

BEREC Report

Regulatory Accounting in Practice 2025



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List of Abbreviations

A

AD..... *Access Directive*
ADSL..... *Asymmetric Digital Subscriber Line*

B

BB..... *Broadband*
BWA..... *Broadband Wireless Access*
BTS..... *Base Transceiver Station*
BU-LRIC..... *Bottom Up - Long Run Incremental Cost*
BCRD..... *Broadband Cost Reduction Directive*

C

CAP-M..... *Capital Asset Pricing Model*
CCA..... *Current Cost Accounting*

D

DSL..... *Digital Subscriber Line*
DESI..... *Digital Economy and Society Index*
DA..... *Direct Access*

E

EECC..... *European Electronic Communications Code*
EFTA..... *European Free Trade Association (Member countries: Iceland, Liechtenstein, Norway, Switzerland)*
ERT..... *Economic Replicability Test*
EU..... *European Union*
ERP..... *Equity Risk Premium*
ECN..... *Electronic Communication Network*

F

FDC..... *Fully Distributed Costs*
FTTB/C..... *Fibre to the Building/Curb*
FTTH..... *Fibre to the Home*
FTTx..... *Fibre Connection to x*
FTTP..... *Fibre To The Premises*
FLLU..... *Fibre Local Loop Unbundling*
FSLU..... *Fibre Sub-Loop Unbundling*
FWA..... *Fixed Wireless Access*

G

GPON..... *Gigabit Passive Optical Network*
GIA..... *Gigabit Infrastructure Access*

H

HCA..... *Historic Cost Accounting*
HFC..... *Hybrid Fibre Coax*
HIPC..... *High Impact Physical Corridor*

I

ISP..... *Internet Service Provider*

L

LLU..... *Local Loop Unbundling*
LR(A)IC..... *Long Run (Average) Incremental Cost*
LRIC..... *Long Run Incremental Cost*
LTE..... *Long Term Evolution (3rd Generation Mobile Standard)*
LL..... *Leased Lines*
LE..... *Local Exchange*

M

MST..... *Margin Squeeze Test*
MDF..... *Main Distribution Frame*

N

NDCM..... *Non-discrimination Obligations and Costing Methodologies*
NGA..... *Next Generation Access*
NRA..... *National Regulation Authority*

P

PIA..... *Physical Infrastructure Access*
PDH..... *Plesiochronous Digital Hierarchy*

R

RA..... *Regulatory Accounting*
RFR..... *Risk Free Rate*

S

SA..... *Shared Access*
SLU..... *Sub Loop Unbundling*
SMP..... *Substantial Market Power (regulated operator)*
SDH..... *Synhronous Digital Hierarchy*

U

ULL..... *Unbundling Local Access*

V

VDSL..... *Very High Speed Digital Subscriber Line*
VULA..... *Virtual Unbundled Local Access*
VULA-H..... *Virtual Unbundled Local Access – High Speed*
VHCN..... *Very High Capacity Network*

W

WACC..... *Weighted Average Cost of Capital*
WCA..... *Wholesale Central Access*

1. Executive summary

This is the 21st RA annual report which summarises the findings of a detailed survey of regulatory accounting systems in the context of access markets across Europe. Information has been gathered from National Regulatory Authorities (NRAs) and covers the implementation of regulatory cost accounting methodologies in national markets. It includes the state of play in terms of remedies of market regulation and focuses on price control, and the way in which it is defined in practice. The report also provides (i) certain structural parameters of each country, (ii) WACC methodologies applied by NRAs and WACC values currently in force focusing on the implementation of the corresponding European Commission WACC Notice on the calculation of the cost of capital for legacy infrastructure.

The document offers an up-to-date factual report on the regulatory accounting frameworks implemented by NRAs and an assessment of the level of consistency achieved. Where possible, trends and comparisons with data collected in the past years are illustrated.

The report focuses on the analysis of services in key wholesale markets: Wholesale Local Access (former Market 3a/2014, now Market 1/2020), Wholesale Central Access (Market 3b/2014) and Wholesale high quality access (former Market 4/2014, now Market 2/2020 – Wholesale Dedicated Capacity).

In line with previous reports, it also provides information about the regulatory and competitive framework in each member state, such as the presence of a geographical regulation, the equivalence model applied, the application of retail margin squeeze tests, and the regulation of cable networks. A brief analysis of symmetric remedies is included. Outcomes of the survey are simply reported in a descriptive form.

The report also looks at annualisation methodologies provided by respondent NRAs. As in last year's report, accounting information for specific products in Market 1/2020, such as copper access (including LLU, SA, SLU), fibre access (FLLU, VULA), dark fibre access and duct access have been further analysed; with respect to last year's report separate information on fibre sub-loop unbundling (FSLU) and pole access have been included.

An evaluation of the implementation of the Recommendation 2013/466/EU on consistent non-discrimination obligations and costing methodologies (NDCM) is also reported (par. 3.5). In this context some new elements about BU models are reported. The NDCM has been updated and substituted in February 2024 by the new Gigabit Recommendation¹. Where regulatory decisions at the cut-off date for this report of 1 April 2025, were taken on the basis of the Gigabit Recommendation, this has been reported accordingly, still a considerable number of decisions are referring to the NDCM. Also, the report monitors the new elements provided for in the Gigabit Recommendation in the general regulatory context.

Furthermore, as in previous reports, in order to include factors influencing NRAs regulatory strategy, additional structural data (e.g. population, market and competitive structure, infrastructure) have been collected from NRAs (chapter 4).

In Chapter 5 the report delivers an extended survey on WACC parameters, mainly focusing on Market 1/2020. The WACC chapter summarises the main methodologies currently used by NRAs

¹ On 23rd February 2023, the European Commission invited BEREC to provide the Commission with an opinion on the draft "Gigabit Recommendation", and BEREC published its Opinion on the 5th May 2023 (BoR (23) 83). The Recommendation (EU) 2024/539 on the regulatory promotion of gigabit connectivity (Gigabit Recommendation) was published on 19th February 2024.

and sets out the reasons behind the estimation of single parameters needed to evaluate the cost of capital under the Capital Asset Pricing Model (CAP-M) model. The focus this year remains the reporting of the application of the 2019 Commission WACC Notice by NRAs.

Appendix I contains a number of figures/tables providing further details on some of the analyses in the report.

1.1 Key findings

The Regulatory Accounting annual report gives an overview of the main remedies imposed on SMP operators in relevant markets susceptible to ex-ante regulation. Specific focus is given to the relevant costing methodologies, applied in relation to the corresponding price control schemes, adopted by NRAs for single products. As in the last year, the increased use of geographic regulation (either by market segmentation or differentiated remedies) is analysed. Furthermore, the interplay of SMP regulation and symmetric regulation (both acc. to Art. 61.3 of the EECC and acc. to the BCRD/GIA) is looked at.

The actual trend in the regulatory practice is not following a straight line. From one side there is a reduction of ex ante regulation over time by some NRAs. However, it can happen that the need for ex ante regulation can arise in previously deregulated markets due to a detriment of competitive constraint at retail level, specifically in cases when a 'lighter' regulatory approach is no longer sufficient to spur investment in VHCN or provide fair access to networks necessary to promote competition. Considering that the base of ex ante regulation follows the three criteria test, it can happen that also in a fully or partially deregulated market, competitive conditions can worsen in a way that ex post intervention is not enough to address the corresponding competitive problems. In this light some new recent proposals can be seen, still under consultation, from RO and BG, which are proposing to take again into consideration the possibility to apply an ex-ante (SMP) framework after years of fully deregulated access markets, at least in some geographical areas where VHCN has been available for several years.

Regarding the general regulatory trend, some NRAs are proposing to fully deregulate all markets due to the fact that commercial agreements are the main instrument used by operators to access to SMP products – PL²) or to fully deregulate the wholesale local access markets leaving access to civil infrastructure remedies regulated in an specific standalone Physical Infrastructure Access Market still to be defined – ES³ –. Some NRAs are applying symmetric regulation together with SMP remedies. Mostly, the regulatory obligations on copper and VHCN products are still widely imposed on the legal basis of the SMP framework. For the first time more VHCN than copper access products are regulated in market 1/2020.

The detailed product by product analysis on the wholesale access level has shown that ex ante regulation is applied by NRAs in a more targeted way using the flexibility of the EECC provisions to tailor the regulatory obligations to the specific competition and infrastructure situation identified in the market analysis (also from a geographical point of view).

² In PL a proposal for full deregulation of WLA and WCA is ongoing.

³ In July, the CNMC deregulated markets 1/2020 and 3b/2014. Previously, regulation in these markets applied to only around 30% of the population due to geographical segmentation. The CNMC is currently working on a standalone PIA market to ensure the continuation of civil infrastructure remedies, and Telefónica has submitted a set of commitments in this market that is currently under assessment. On the other hand, Wholesale Dedicated Capacity (market 2) remains regulated in Spain due to Telefónica's high market share in the corporate segment.

The overall picture of the cost accounting methodologies (chapter 3) is relatively stable in comparison to last year with just a small number of changes by NRAs since last year. There are clear preferences for price control methods (cost orientation alone or in combination with price cap, but the overall picture is more differentiated), cost base (current cost accounting – CCA) and allocation methodologies (mainly long run incremental costs (LR(A)IC), with fully distributed costs (FDC) preferred only for few products). The degree of consistent application of methodologies in accordance with the EU Regulatory Framework continues to be high and accommodates the use of elements or parameters that reflect national circumstances.

