updated parameters should only apply to new investments and with sufficient notice (legal certainty). **Anton Horshkov (Deutsche Telekom)** also criticises the methodology to set the WACC in the Commission November 2019 Notice for legacy assets. He anticipates that inflation in the US, will bring about an increase in interest rates. As a consequence, EU telcos investing will be increasingly less attractive targets to invest given that margins on regulated prices are capped at WACC values (based on EU values), which are sometimes negative in mid-term.

Maurizio Mucci (Sky Italy) pleads for a wholistically approach to address the risk premium concept: first, determine where it is needed, whether it worked, what are the side-effects on the market. The Bourreau study says that the risk premium can incentivize investment, but it also says that it distorts retail pricing. Did it work? We have enough data to analyse this from an empirical analysis. Input-output analysis. He can speak about Italy, where one of the higher risk premium for FTTH, currently it is highest, was calculated by the NRA. But the boost in terms of VHCN coverage materialized when infrastructure competition emerged and not due to risk premium. Also today it is not a mystery that despite the highest risk premium the Italian incumbent is seeking other regulatory incentives through co-investment in order to expand its FTTH footprint.

In any case, there must be no risk premium on FTTC. And there should not be any risk premium in case there are other risk mitigating factors, such as in case of public subsidies or co-investment.

He finds that AGCOM's methodology for setting risk premium goes in the right direction by looking at real risks incurred by the SMP operator. But real options are based on hypothetical investment plans. AGCOM used different kind of geographies with different densities, which led to identification of certain risk reflecting different types of areas covered. What happens. if one sets this ex ante, is that the incumbent will be in the position to choose to roll out only in most dense areas (where lower risk is present). This is what happened in IT which is leading to discrepancies between risk calculated by NRA ex ante and the risk actually incurred by incumbent. The new recommendation should change the parameters so that risk premium would not be granted on hypothetical willingness to invest, but on the basis of commitments. This way you have certainty, and regulator is in the position to define the real risk that the SMP op would incur. Such amendment of the approach in the NGA rec is also supported by **Edoardo Fagiolini (Open Fiber)**, who adds that as soon the SMP operator starts applying volume discounts –the debate on a risk premium becomes less relevant. There is no justification for setting cost-oriented prices above market prices. **Maria Cristina Ietto (TIM)** replies that volume discounts reflect a lower risk and she pleads therefore for maintaining the possibility for SMP to use such discounts, be it under supervision of the NRA.

Florence Bailly-Monthury (Bouygues Telecom) states that there is hardly any risk of deploying FTTH in countries like France, where full fibre coverage is already decided according to a clear timetable. In France, **"**le Plan France Très Haut Débit" has detailed the deployment phases of full fibre coverage and set the date of 2025, for full optical fiber coverage. Therefore,

[1025] ETNO Statement on the WACC Notice of the European Commission https://etno.eu/downloads/positionpapers/etno%20statement%20on%20ec%20wacc%20notice_210121.pdf

the deployment of the fiber no longer justifies any premium on top of the standard ERP.

Non-discrimination obligations

Should the current preference for EoI be maintained?

Tony Shortall (TELAGE) says that EoO is the principal mechanism used by NRAs (see BoR (20) 210)- so making it work better would seem to be the best option. However, **Gita Sorensen (GOS Consulting)** considers that it is unlikely that EoO would constitute a sufficient safeguard against (non-price) discrimination, as it is extremely difficult to compare outputs when the regulated operator does not have to use the same services and processes as the access seekers. If the regulated party does not consume the same inputs, then you do not have comparative KPIs. In the UK, the NRA struggled for years to get EoO to function as regards access to PIA. **Boris Schmidt (1und1)** adds that EoO is not working in Germany. **Florence Bailly-Monthury (Bouygues Telecom)** also considers that EoO is not efficient and requires continued NRA monitoring that is often insufficient in practice.

Gita Sorensen (GOS Consulting), acknowledges on the other hand, that EOI is a sledgehammer which is costly and lengthy to implement. it might be possible to identify where EoI could be applied and, conversely, where KPIs can be meaningfully applied and monitored. For active products, it is easier to apply EoI. **Jana Hays (CETIN)** says that during a brief period when they were subject to KPIs and that this worked on large numbers, not small ones. In the latter case, deviations are statistically not relevant.