The RA report 2025 provides an analysis more oriented on single products (increasing the scope of monitoring) with respect to the previous editions. As in the 2024 report, the 2025 report collects information on 19 main products, two more than the 2022 and 2023 reports (there were 13 in 2015), as reported in Figure 2, taking into account a separate view of underground civil infrastructures (ducts) and aerial civil infrastructures (poles), as well as including separate information on access to the fibre sub loop unbundling with respect to previous years.

The regulation of legacy products in market 1/2020 and 3b/2014 remains frequent: 56% (2024: 63%) of EU NRAs still maintain SMP remedies on ULL and 41% on market 3b/2014 over legacy copper network (reduced from 48% compared to last year's report). There is a substantial decrease of the number of NRAs that regulate services on copper products that become less and less relevant (ULL, SLU and BTS legacy). A more stable situation can be found in the access market based on NGA/VHCN, with only a few NRAs having removed regulation since 2021 and others that have started regulating new access products, including duct access. The regulatory obligations have been removed consistently for the legacy terminating segment products (market 2/2020), due to the advanced decommissioning of the legacy technologies like PDH and SDH.

Concerning VHCN products a reduction trend is not evident and it seems that regulatory obligations are adjusted in light of different investment dynamics and needs. The SMP regulatory remedies have been applied by NRAs generally towards a single national SMP operator. In some cases, the SMP regulation has been applied to more than one SMP operator.

Civil infrastructures access is the main regulatory instrument in some countries and this is the case where VHC networks are already widespread and copper-based NGA service is not present, or where a symmetric framework is applied as the main instrument of regulation (often together with SMP regulation). In general, where the regulatory framework is mainly based on passive access products the market is also more concentrated. In some group of countries where infrastructure competition is the main instrument of competition, SMP regulatory framework, even if still present, provides only an indirect competitive constraint. Full deregulation or reduced regulatory pressure are present when there is efficient infrastructure competition; this is the case mainly where cable is widespread or where a wholesale only model is present as a competitor.

The number of NRAs that face different competitive conditions across their national territory thus justifying a geographically differentiated approach (in terms of market definition or remedies application) has increased in comparison to last year for most markets/products. More than 75% of NRAs that regulate market 1/2020 apply a geographical approach to regulation, specifically for VULA-H (last year was about 70%). The increasing trend prevails notwithstanding the deregulation cases of the corresponding product. Looking at geographically differentiated regulation, the deregulated areas range from 5% of households up to 95% for local and central access products, more often between 20% and 50%, increasing in comparison to last year's report.

Most NRAs apply the whole set of remedies when SMP regulation is imposed on a specific product/market, where access obligation in combination with non-discrimination are the most frequently applied remedies.

Within the copper network, ULL is still the most regulated product. Focusing on RA in general, accounting separation is often imposed together with the cost accounting obligation. Some NRAs consider it necessary to impose both obligations in order to ensure that robust regulatory accounting information is available for each product. This rationale is related to the fact that accounting separation is useful for vertically integrated undertakings by using cost models to supplement price control measures in order to prevent unfair cross-subsidies (e.g. if the result of the cost model is higher than the cost derived from the accounts of the SMP operator), and when the regulatory framework, in perspective, can become less intrusive.

As a stable result during previous years, cost orientation remains the most commonly used price control method and it is applied mainly for legacy products, while retail minus is mainly used for VULA and market 3b/2014 products (Figure 17-Fig. 19).

The Economic Replicability Test (ERT) as a price control methodology is still mainly used complementarily to cost orientation, albeit an increased use of the ERT at least for NGA/VHCN wholesale products as a price control method can be observed, suggesting it is a substitute with respect to cost orientation, in line with the Commission NDCM Recommendation (2013/466/EU) and the Gigabit Recommendation (2024/539/EU) and the price flexibility tool according to Art. 74 of the EECC.

Cost orientation for FTTH is more frequent when a legacy network based on copper is still relevant for NGA products (FTTC), where a stronger relation of substitution with respect to a legacy copper product may occur. In case no intermediate steps like FTTC for VHCN transition exist, more flexibility is granted when regulating FTTH, e.g. with the application of ERT. The relevance of the legacy copper network for NGA take-up (e.g. the case of FTTC) appears to be correlated to remedies imposed in access markets as well as on the level of the price flexibility tool according to Art. 74 of the EECC, irrespective of the application of non-discrimination rules such as EoI.

Overall, the application of EoI models is increasing over the years. The cumulative percentage of EoO and/or EoI is higher in relative terms in case of VULA (FTTH) as well as for market 3b/2014.

With regard to the cost base CCA is by far the most commonly used methodology for all markets. The situation remains stable in comparison to last year.

The most frequent cost allocation approach is LRIC/LR(A)IC, for almost all products/markets. In the access market (market 3a/2014) a preference for LRIC/LR(A)IC can be found. In general, when LR(A)IC/LRIC is chosen as the main category, the most common approach is Bottom-up. FDC is a frequent approach for duct access, specifically for legacy reusable legacy infrastructure, but has been decreasing since last year. There is no “transition” from LR(A)IC to FDC.

For copper LLU most NRAs apply a cost orientation alone/LRIC-LR(A)IC/CCA approach. Generally, there is an increase in the use of the combination of cost orientation/price cap with BU-LRIC approach and a reduction of accounting methodologies based on FDC; TD approach is by far less frequent.

A more in-depth analysis on the application of the 2013 NDCM Recommendation, and where relevant the 2024 Gigabit Recommendation, has been carried out. The survey shows that the Recommendations provide enough flexibility for NRAs to consider the most appropriate regulatory

approach to promote investment and take up of VHCN in light of specific national conditions as well as promoting competition.

The analysis of the structural data (chapter 4) confirms that countries start from very different points in terms of population, topography, infrastructure and market situation etc. These factors influence the regulatory strategy of NRAs for the wholesale access markets.

Compared to the BEREC WACC parameters Report 2025 (BoR (25) 64), the present BEREC Regulatory Accounting Report WACC chapter (chapter 5) is of a more descriptive nature, aiming at reporting and analysing NRAs WACC calculations “as is” as well as showing the evolution over time, in line with previous versions.

Regarding the WACC, the in-depth survey and the update provided in this report (chapter 5) highlights that all NRAs use the Capital-Asset-Pricing-Model (CAPM)⁴ and hence similar parameters for determining the WACC. However, the value of these parameters naturally differs reflecting different national financial market conditions. The statistical analysis (regression) of the data shows – in line with the previous exercises – that the differences of the final WACC values over time are mainly explained by parameters in the WACC calculation that are more “country related” such as the RFR, ERP and Tax rate, with a less relevant role for “sector-specific” parameters such as beta, gearing and debt premium. This is consistent with survey results on “used methodologies” that confirm that beta, gearing and debt premium are estimated mainly on a “notional” basis (see also Appendix II of Ch. 5) by NRAs for a long time prior to the WACC Notice.

Summing up, 18 NRAs from past years reports plus DK this year, are considered to fully apply the WACC Notice (AT, CZ, DE, ES, FR, HR, HU, IS, IT, LI, LU, LV, NO, PL, PT, SE, SI, SK, DK), including countries that use the appropriate flexibility considering the fact that those cases have been commented on and accepted by the Commission in the notification process according to Art 32 of the EECC.

By taking into account only the most recent estimation over time (last three most recent values for each NRA) in the pooled regression analysis, we observe that the most relevant country specific parameters in explaining differences are RFR and Tax. Notional parameters such as Beta, gearing, ERP and debt premium, provide a less important contribution to explaining differences in final WACC values - in the proposed order of relevance. This outcome shows that the application of the WACC Notice starts to have a visible effect in converging notional values, also considering that the WACC Notice provides some flexibility for NRAs to choose the peer group for the beta and gearing estimation to better reflect national circumstances. Among notional parameters, Beta is becoming more relevant for explaining the differences between EU NRAs and this can be related to different aspects: the estimation of this parameter may address the country situation, as allowed by the Notice and it has been less stable in recent years than in the past due to a change in the risk profile of telecom operators (this can be indirectly seen in the different frequencies of WACC updates).

Overall, the 2025 data confirms a consistent approach to regulatory accounting. The latter indicates that NRAs are providing predictable regulatory environments in their countries. The convergence of regulatory accounting approaches for wholesale access markets needs to bear in mind that wholesale access markets are reflecting different national market situations and structural factors influencing the regulatory strategy.

⁴ Cf. BoR (13) 110.

1.2 Future development

As can be seen from the results above the Report confirms a trend towards a consistent application of regulatory accounting frameworks by NRAs. This also reflects clearly convergence in the application of the 2013 Recommendation on consistent non-discrimination obligations and costing methodologies and its successor, the 2024 Gigabit Recommendation. In 2026 the report will continue to look at the application of regulatory accounting with regard to key access products (e.g. fibre) and will maintain an in-depth analysis of the methods as well as the national market situations in which they are applied. Further to this, the focus of the report will be further adapted in the light of the EECC provisions and the way in which NRAs apply the provisions to deal adequately with the developments in markets and technology including in geographical terms. The analysis of the interplay between SMP regulation and symmetric regulation (Art. 61 EECC or BCRD/GIA) will be continued.

Regarding the WACC calculation, the report data will continue to be collected based on the methodology and input parameters actually used by NRAs to estimate the rate of return on capital employed, and the impact of both on the result will be considered. Furthermore, the convergence of WACC calculations through the application of the 2019 Commission WACC Notice will be assessed.



2. Introduction

2.1 Background and synthesis of the main results

This section provides an introduction to the Report specifying procedural aspects of the survey and including some high-level findings, for a better reading of the next sections. This is in light with the twofold scope of the report : i) to provide an updated benchmark on the status of the remedies implementation in access market; and ii) to give an overview on how the supply and demand factors and competition conditions may affect the choices of the regulatory framework applied by NRAs, to better figure out the rationality behind the regulatory decisions, in terms of proportionality and outcomes of the competitive conditions specifically on price control and costing methodology.

BEREC has been gathering and reporting data from NRAs to provide a wide picture on remedies in charge with reference to the SMP and symmetric framework according to the Code and more specifically on remedies about price control and costing methodologies including high level implementation of the relevant soft laws EU decisions: NDCM (2013/466/EU), replaced by the Gigabit Recommendation (2024/539/EU), and WACC Notice (2019/C 375/01) in European countries.

The actual trend in the regulatory practice is not following a straight line. From one side there is a reduction of ex ante regulation over time by some NRAs. However, it can happen that the need for ex ante regulation can raise in already deregulated markets due to a detriment of competitive constraint at retail level, specifically in cases when the 'lighter' regulation is not any more sufficient to cope with investment in VHCN and fair access to networks necessary to promote competition. Considering that the base of ex ante regulation follows the three criteria test, it can happen that also in a fully or partially deregulated market, competitive conditions can worsen in a way that ex post intervention is not enough to address the corresponding competitive problems. In this light some new recent proposals can be seen, still under consultation, from RO and BG that are proposing to take again into consideration the possibility to apply an ex-ante (SMP) framework after years of fully deregulated access markets, at least in some geographical areas where VHCN has been available for several years.

The case of BG, where all access markets have been previously assessed as competitive, CRC has defined a civil infrastructure market with an SMP operator at national level. This is due to the fact that CRC's assessment shows that the competitive environment under the currently available symmetrical regulation (BCRD/GIA) is less effective⁵.

In LU, ILR has decided to shift the regulation from pricing flexibility (economic replicability test) towards stricter price control remedies (price caps based on a cost model)⁶. This adjustment

⁵ "As the existing symmetric regulation is not effective enough to provide stable and clear conditions for operators that have deployed or intend to deploy their own electronic communications networks, CRC is concerned that the frequency and outcomes of dispute resolution regarding the access to physical infrastructure create uncertainty in the market for the undertakings that rely on regulated access" (case BG/2024/2521). On 15 August 2024 the Supreme Administrative Court decided not to allow the application of the preliminary execution. The decision is suspended until the final court ruling.

⁶ In the recent case (LU/2025/2590-91 in September 2025), ILR proposed, after many years, to review the partial flexibility on wholesale VHCN prices (FTTH), where prices were defined through the implementation of an ERT price test in combination with a cost-oriented price for legacy copper network (copper anchor). The recent market review highlights that copper is no longer a competitive constraint and the cable network is also not considered to be substitute of fibre (it does not represent a direct or indirect competitive constraint in wholesale local and central access market). Therefore, cost-orientation has been proposed in a form of a price cap for local access products and full cost

reflects a reassessment of competitive conditions in light of the ongoing transition from copper to fibre networks.

Regarding the general regulatory trend, some NRAs are proposing to fully deregulate all markets due to the fact that commercial agreements are the main instrument used by operators to access to SMP products – PL⁷) or to fully deregulate the wholesale local access markets leaving access to civil infrastructure remedies regulated in an specific standalone Physical Infrastructure Access Market still to be defined – ES⁸ –. Some NRAs are applying symmetric regulation together with SMP remedies. Mostly, the regulatory obligations on copper and VHCN products are still widely imposed on the legal basis of the SMP framework.

Regulatory obligations must be proportional and entail minimal restrictions of competitive behaviour necessary to address competition problems in the relevant market and to achieve the framework's objectives. In particular, the European Electronic Communications Code (EECC) in the Article 67 framework, gives NRAs powers to impose obligations concerning: (a) transparency, (b) non-discrimination, (c) accounting separation, (d) access to, and use of, specific network facilities, (e) access to civil engineering, and (f) price control and cost-accounting obligations. The strict application of the principle of proportionality together with the likely convergence with antitrust law, were expected to generate a wave of pro-competitive regulation, with an initial increase of regulatory intensity followed by a progressive attenuation.

At the time of the opening of telecom markets, the scope of regulation has been extensive due to the pervasiveness of incumbent significant market power in most of the markets susceptible to ex ante regulation. After years of application of ex ante regulation, some regulatory obligations have been progressively removed, and the residual measures are becoming more 'light-handed' as healthy market dynamics and empowered consumers become able to discipline the market. Consistent with this vision and expectations, in 2003 almost all upstream and downstream retail market segments were identified by the European Commission as susceptible to ex-ante regulation and were regulated in almost all European countries. Later, the number of markets that required such market reviews has progressively fallen from 18 to 2⁹: most part of wholesale markets, and all downstream retail markets, have been declared effectively competitive. Hence, currently, with some national variance, ex-ante regulation is focused on a few key wholesale access markets, such as fixed broadband access (wholesale dedicated capacity, and wholesale local access), and in some cases, civil infrastructure.¹⁰

Even if the evolution of the regulatory framework might allow to be based only on civil infrastructure access, access acc. to Article 61.3 EECC and/or symmetric (ex-post) regulation such as the GIA, at least the current market conditions still require SMP based solutions both in the short and medium term considering the lack of competition (or risk of a backlash from premature deregulation) as well as the different levels of investment and take up of different access

orientation alone for central access products. Since the decision will enter into force in 2026, in the present report the current framework for LU is reported as in the previous year.

⁷ In PL a proposal for full deregulation of WLA and WCA is ongoing.

⁸ In July, the CNMC deregulated markets 1/2020 and 3b/2014. Previously, regulation in these markets applied to only around 30% of the population due to geographical segmentation. The CNMC is currently working on a standalone PIA market to ensure the continuation of civil infrastructure remedies, and Telefónica has submitted a set of commitments in this market that is currently under assessment. On the other hand, Wholesale Dedicated Capacity (market 2) remains regulated in Spain due to Telefónica's high market share in the corporate segment.

⁹ Commission Recommendation (EU) 2020/2245 on relevant product and services markets within the electronic communications sector susceptible to ex ante regulation

¹⁰ BoR (25) 146 "BEREC Input to the European Commission's consultation on the revision of the Recommendation on relevant markets susceptible to ex ante regulation."

technologies in the EU countries. It is important to prevent that the copper monopoly is leveraged into the fibre environment.

On the remedies side the new VHC networks may pose a significant regulatory challenge. The regulatory framework aims to provide neutral investment incentives as well as overcoming inefficient overbuild which may reduce the chance of enlarging coverage with private investment, while fostering take-up in a fully competitive environment. Therefore, the current survey results reveal varied national or sub-national situations that require geographically tailored SMP remedies.

Several EU cases may be summarised as follows (more details will be provided explained in the next sections, providing an in-depth analysis of the replies to the survey):

- Pro-investment regulation - leveraging regulatory flexibility, especially where investments are expected mainly by the SMP operator with stricter regulation delayed (*“forbearance”*). In this scenario, the possibility that SMP regulatory obligations can be complemented or even overcome by commitments/agreements proposed by the SMP operator is likely (i. e. co-investments/commercial agreements).
- Commercial agreements, including open access models with reciprocal access among operators, not limited to SMP operators.
- Cable competition, where widespread, cable networks impose a real competitive constraint, influencing deregulation. SMP regulation may be less relevant, and commercial agreements at the wholesale level seem to develop more frequently.
- Symmetric regulation in combination with co-investment incentives can be a long-term solution to achieve the connectivity objective, where the rollout of VHC networks by different operators is proceeding at a satisfactory level.
- Elsewhere, the wide availability of civil infrastructure can provide an opportunity for infrastructure competition, especially where multiple networks compete.
- In a few cases, where the relevant OAO is the first mover to deploy fibre, the SMP remedies framework, also on VHCN, aims at maintaining infrastructure competition, providing a level playing field to enhance a neutral investment decision and certainty for investors.
- The wholesale-only model has started to be implemented in several countries, and regulatory intervention may be lighter as guided by the Code.
- The presence of an old copper network that provides a competitive constraint on VHCN roll-out requires a more continuous and generally stricter regulatory intervention (especially if the NRA has imposed a form of regulatory forbearance for VHCN, i.e., “pricing freedom” for the SMP operator).

Therefore, the report provides high level information on the implementation of access remedies including price control and cost accounting obligations, taking into account the information provided by NRAs on the implementation of the regulatory framework, with reference mainly to VULA/Fibre LLU/ bitstream and civil infrastructure access on NGA/VHC networks (data related to copper is collected as well). The following description and analysis are also relevant to understand the level of consistency in the implementation of the European wholesale regulatory framework implementation by NRAs to reach the objective of creating an internal market for electronic communication networks and services without barriers for cross-border service provision.

This is the twenty-first annual report summarising the results of the 2025 survey.

The report has been updated since 2005 in order to monitor trends in the degree of harmonisation of regulatory accounting systems across Europe (from the first rounds of the market analysis according to the 2003 Recommendation defining 18 relevant markets to measures adopted

according to the 2007 and 2014 Recommendations that have reduced the number of markets susceptible to ex ante regulation). Thus, the report focused over time gradually on a lower number of markets¹¹.

The current Recommendation (EU) 2020/2245 on relevant markets susceptible to ex ante regulation has been issued on 18 Dec. 2020 (C(2020) 875), identifying 2 relevant markets (Market 1/2020 Wholesale local access provided at a fixed location; Market 2/2020 Wholesale dedicated capacity). The European Commission announced its most recent review will likely be concluded in the first half of 2026.¹² In this report the taxonomy of the 2020 Recommendation on relevant markets is used, providing, when needed, the corresponding old taxonomy, thus markets and products may refer also to the Commission Recommendation of 2014 (2014/710/EU).