According to **Gita Sorensen (GOS Consulting)** NRAs should carefully consider whether they want to put lots of things on hold because they need to go through the implementation of EoI. She therefore advocates moving to EOI over time. If you have EoO and consider a transition to EoI, the burden of proof that implementation cost is disproportionate must be on the provider. **Volcy Lesca (Orange**) replies that before imposing EoI, especially for PIA, cost calculation must be done by the NRA.

Jana Hays (CETIN) says that given that CETIN is wholesale-only, EoI is in our nature. Although we are an SMP operator, we consider that EoI is certainly the only way to ensure effective service and non-discrimination. BUT NRAs should dedicate great care to consider on which products and where it is applied. While on an active wholesale product it is an appropriate remedy to impose, the effect on EoI on access to CEI could be detrimental to the deployment of VHCN because it would stifle the deployment of new networks since it would require sharing complete information with anyone about CEI deployment. Access to CEI is not guarded. In the Czech Republic, some ANOs use CEI without notice and without paying any compensation. This freeriding complicates planning for future development reserves.

How to improve the implementation EoO?

Volcy Lesca (Orange) says that NRAs should consider using KPIs alongside efficient information exchange processes such as regular multi-operator meetings with NRA to deal with operational issues. Orange has experiences in that domain. The KPIs defined must allow easy comparison for NRAs and wholesale customer. Their definition must occur in through an accurately designed processes to make system credible, i.e. by the SMP operators under supervision of NRA and shared with access seeker. Once they are defined, they must be updated from time to time, again under supervision of NRA and discussion between the parties. **Gita Sorensen (GOS Consulting)** warns that multi-stakeholders approaches can be very effective, but can also take a long time and even be used to delay the process. The framework around how that is done should be further detailed instead to say multi-stakeholders process

as such, otherwise the investment is not meaningful. She also advocates meaningful penalties. Where access seekers must prove the harm, this is often almost impossible to do due to the absence of factual evidence. On the other hand, there is not really a yardstick to set penalties independently from proven access seeker harm.

Luc Hindryckx (ECTA) stresses that penalties for breaches of allowed deviation on KPIs should be really dissuasive. The SMP operator should feel the pain and never do it again. If there is an SLA, and the SMP operator has only to forsake the rental for the line for the period when the SLA is not fulfilled– what is the point? SMP operators will prefer forsaking the revenue and not make life easier for the access seeker. The way to fix it – to be strong on KPIs, SLAs and SLGs and penalties. Also EoI. He also advocate favouring passive products (VULA does not work well). For passive products, one is less dependent of quality of the service parameters.

Is the guidance on SLAs fit for purpose?

Volcy Lesca (Orange) recalls that the question of SLAs/SLGs is a different question than the publication of KPIs to monitor non-discrimination. KPIs may not be based on the same perimeter of the wholesale products for which SLAs/SLGs exist, nor be linked to the commercial conditions attached. Thus, this topic should be totally excluded, even though the topic of appropriate SLAs/SLGs is a key element of the access provided by the SMP operator, especially for addressing the Business segment of the market.

Is the guidance on Long-term pricing and volume discounts still fit for purpose?

Gita Sorensen (GOS Consulting) says that the current guidance enables NRAs to look at both downstream (distortion of competition between larger and smaller ISPs) and upstream impact (where alternative networks are deployed). but does not put that explicitly. The Commission should recommend that they do both before they approve the types of discounts. Applying a Wholesale MST is a good thing to do but she advocates that NRAs should not perform such test as an additional layer to other remedies. In the UK, there is cost orientation for PIA and for dark fibre. But dark fibre pricing is set at a level that cannot be replicated via own infrastructure. Alternative operators that build PIA are foreclosed from the dark fibre market, because the regulated dark fibre product is cheaper than what they can offer, since the cost for the SMP operator is lower. **Edoardo Fagiolini (Open Fiber)** confirms that discounts can be used to squeeze out wholesale competitors. Conditional rebates should be strictly limited.

Volcy Lesca (Orange) advocates that NRAs would look at the pricing structure of the discount since in some agreements there is an initial payment plus then recurrent fees and in other there is only a discount. The outcome of the test will not be the same. The MST should be on a prospective basis corresponding to the duration of the commitment.

Access to CEI

Is the guidance in the NGA Rec still fit for purpose?

Tony Shortall (TELAGE) acknowledges that cost orientated access to SMP existing CEI is important, but this will likely also be addressed in the revision of the BCRD and pleads for harmonizing pricing rules in the future recommendation and the revised BCRD.