Since 2013, the report has focused also on how NRAs implement the principles of the Commission Recommendation on consistent non-discrimination obligations and costing methodologies (NDCM)¹³, that has been updated and substituted in February 2024 by the Gigabit Recommendation¹⁴. The Gigabit Recommendation provides recommendations on the application of the provisions of the EECC (Directive (EU) 2018/1972) for SMP remedies taking into account the increased flexibility of the EECC.

Following this path, cost oriented prices can become more relevant for access to civil infrastructure, when available, as it is the lower level of the ladder step where SMP access obligation is needed, and when there is a need to overcome some potential strategic hold-up risk that may be important during transition periods (including copper switch off).

¹¹ Previous years (2005-2024):

- IRG (05) 24 Regulatory accounting in practice 2005.
- ERG (06) 23 Regulatory accounting in practice 2006.
- ERG (07) 22 Regulatory accounting in practice 2007.
- ERG (08) 47 Regulatory accounting in practice 2008.
- ERG (09) 41 Regulatory accounting in practice 2009.
- BoR (10) 48 Regulatory accounting in practice 2010.
- BoR (11) 34 Regulatory accounting in practice 2011.
- BoR (12) 78 Regulatory accounting in practice 2012.
- BoR (13) 110 Regulatory accounting in practice 2013.
- BoR (14) 114 Regulatory accounting in practice 2014.
- BoR (15) 143 Regulatory accounting in practice 2015.
- BoR (16) 159 Regulatory accounting in practice 2016.
- BoR (17) 169 Regulatory accounting in practice 2017.
- BoR (18) 215 Regulatory accounting in practice 2018.
- BoR (19) 240 Regulatory accounting in practice 2019.
- BoR (20) 210 Regulatory accounting in practice 2020.
- BoR (21) 161 Regulatory accounting in practice 2021.
- BoR (22) 164 Regulatory accounting in practice 2022.
- BoR (23) 196 Regulatory accounting in practice 2023.
- BoR (24) 166 Regulatory accounting in practice 2024.

¹² BEREC provided its Input to the European Commission's consultation on the revision of the Recommendation on relevant markets susceptible to ex ante regulation on 30th Sept. 2025 (BoR (25) 146).

¹³ "Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment (2013/466/EU)" (C(2013) 5761). BEREC provided detailed input to the public consultation, cf. Document BoR (11) 65. Furthermore, it submitted the BEREC Opinion on the draft recommendation on non-discrimination and costing methodologies on March 26th 2013, cf. Document BoR (13) 41.

¹⁴ In 2020 the Commission ran a targeted consultation on the review of the 2010 NGA Recommendation as well as on the 2013 NDCM Recommendation. BEREC submitted its response in October 2020 (BoR (20) 169). On 23rd February 2023, the European Commission invited BEREC to provide the Commission with an opinion on the draft "Gigabit Recommendation", and BEREC published its Opinion on 5th May 2023 with decision BoR (23) 83. The Recommendation (EU) 2024/539 on the regulatory promotion of gigabit connectivity (Gigabit Recommendation) was published on 19th February 2024.

The current regulatory framework provides instruments to address different competitive and risk situations with the common objective to address the deployment of VHCN in an efficient competitive environment while also balancing potential trade-offs between static and dynamic efficiency. Those conditions are well reflected in the NDCM Recommendation as adapted in the Gigabit Recommendation.

In line with the trend of previous years, even if the focus of the report is traditionally based on the Regulatory accounting measures, it is a matter of fact that the regulatory scope, outlined by the EECC, is evolving and price control and costing methodologies are regulatory tools that are used in a more sophisticated way instead of a stand-alone remedy.

A clearer view in terms of technical, economic and commercial features of the wholesale products available within the EU is relevant within the scope of the present report providing a better understanding of the way price control and cost accounting remedies are imposed.

The EECC introduced new objectives for ensuring connectivity and widespread availability of very high-capacity networks (VHCN). Thus, the regulatory context has become more complex, also in light of the national specificities of each country in terms of the technology adopted by the SMP operator for upgrading the legacy network as well as the level of infrastructure competition reached. This may moderate the scope of regulatory intervention.

In this context the report provides an overview of the regulatory outcomes at single country level giving information also on the technology and competitive environment in which the remedies are imposed.

2.2 Current report

Following the traditional approach, the report provides an update on the status of costing methodologies in use across Europe and monitors the evolution over time as a consequence of the adoption by NRA decisions regarding market analyses.¹⁵ The first part of the document reports the remedies framework for each EU country in combination with the state of play of technology adoption and level of competition. A second section provides a statistical analysis on costing methodology: the most frequent approach should be seen as the most frequent situation at the European level without judging the appropriateness of the solution for the specific country case. Instead, the statistical analysis can provide information on the regulatory paths that are emerging at the EU level.

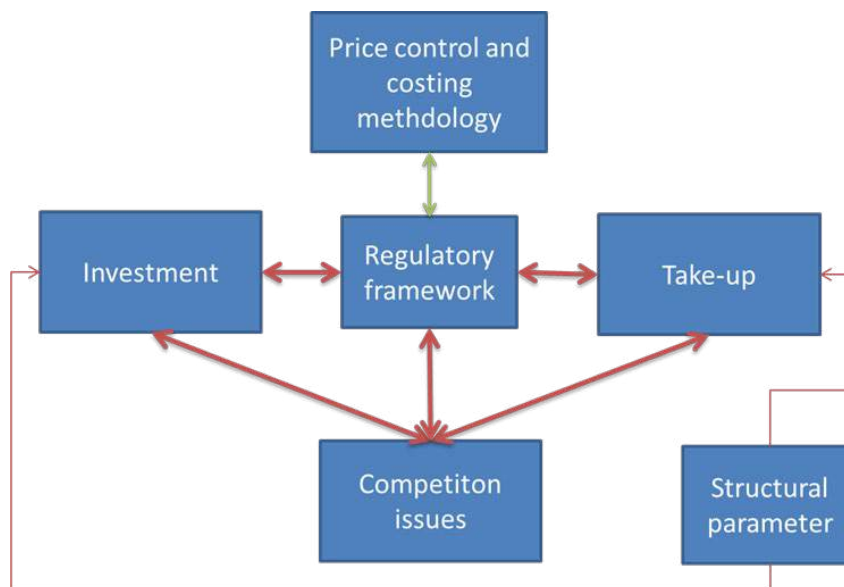
In line with past years the 2025 RA Report has collected information on the following main elements:

- i) Regulatory framework (Access regime/geographical regulation);
- ii) Cost assessment (cost orientation implementation; wholesale price; WACC and risk premium);
- iii) Competition indicators (i.e. market share of SMP operators);
- iv) Structural parameters.

¹⁵ The monitoring approach is based on NRA responses mainly based on predefined categories and sub categories. The approach described for each country is standardised for statistical reasons. This means that the results reported in this report just give an indication of the main approach in use and stakeholders should rely on respective decision. and stakeholders should rely on each NRAs respective decision document(s).

The following picture provides information about the main groups of elements/indicators that have been collected in the survey.¹⁶

Figure 1 – Categories of information collected



The report benefits from information collected from 30 NRAs (listed in Appendix I) with most NRAs responding to the majority of the questions, thus providing a solid base for further analysis and comparisons along the years.

The information provided in this report refers to those markets for which remedies are in force on the 1 April 2025.

2.3 The data collection process

As highlighted in the introduction, the collected information is targeted at single product level within the relevant market, reflecting the fact that the regulatory framework related to NRAs decision is mainly influenced by technological drivers, capital costs, business models for investment, demand side factors and national policy, thus addressing national specificities.

The level of competition in most European countries has reached at least the “local” level of the ladder of investments¹⁷ even if it can happen that, specifically in countries with reduced surface extension, the demarcation between local and central access service is less relevant, specifically in transition towards NGA and VHCN. The central access market is still relevant in some countries with specific obligations.

¹⁶ The boxes connected with bold arrow include indicators that directly guide regulatory decision-making the “regulatory framework”. Structural Parameters are external elements that influence the outcome in terms of investment and take-up of services, but they are not under direct control of the regulatory framework and they guide decisions indirectly. Green arrows refer to the focus inside the regulatory framework that is more target topic of the present report.

¹⁷ The “ladder of investment” is a concept introduced for the first time by Martin Cave (see M. Cave, Encouraging infrastructure competition via the ladder of investment - Telecommunications Policy (2006).

Investments in VHC networks are largely increasing in most EU member states, sometimes in the form of parallel networks, with some countries already having reached the final step of removing ex-ante regulation, including the civil infrastructure access, provided that the Broadband Cost Reduction Directive¹⁸ regime and the new GIA regulation has been deemed sufficient to address the need of infrastructure competition at least at a point of interconnection. For this reason, information on the relevance of this non-SMP framework is also reported.

The transposition of the EECC (Directive 2018/1972/EU) was due on 21 December 2020 and led to each member state introducing new instruments to address the issue of incentivising investments in VHC networks in a context where competition issues have been addressed at a different scale for two decades of regulation. The framework invites NRAs to incentivise infrastructure competition where this is efficient, while relying on other competitive instruments, where appropriate. A part from the -well-established SMP access regulation, the EECC provides instruments such as i) civil infrastructure access as an independent remedy (Article 72); ii) SMP co-investment agreements (Article 76); iii) SMP commitment for co-investment agreements (Article 79)¹⁹, iv) wholesale-only operators regime (Article 80) and v) symmetric regulation (Art. 61). All these instruments provide rules for a more flexible approach to imposing regulatory obligations with the objective to spur investment in VHC networks as well as promoting competition for the benefit of end- users. At the same time the 2020 Commission Recommendation on relevant markets susceptible to ex ante regulation (Recommendation (EU) 2020/2245) suggests considering specific geographical situations.

As reported in previous RA reports, the use of these “new” instruments is low, and this remains the case.

In Art. 61 (3) subparagraph 1 of the EECC, NRAs may impose obligations – upon reasonable request and regardless of any findings of SMP – thus granting access to wiring and cables and associated facilities inside buildings or up to the first concentration or distribution point as determined by NRAs. Access obligations may be imposed on electronic communication network (ECN) providers or owners of such network elements, where replication of the concerned network elements would be economically inefficient or physically impracticable. Where access obligations pursuant to Art. 61 (3) subparagraph 1 do not sufficiently address economic or physical barriers to replication, Art. 61 (3) subparagraph 2 of EECC authorises NRAs to extend the imposition of access obligations (including active or virtual access obligations if justified on technical or economical grounds) beyond the first concentration or distribution point, up to a point capable of hosting a sufficient number of end-user connections to be commercially viable for efficient access seekers. BEREK has provided Guidelines on the criteria for a consistent application of Art. 61 (3) EECC in BoR (20) 225.

Despite symmetric regulation taking place – often in combination with SMP regulation, the standard SMP regime is still mostly used to in particular address competition problems and is the main focus of the present report.

¹⁸ Broadband Cost Reduction Directive 2014/61/EU, now replaced by the Gigabit Infrastructure Act (Regulation (EU) 2024/1309) published in the OJ of 8th May 2024.

¹⁹ Commercial agreements should be taken into account when a market analysis is done and NRAs should evaluate how they can affect the regulatory framework in terms of SMP assessment and consequently remedies imposed overcoming the price control obligation.

Alongside the EECC, it is also relevant to point out specific topics of the Gigabit Recommendation (EU) 2024/539 (C(2024)523). The Gigabit Recommendation focusses on the scope on the wholesale local access market 1/2020 in line with the updated Recommendation (EU) 2020/2245 on relevant product and service markets susceptible to ex ante regulation and eventually to the markets that are upstream and downstream of the listed access markets (civil infrastructure access and previous market 3b/2014 “wholesale central access”). Some elements of the previous Commission Recommendation 2013/466/EU remain unchanged in the new regulatory scope of the Gigabit Recommendation, inter alia:

1. The fact that, in case of SMP, the legacy product should be priced based on cost orientation through a BU-LRIC+ approach providing an anchor for the VHC network to provide a neutral efficient make-or-buy signal to the market;
2. Flexibility for the regulation of VHC networks when some conditions are met on a non-discrimination basis; and
3. Importance of civil infrastructure access to spur efficient infrastructure competition.

With this in mind the present report provides a picture on the implementation of the costing methodologies considered in the Recommendation 2013/466/EU that are also valid according to the Gigabit Recommendation, in line with last year’s RA report (BoR (24) 166). It will address the compliance of the application of the SMP remedies addressed by the Gigabit Recommendation.

The 2025 RA Report collects information on 19 main products, as reported in Figure 2, taking into account a separate view of underground civil infrastructures (ducts) and aerial civil infrastructures (poles), as well as including separate information on access to the fibre sub-loop unbundling.

The report targets the SMP ex ante framework, focusing on the monitoring process of the products shown in Figure 2. At the same time, it is relevant to understand if and how the new instruments provided in the EECC are applied and considered: i) symmetric regulation (Art. 61 (3)); ii) co-investment (Art. 76); iii) functional and voluntary separation (Art. 77, 78); iv) commitments for co-investment agreement (Art. 79); v) wholesale only operators (Art. 80).

There is evidence that co-operative and commercial agreements are considered by NRAs, affecting the regulatory outcome independently from the application of the legal basis of the EECC.



Figure 2– Product monitoring

Products investigated	Definition
Terminating segment (in line with definition of Art. 61 (3)) symmetric regulation	Symmetric access to wiring and cables and associated facilities inside buildings or up to the first concentration or distribution point
Terminating segment (point beyond the first concentration point Art. 61 (3)) symmetric regulation	Symmetric access to wiring and cable and associated facilities beyond the first concentration point
Copper_ULL	SMP Local loop unbundling service on copper network
SLU	SMP Sub loop unbundling on copper network
Optical terminating segment SMP regulation (in-house wiring)	SMP Access to wiring and cables and associated facilities inside buildings or up to the first concentration or distribution point
Fibre LLU	SMP fibre local loop unbundling
Fibre SLU	SMP fibre Subloop unbundling
VULA (FTTC)	SMP VULA on fibre to the cabinet network
VULA (FTTH)	SMP VULA on fibre to the home network
VULA (cable Docsis >3.0)	SMP VULA on cable docsis >3.0 network
DF	SMP Dark fibre
DA	SMP Duct access
Pole access	SMP Pole civil infrastructure access
Bitstream_legacy_services	SMP Bitstream access over legacy copper network
Bitstream_NGA_FTTC	SMP Bitstream access over NGA FTTC network
Bitstream_NGA_FTTH	SMP Bitstream access over FTTH network
Bitstream_Cable docsis >3.0	SMP Bitstream access over cable docsis >3.0
Leased_lines_Active_Legacy	SMP Terminating segment over copper network
Leased_lines_Active_NGA	SMP Terminating segment over NGA network

Source: BEREC RA Database 2025

2.4 The symmetric regulation

The symmetric framework has been introduced by Art. 12 of the Framework Directive, as modified by Directive 2009/140/EC, and it is still the main legal basis used by NRAs to impose a symmetric access obligation.

The EECC enhances the relevance of symmetric regulation in Art. 61 and introduces new powers for NRAs in 61(3)²⁰. Symmetric regulation is considered in some way logically upstream to the SMP regulation. This is why it is presented before the SMP approach in the present report.

This form of symmetric regulation appears relevant also for the future regulatory outcome as a tool in order to minimise the risk of overbuild and boost the operators' willingness to deploy own fibre infrastructure, to enhance competition based also on passive products, with the aim to increase quality and innovation.

This year's report contains some information about the implementation of the provision of Art. 61 (3) of the EECC, specifically on access to a concentration point outside the building. This was requested in light of BEREC's 2020 Guidelines, BoR (20) 225.

Up to now, including the updated information in the present report, there has been no real new direct application of Article 61 of the EECC, but a "legacy" symmetric framework is used in several member states and updated also in light of the EECC. Different information on Art. 61 (3) sub-

²⁰ Art. 61 (3) subparagraph 1 EECC states that: "national regulatory authorities may impose obligations, upon reasonable request, to grant access to wiring and cables and associated facilities inside buildings or up to the first concentration or distribution point as determined by the national regulatory authority, where that point is located outside the building". The NRA "national regulatory authority... it may extend the imposition of such access obligations, on fair and reasonable terms and conditions, beyond the first concentration or distribution point, to a point that it determines to be the closest to end-users, capable of hosting a sufficient number of end-user connections to be commercially viable for efficient access seekers."

paragraph 1 (access to wiring and cables and associated facilities inside buildings) and sub-paragraph 2 (access point beyond the first concentration point) has been collected.

Symmetric regulation affecting the terminating segment, in line with past reports, is applied by 8 NRAs (ES, FR, HR²¹, HU, IT, PT, PL, SE), thus granting access to wiring and cables and associated facilities inside buildings or up to the first concentration or distribution point as determined by the NRA.

An access obligation beyond the first concentration point (which would correspond to Article 61 paragraph 3 sub-paragraph 2) has been imposed by 4 NRAs (FR, HR, HU, SE).

The symmetric obligation has been considered a complement of the SMP regulation of the terminating segment inside the building for HR, HU, IT, PL as SMP remedies are also applied; in these cases all sets of other remedies have been imposed on an SMP basis, also including the obligation to publish a reference offer for accessing the terminating segment.

A symmetric access obligation in line with Art. 61 (3) sub paragraph 2 (access beyond the first concentration point) has been considered a complement with respect to Fibre ULL (FULL) and/or VULA FTTH by three NRAs (HR, HU, SE) of the five that already apply the symmetric obligation.

In France, the choice of a symmetric regulation with passive access obligation at the shared access point has been applied since 2009 as the main regulatory instrument for NGA networks. The main objective has been to promote fair and effective competition as well as efficient investment by multiple operators wanting to invest in new FTTH infrastructure. This symmetric regulation works together with SMP regulation of the access to civil engineering where FR has defined a separate market for duct infrastructure access including poles since 2020. It includes provisions that facilitate co-investment between operators.²² In the case of France, the application of the symmetric obligation has been considered sufficient to not having to impose SMP remedies on fibre in market 1/2020 for the mass market.²³

In Spain CNMC adopted a decision in 2009 imposing symmetric regulation, where the first operator deploying the fibre local access segment within a building (i. e. the segment of an NGA network that connects end-user premises to the first distribution point) must make it available to third parties

²¹ In 2023 HR (case HR/2023/2477) adopted some measures within the scope of Art. 61(3) of the EEC that complement the BCRD concerning the symmetric access point and physical infrastructure within residential and commercial buildings in Croatia. The measure defines rules for technology neutral and rational use of free space in in-building infrastructure. The measure obliges owners of the in-building infrastructure, who are at the same time providers of electronic communications services, to establish a data base of in-building infrastructure and to publish a Reference Offer for access seekers. The measure proposes to prescribe rules for the maintenance of the in-building infrastructure and for consolidation of the existing one. The measure does not propose prices to be applied. In 2024 (case HR/2024/2501) a new updated of the symmetric regulatory framework available since 2014 (case HR/2014/1579) was adopted, the new notification has been done on the legal framework of art. 61(3) of the code. The main elements of the symmetric regulatory framework in HR are based on the identification of the OFDN (Optical fibre distribution network) operator that build at least 500 units/km²: this operator has access obligation to a concentration point (collocation and fibre unbundling at the distribution point) for sharing the terminating segment. The obligation should enable OAO the connection of all existing and planned buildings and facilities with at least 300 user units. The new updated measure introduced new provisions regarding the obligations of the building operator and the obligation to complete the deployment of the OFDN and connect end-users in certain time frame. While it stipulates content of an access and sharing offer, which should be published at least 30 days before the building operator starts offering services and obligation to set a clear deadline of three years for the full completion of the OFDN.