Luc Hindryckx (ECTA) regrets that since the adoption of the NDCM we saw an increased focus on virtual products – as opposed to the focus on access to CEI in the NGA rec. **Tony**

Shortall (**TELAGE)** considers that this is partly because not all NRAs believed there could be entry (and so did not plan for it). Access to CEI is a complex process and so it likely to take time to bed in that process (just as what happened with LLU long ago where it took years to bed in, even in MS that did it well). In this regard, **Valerio Usella (Open Fiber)** says that in Italy, the RO of the SMP operator contains different limitations in terms of number of accesses to CEI that can be ordered. E.g. no more than 30 infrastructure access per month/10 per week. This limitation in practice hinders usage of SMP CEI to deploy FTTH for the mass market. **Luc Hindryckx (ECTA)** reports of cases where the SMP operator prefilled its ducts to refuse access because of lack of space. **John Gunnigan (National Broadband Ireland)** says that effective use of CEI is also hampered by administrative requirements (local permits etc) and that these requirements often raise the cost of deployment (e.g. obligations on reinstatement). The measures set out in the Connectivity Toolbox could be of help here but only if these result in tangible action at national level.

How to tackle the current bottlenecks?

Gita Sorensen (GOS Consulting) says that in the UK, the NRA allowed ANOs to make repairs in the SMP CEI themselves. They are not obliged to use a list of authorised contractors but can having their own people authorised. Moreover, they get compensated by the SMP operator at the same rate as they would have to pay if the SMP operator would have done it. This puts an interesting constraint on ancillary services as ANO must pay SMP, and vice versa. In the UK, everything underground can be done by ANOs. Overground not yet, but there are improvements. Moreover, OFCOM has set clear rules of who owns improvements. If an ANO repairs the CEI, the latter remains the ownership of the SMP operator. If the ANO builds new CEI, e.g. new duct around collapsed infrastructure, the rule is that the ownership of the new assets also accrue to the SMP operator. It is in the interest of the sector to avoid the fragmentation of CEI in bits and pieces owned by various network operators.

Jana Hays (CETIN) expresses however concerns as to the authorisation/certification of ANO staff for performing works in the SMP operator's CEI. This is a complex solution when there are multiple ANOs. An obligation to certify staff of each and to monitor works implemented could put an excessive burden on the owner of infrastructure.

Conversely, **Luc Hindryckx (ECTA)** reports a positive effect on CEI usage in countries where certified technicians are allowed to intervene in SMP CEI, e.g. in Italy. He advocates that the Commission would give clear guidance to simplify the certification process. He refers to the Belgian SMP operator which introduced very complex processes for certification, even for subcontractor that the former used itself.

Volcy Lesca (Orange) flags the issue of the responsibility in case third parties are allowed to perform works in the SMP operator's CEI. In this regard, **Luc Hindryckx (ECTA)** advocates that the Commission would ask NRAs to prevent excessive liability clauses. He refers to a precedent where the SMP operator was asking ANOs to take an insurance that was excessive in relation to the value of the assets at stake. As a consequence, ANOs were unable to find an insurance company that would cover the risk for a reasonable price.

Gita Sorensen (GOS Consulting) says that pricing stability is another issue. Setting cost-based prices on SMP CEI can be done in many ways. One allocation rule is how much space is relatively occupied by the ANO and the SMP operator. But the ratio suddenly changes when copper is removed from the ducts. ANOs relative share can jump to 50 % against 10-15% when there was still copper in the ducts. This goes against the continuity and predictability of underlying costs required to foster FTTH deployment. This could have significant implications in the medium term. Ofcom found a way to avoid a strong price hike.

Migration from copper to fibre

Is the guidance in the NGA Rec still fit for purpose?

Gita Sorensen (GOS Consulting) argues that the migration process should cover not only physical network issues and assess to equivalent products, but also customer communications and the impact migration communications could have on both downstream and upstream competition. There is a risk that the dominant provider could use the migration communications to harm downstream competition and also that they could foreclose infrastructure competition by entering into arrangements with large downstream providers in a manner that actively discourages those downstream providers for using competing infrastructures. **Valerio Usella (Open Fiber)** says that there is a risk that the SMP operator will select areas where competition is in place or is emerging as first areas where legacy switches are closed. NRAs should supervise the selection of the area and the order of closure. They should set criteria that have to be satisfied in order to select area.

Should guidance be provided on 'commercial closure' in addition to the technical closure?