²² Recurrent access prices are reduced in combination with the level of investment covered.

²³ However, concerning FR, even if no SMP regulation has been imposed for fibre LLU, the SMP operator - since the 2017 market analysis decision – has been regulated on a part of the fibre local loop, in two specific cases: (i) offers for business customers; (ii) offers with enhanced quality of service.

at reasonable prices. The decision was adopted on the basis of provisions in the Spanish law that were similar (but not identical) to those existing under the regulatory framework at that time (i. e. Article 5 of the Access Directive and Article 12 of the Framework Directive), and which enabled the NRA to impose, in exceptional circumstances, symmetric obligations on operators regardless of their SMP status. As a consequence, access to the fibre local access network available within buildings is excluded from the scope of SMP regulation in market 1, since it is already covered by the symmetric obligations imposed by CNMC in 2009.

In IT AGCOM has adopted the symmetric framework for in-building wiring since 2013, parallel with SMP regulation, using as legal basis Article 5 of the Access Directive and Article 12 of the Framework Directive. The symmetric framework also covers the civil infrastructure between the first manhole outside the private property and the access point of in-building wiring in fibre.

With respect to the symmetric obligation in relation to the provision of Art. 61 (3) sub paragraph 3: *“If justified on technical or economic grounds, national regulatory authorities may impose active or virtual access obligations”* one NRA declared to have imposed symmetric obligation on active or virtual layers exceptionally, in case when access on passive layers is physically impracticable and/or economically inefficient: the concentration point has been designed explicitly following the BEREC Guidelines on the criteria for a consistent application of Art. 61 (3) BoR (20) 225 with a specific reference to the analysis of the economic barrier.²⁴ In that case the symmetric access obligation is something that is addressed on a case by case basis similar to dispute resolution.

In relation to the specific symmetric framework, the BCRD (now GIA) provisions with respect to third party access to civil infrastructures also complement the SMP framework. Therefore, NRAs were asked in the questionnaire about the relevance of symmetric access to civil infrastructures through BCRD/GIA provisions, choosing from one of the following main options, taking into consideration the national situation concerning VHCN investment and competition: 1) very relevant for competition and investment, as operators use third party access to civil infrastructures to build up own VHCN networks and/or reaching the last concentration point (BG, IT, LV, PL); 2) moderately relevant, as operators occasionally use third party access to civil infrastructures to build up own VHCN network and/or reach the last concentration point (RS); 3) marginally or not relevant for investment and competition up until now (AT, CZ, HU, NL).

Only few NRAs, 9 of 30, have answered this question and only four mentioned a material relevance for investment and competition of VHCN deployment. In detail:

BG	Clear conditions for using third party access are very important for building out the VHCN
IT	The main OAO wholesale only operator built up its own infrastructure in subsidised and non-subsidised areas using mainly third-party infrastructure access on the BCRD legal provision (dispute resolution)

²⁴ RS developed a tailored Economic Replicability Test (ERT) model ([https://www.ratel.rs/storage/upload/2024/11/Metodologija-ERT_RATEL_26092024-\(2\).pdf](https://www.ratel.rs/storage/upload/2024/11/Metodologija-ERT_RATEL_26092024-(2).pdf)) with the aim to address the following main question: can the access seeker deploy its own infrastructure to reach end users in an economically efficient manner without relying on access to the existing network? If the answer is affirmative, regulatory intervention in the form of symmetric obligations is deemed unnecessary. If full replication is not economically feasible, the ERT model aims to identify the nearest feasible access point (toward the core network) from which the access seeker can replicate the network in a sustainable and economically viable way.

LV	In the past, operators opted for overhead cable deployment in Latvia due to very low deployment costs. Now there are discussions to migrate from aerial to underground infrastructure for aesthetic reasons, especially in Riga, which is extremely challenging. Symmetric access to civil infrastructures through BCRD/GIA provisions have been used but not on a large scale. Nevertheless, symmetrical access remains important. Installing fibre in underground ducts is the most efficient method for installation of fibre. As a result, symmetric access to ducts is crucial for the fibre deployment. Also, if there is an opportunity to use other sectors' infrastructure, it should be regulated.
PL	In Poland, the development of very high-capacity networks primarily involves sharing technical infrastructure in the form of pole sub-structures (lamp posts), power lines, telecommunications poles) and cable ducts. This solution positively impacts competitiveness among operators (cost sharing) and network development (especially in sparsely populated areas). Both large and small operators can use physical infrastructure on equal terms, preventing the development of monopolies in the telecommunications market in terms of ensuring equal access to very high-capacity networks.
RS	Given that Serbia is not a member of the EU, its legal framework has not been aligned with the BCRD/GIA. There are provisions regarding the symmetric regulation in the national Law on Electronic Communications and in practice there are some cases where operators use third party access to civil infrastructures to build up own VHC network and/or reaching the last concentration point. However, a Draft Law on Broadband Infrastructure, which will be harmonized with the GIA, is being prepared where this matter will be addressed more thoroughly.
CZ	Based on CTU's information, civil infrastructure is not widely used for network deployment, operators mainly build their own network incl. civil infrastructure. There is no widely available incumbent's legacy civil infrastructure to be used for VHCN rollout in CZ.
NL	BCRD and now GIA has very little relevance in the Netherlands as there are no ducts or poles. Even for in-house infrastructure network providers always roll out their own cabling. The only clause that is used in the Netherlands is Article 3.1 from the GIA that also applies to associated facilities and operators use that for mobile network deployment on roofs with infrastructure being present.

In summary the sharing of civil infrastructures including pole access appears crucial in some countries for investment and competition. The legal basis of the BCRD and now the GIA appears to be particularly relevant to effectively enabling efficient VHCN investments. At the same time, the fact that most NRAs did not specifically reply, may indicate that at the moment the symmetric framework already established through the BCRD is considered as a complementary measure. Also, the BCRD/GIA is not addressing competition problems as effectively as SMP regulation. Some NRAs consider that it is mainly useful to enhance investment from alternative operators rather than providing an instrument to speed up investment by the SMP operator to control its own infrastructure. A specific case is the voluntary separation of the network of Telecom Italia, partially driven by the role of the debt structure is the case of the Italian SMP operator (IT²⁵).

2.5 The SMP remedies framework

In this section an overview of the SMP regulation at the single product level is reported. The information provided is consistent with other BEREC reports, but with the specificity to be targeted

²⁵ Since 1st July 2024 the former SMP operator (TIM) structurally separated its access network, selling the access assets and activities (including the self-provision of services) to a fully separated company without any direct or indirect control of it, see https://ec.europa.eu/competition/mergers/cases1/202436/M_11386_10222059_1158_3.pdf.

to a specific product/market. NRAs were asked to identify one or more SMP operator(s) with respect to the corresponding product/market on the legal basis of Art. 63 of the EECC. When an SMP position is identified the NRAs may impose obligations on the SMP operator(s) on the basis of the ex-ante (asymmetric) market review process that is provided under EU legislation (Art. 68 of EECC).

General remedy application

In Figure 3 the updated remedies applied in the context of SMP regulation at single product level is shown as reported annually. The number of NRAs that apply SMP regulation for the corresponding product/market is provided, considering: i) all NRAs (EU and non-EU: 30 NRAs)²⁶ and ii) only EU NRAs (27 NRAs) that have provided information.

This year is the first time that regulation of legacy copper network products in market 1/2020, is less frequent in comparison to VCHN regulation.

Two main cases have occurred since last year's report (EE, ES): in the first case the legacy copper network markets have been fully deregulated (EE); in the second case, only civil infrastructure access including poles remained regulated as an SMP access product – moreover, the copper network in Spain was fully shut down in May 2025²⁷ –. In comparison to last year, no NRA has introduced new regulatory obligations, however some NRAs consider re-introducing SMP obligations while others are consulting on modifying existing obligations.²⁸

Civil infrastructure access²⁹ is the product that is still most ex-ante regulated, mainly in market 1/2020. 6 NRAs have already defined a separated civil infrastructure market (BG, EE, FR, IE, LV, PT), while ES has fully deregulated all other products and planning a new market review for civil infrastructure access without modifications to the actual wholesale remedies (ES/2025/2576).³⁰

The definition of the relevant market for civil infrastructures may be found, either where symmetric regulation is applied (FR),³¹ or in combination with passive remedies, such as FLLU (LV) or when access to civil infrastructures has been the principal instrument of regulation for a long time (PT) and deregulation of the downstream market is strictly dependent on civil infrastructure availability. Last year CRC (BG), which had previously assessed all access markets as competitive, defined a civil infrastructure market with an SMP at national level. This is due to the fact that CRC's assessment shows that the competitive environment under the currently available symmetrical regulation (BCRD) is diminishing, *“as the existing symmetric regulation is not effective enough to provide stable and clear conditions for operators that have deployed or intend to deploy their own electronic communications networks. CRC is concerned that the frequency and outcomes of dispute resolution regarding the access to physical infrastructure create uncertainty in the market for the undertakings”* (BG/2024/2521). This 2024 decision has been appealed at Court and thus,

²⁶ LI, NO, RS as non-EU countries, CH does not have a SMP framework.

²⁷ For an explanation of the copper switch off process, please see <https://blog.cnmc.es/2025/05/27/adios-definitivo-al-cobre/>.

²⁸ Three consultations are on-going pointing in different directions: in PL there is a proposal for full deregulation of WLA and WCA, whereas in RO and BG new regulatory measures in market 1/2020 which was fully deregulated are proposed in public consultations. In IT a public consultation is on-going to adapt the regulatory framework to the condition of a wholesale only SMP operator (Art. 80 of the EECC) relaxing some of the previous regulatory obligations. In the present report the status of the applied regulatory framework is benchmarked not considering the ongoing consultations.

²⁹ A more detailed overview of physical infrastructure regulation can be found in the BEREC Report on the regulation of physical infrastructure access, BoR (24) 178, published in Dec. 2024.

³⁰ In ES the reference offer for poles access has been updated in 2024.

³¹ The civil infrastructure in this case is useful to reach the concentration point or the mutualisation point at the base of the building in the more competitive areas.

even if there is a defined regulatory framework for a PIA market, including remedies, the decision is not currently in force.

In IE the civil infrastructure market³² is defined in combination with VULA regulation where fibre LLU is removed from the regulatory framework. The objective is to define a long-run evolving framework to give the opportunity to the OAO to deploy, where efficient, their own VHCN infrastructures where FLLU is not feasible or relevant.

In all those cases underground and aerial infrastructure are regulated in the same civil infrastructure market.

When civil infrastructure access is regulated in market 1, pole access is not always included in the access remedy (BE³³, HR, LI, LT, RS, SI, SK) while only underground civil infrastructure access (i. e. ducts) is considered.

Concerning civil infrastructure access, the SMP obligation is missing on ducts/poles in combination with other regulatory remedies only in some countries: In CZ the SMP is vertically separated. In FI numerous SMP local operators provide access to each other on an SMP basis while at the same time, the same operator is an SMP operator in some parts of the country and access seeker in other parts. In SE VHCN infrastructure is widely deployed through municipal networks. In MT, LU, DK specific geographical situations do not allow the deployment of more than two independent networks.

Two NRAs do not have an SMP (NL and RO³⁴) in all analysed products/markets due to the fact that all markets have been found to be competitive.³⁵ Since 2023, one more NRA (AT) has removed SMP regulation in market 1 and market 3b/2014, due to the availability of commercial offers provided by the (former) SMP operator. Therefore, it was concluded that the three criteria test was no longer fulfilled. In this case no access to civil infrastructure obligation is imposed. Also, large geographic parts of the residential market (most of the urban areas) were found to be competitive due to infrastructure-based competition from cable networks and a competitive constraint from mobile broadband.³⁶

In the table below the relevant market in which the specific product is regulated, in combination with the time of the market review, is provided.³⁷

Bitstream services have been regulated within market 1 in by PT (only for FTTH) where VULA products are not available and when Fibre LLU is regulated. VULA is regulated in former market 3b only in MT, but in this case the market review dates back to 2013.³⁸

³² In case of IE Dark Fibre has been regulated since 2024 as part of the new PIA (civil infrastructure) decision. Dark Fibre has to be provided by the incumbent where there is no PIA and where Dark Fibre is available.

³³ Poles generally belong to utility operators and the access to civil infrastructure (underground) is regulated in market 1/2020 and market 2/2020.

³⁴ RO recently consulted the market on a proposal for a new SMP and remedies.

³⁵ NL analysed market 1 in 2023 finding the market competitive after the market analysis of 2018 concerning Joint Dominance was annulled by the Dutch court and thus the obligation for network access that was imposed on the two networks. The leased line market has been analysed in 2021 and has been found to be competitive as well.

³⁶ In AT Dark fibre is provided as a remedy in market 2/2020 that it is still regulated.

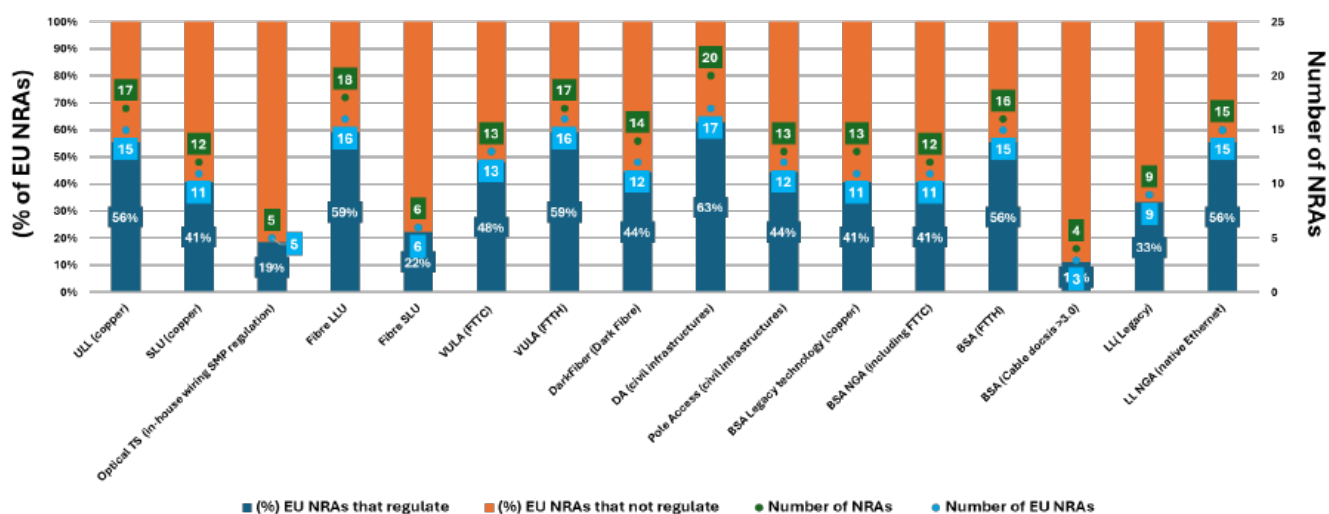
³⁷ NRAs have provided information on the last market review, few NRAs have indicated a different date of remedies application (CY, CZ, DE, LU), other NRAs have updated the geographical market regulation (remedies or market). Generally, the market analysis procedure and the corresponding remedies framework definition may be taken a few months up to a year, later.

³⁸ A new decision is under EU consultation and may change this outcome.

Fibre sub-loop unbundling is regulated in 6 countries (CZ, FI, HR³⁹, IT, LV, PL). In IT the access obligation has been imposed in light of availability of P2P fibre deployment from the street cabinet where an own OAO FTTC solution based on SLU on copper was a solution in the past.

Therefore, the regulatory obligations on VHCN products are still widely imposed on the legal basis of SMP framework: Fibre LLU and VULA-H are imposed in 16 EU NRAs (59 % of EU NRAs). The percentage has been decreasing since last year, but is higher for the first time than the legacy products, meaning that ex ante regulation is still required for competition and the regulatory framework is still relevant for VHCN networks. Legacy product regulation is reducing year by year and 15 EU NRAs (representing 56 %) still maintain the remedy of ULL on copper network (81 % in the 2023 report). The same reduction is apparent in market 3b/2014 on the legacy copper network where only 40 % of EU NRAs (11 NRAs) still apply a remedy in the wholesale central access market. This trend is in line with the fact that NRAs adapt the regulatory framework with the progress of the copper switch-off and the old legacy network is becoming less relevant for investment decisions and competition, losing over time the relevance as a legacy anchor.⁴⁰ FTTH WCA products are still also quite frequently regulated: – in 2025 52 % of EU NRAs impose SMP remedies on this market.

Figure 3 - SMP-regulatory obligations per access service (the name of NRAs and year of latest market review is reported in the associated table⁴¹)



³⁹ Fibre SLU is an FA PON service. Due to the FTTH network infrastructure, it is the sole available service in the Republic of Croatia (HR) and FLLU is imposed as an obligation, but due to the network structure it is not available effectively.

⁴⁰ In some countries a different product market is adopted for the legacy copper network and VHCN in light of the fact that the chain of substitution between copper and fibre is no longer relevant. (i. e. EE no SMP for ULL (copper) as market 1/2020 product definition was divided into two: copper+coaxial+mobile (CCM) and fibre markets. The CCM market was deregulated, as each of the three MNOs (4G/5G) covered almost the whole population).

⁴¹ For DE M2/2020 market analysis has been finalised in summer 2024, however the decision of the new regulatory framework of remedies is still not decided, thus the remedies imposed date back to 2018. CY indicated that it had imposed collocation as a remedy in the context of its ex-ante review of the markets which included all PIA (Physical Infrastructure Access) elements.