Luc Hindryckx (ECTA) flags that commercial closure could have discriminatory effects. For example, in the B2B segment, copper is sometimes used for backup. Will the SMP operator also cease to use copper for such purpose after the commercial closure? Imagine you are a big corporate customer. The ANO will need to disclose that it can no longer provide the same backup solution, while the SMP can continue to provide backup on copper. That will distort competition. **Yves Blondeel (T-REGS consultancy)** says that it should be written in the recommendation that commercial closure is not the same as decommissioning or migration. In the 2010 Rec, the advanced notice period refers to the decommissioning. The NGA Rec does not say anything about whether SMP stops providing wholesale access on an earlier date. The future recommendation needs to be very precise to avoid that SMP operator shuts down wholesale access and keeps using the copper network for itself. The backup example is a real one. There is a risk here that the way this will be worded in the future recommendation, could mean that wholesale services are no longer offered but internal provision might be maintained.

Revision of the advanced notice period

Volcy Lesca (Orange) says in France, the NRA allows for the commercial closure in advance of the technical closure. It is appropriate to deal differently with the two steps. For the commercial closure, very limited advanced notice is required when there are 4 competitive operators present in the area concerned: only 2 months of advanced notice. That will allow commercial closure of substantial numbers of exchanges in a short term. The French precedent shows that it is important to differentiate advanced notice periods according to different zones (dense, less dense). **Florence Bailly-Monthury (Bouygues Telecom)** says that it is essential that the NRA ensures conditions are respected. Information must be shared by the SMP-operator with the ANOs, the same level of info and well in advance in order so as to plan for the migration.

Luc Hindryckx (ECTA) says that the migration from ATM based leased lines to IP lines had severe discriminatory effects for altnets, which often were not able to maintain contracts with customers, because were pushed into rapid migration. This stresses the importance of advanced notice periods and involvement of regulator with weekly/monthly meetings to monitor migration, for example to look if some customer is left behind without solution etc.

Jana Hays (CETIN) says that the future recommendation should also consider the case of forced decommissioning that is driven e.g. by denial of permits from third parties or cancellation of PIA that was used. In such case, the timing is out of the hands of SMP operator.

Should the pricing of copper be relaxed after full FTTH deployment?

Luc Hindryckx (ECTA) says that what ARCEP is proposing is not acceptable. SMP operators should not be rewarded to come up with ambitious migration plans. It is in the interest of everyone to migrate as soon as possible. **Florence Bailly-Monthury,** Bouygues Telecom, stresses the importance of pricing stability. Passing on wholesale tariff increases to retail clients will give them the right to cancel their contract and have the effect of weakening competition at the advantage of the SMP operator. Moreover, maintenance and quality of service of the copper loops should be warranted. The approach by ARCEP to allow the SMP operator to ensure a lower quality of service after commercial shutdown should not be followed at EU level.

Tony Shortall (TELAGE) acknowledges the rationale for relaxing pricing obligations on copper lines after commercial closure, when there is full substitutability with fibre and a regulated access product of at least comparable quality allows to migrate all retail clients concerned, that would become the new anchor product. However, the situation is trickier where the fibre networks in the area have been (partly) deployed by ANOs and are thus not regulated. Can in such circumstance copper be deregulated in the absence of a finding that the area is competitive?

Volcy Lesca (Orange) says that everyone knows that with fibre deployment the cost of copper network that will be less and less used will increase. There is a cost logic to review and increase LLU price together with the progress of the migration. After commercial closure, copper regulation should be removed.

Alternative products of at least comparable quality

Luc Hindryckx (ECTA) flags the importance of QoS. – Functional equivalence and comparable QoS are not enough. Access to a passive copper wire is not the same as active transmission service (even if it is VULA). We need to pay attention to this. If a passive product is removed, the replacement should have similar characteristics. We cannot move from ULL to crappy bitstream.

Several operators have frustrations -NRAs have declared things substitutable which operators in real world do not consider substitutable (in terms of innovations they want to put into the market), and they are forced to move from innovator to replicator positions.

Yves Blondeel (T-REGS) says that in some Member States there are reasonably acceptable SLAs for ULL in terms of repair times. However, a majority of NRAs accepted repair times SLAs that are awful like 80% after 2 days of down time. What we seen in some migrations is that while SLAs for ULL was 4 hour repair time, while it is longer for fibre. We need to be certain there will be an NRA decision at the end of the stakeholder process and there must be visibility on when the decision will occur. In the B2B segment we had frustrations where after discussions on KPIs, SLAs and SLGs, we only obtained incremental improvements and NRAs signed off on these. There needs to be on clear framing. Explicit in NRA decision that modifies RO with unequivocal consequences.

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