	ULL (copper)	SLU (copper)	Optical terminati ng segment SMP regulatio n (in- house wiring)	Fibre LLU	Fibre SLU	VULA (FTTC)	VULA (FTTH)	DarkFib er (Dark Fibre)	Undergr ound Duct Access (civil Infrastru ctures)	Pole Access (civil infrastru ctures)	bitstrea m central access Legacy technol ogy (copper)	bitstrea m central access NGA (Includi ng FTTC)	bitstrea m central access (FTTH)	bitstrea m central access (Cable docsis >3.0)	leased lines Active Legacy	leased lines Active NGA (native Etherne t)	
Market_1_local_a ccess	(BE-2018) (CY-2022) (CZ-2025) (DE-2019) (EL-2023) (FI-2018) (FR- 2023) (HR-2023) (HU- 2017) (IT-2024) (LT- 2019) (LU-2019) (NO- 2018) (PL-2019) (RS- 2022) (SI-2022) (SK- 2018)	(CY-2022) (CZ- 2025) (DE-2019) (EL- 2023) (FI-2018) (FR- 2023) (HR-2023) (HU- 2017) (IT-2024) (LT- 2019) (LU-2019) (NO- 2018) (PL-2019)	(HR- 2023) (HU- 2017) (IT- 2024) (LV- 2024) (PL- 2019)	(BE-2018) (CZ- 2025) (DK-2021) (FI- 2018) (HR-2023) (HU- 2017) (IT-2024) (LI-2023) (LT-2019) (LU-2019) (LV-2024) (NO-2018) (PL-2019) (PT-2023) (SE-2015) (SI-2022) (SK-2018)	(CZ-2025) (FI-2018) (HR-2023) (IT-2024) (LT-2019) (PL-2019)	(BE-2018) (CY- 2022) (CZ-2025) (DE-2019) (EE- 2025) (EL-2023) (FI-2018) (HR- 2023) (HU-2017) (IE-2024) (IT-2024) (LT-2019) (SI-2022) (SK-2018)	(BE-2018) (CY- 2022) (CZ-2025) (DE-2019) (EE- 2025) (EL-2023) (FI-2018) (HR- 2023) (HU-2017) (IE-2024) (IT-2024) (LI-2019) (LV-2024) (NO-2018) (SI-2022) (SK-2018)	(CZ- 2025) (DE- 2019) (EL- (ES-2025) (HR-0) (FR-2023) (HU-2017) (IT-2024) (LI-2023) (LT-2019) (LT-2019) (NO-2018) (PL-2019) (RS-2022) (SK-2018)	2019) (DE- 2023) (ES- 2025) (HU-2017) (IT-2024) (NO-2018) (PL-2019)			(PT-2023)					
Market_3b_2014 central access							(MT- before 2013)				(BE-2018) (DE-2020) (DE-2020) (DK-2021) (EE-2025) (EE-2025) (EL-2023) (FI-2018) (FR-2023) (HR-2023) (HU-2017) (HU-2017) (IT-2024) (LI-2023) (LT-2019) (LU-2019) (NO-2018) (PL-2019) (RS-2023) (SI-2022) (SI-2022) (SK-2018)	(BE-2018) (DE-2020) (DK-2021) (EE-2025) (EE-2025) (EL-2023) (EL-2023) (FI-2018) (FR-2023) (HR-2023) (HU-2017) (HU-2017) (IT-2024) (LI-2023) (LT-2019) (LU-2019) (NO-2018) (PL-2019) (RS-2023) (SI-2022) (SI-2022) (SK-2018)	(BE-2018) (DE-2020) (DK-2021) (EE-2025) (EE-2025) (EL-2023) (EL-2023) (FI-2018) (FR-2023) (HR-2023) (HU-2017) (HU-2017) (IT-2024) (LI-2023) (LT-2019) (LU-2019) (NO-2018) (PL-2019) (RS-2023) (SI-2022) (SI-2022) (SK-2018)	(BE-2018) (DE-2020) (DK-2021) (EE-2025) (EE-2025) (EL-2023) (EL-2023) (FI-2018) (FR-2023) (HR-2023) (HU-2017) (HU-2017) (IT-2024) (LI-2023) (LT-2019) (LU-2019) (NO-2018) (PL-2019) (RS-2023) (SI-2022) (SI-2022) (SK-2018)			
Market_2_High_c apacity								(AT-2023)							(BE-2019) (CY-2024) (DE-2023) (DE-2023) (EL-2020) (ES-2022) (FR-2023) (HR-2023) (HU-2017) (IE-2020) (IE-2020) (IT-2024) (LT-2016) (LU-2016) (SI-0)		(AT-2023) (BE-2020) (CY-2024) (DE-2023) (EL-2020) (ES-2022) (FR-2023) (HR-2023) (HU-2017) (IE-2020) (IE-2020) (IT-2024) (LT-2016) (LU-2016) (PT-2023) (SI-2023)
Civil infrastructures market								(IE- 2024) (PT-2023)	(EE- 2025) (FR-2023) (IE-2024) (LV-2024) (PT-2023)	(EE- 2025) (FR-2023) (IE-2024) (LV-2024) (PT-2023)							

Source: BEREC RA Database 2025

In Figure 4 the evolution, according to data availability, of regulatory remedies, at single product level, in the last five years (2021-2025) for EU NRAs is reported. The percentages of EU-NRAs that have applied the SMP regulation for the corresponding product is provided in homogeneous terms.⁴²

There is a substantial decrease of the number of NRAs that regulate services on copper products that become less and less relevant (ULL, SLU and BTS legacy).

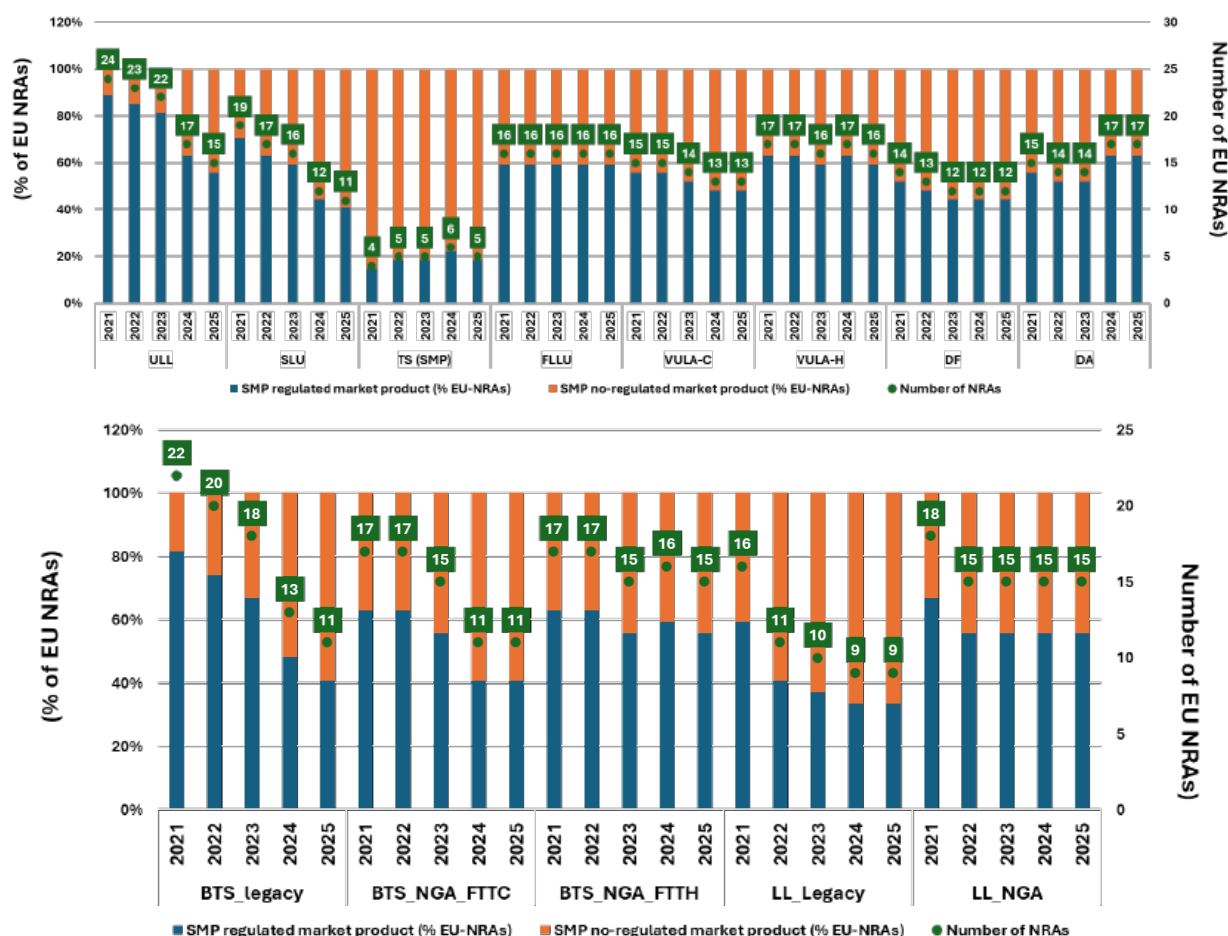
A more stable situation is seen in access markets based on NGA/VHCN, with only a few NRAs having removed the regulation since 2021. Others have started regulating new access products, including duct access. The regulatory obligations have been removed consistently for the legacy terminating segment products (market 2), due to the advanced decommissioning of legacy technologies like PDH and SDH.

Concerning VHCN products, a reduction trend is not evident, and it seems that regulatory obligations are somehow adjusted in light of different investment dynamics and needs. In some cases, FLLU has been introduced (IT, PT), and removed (DE, IE); VULA-H has been enforced since 2024 in one more case (DE)⁴³. No new other SMP remedies have been added in any country.

⁴² Where there are differences in historical time series in comparison to previous reports, they may have been adjusted in light of homogeneity of the information due to a constant improvement of data collection and validation by NRA experts.

⁴³ BNetzA did not impose an access obligation on VULA-H, in every case. The product should be available with the objective to replicate the retail offer of the SMP operator; therefore, a strict non-discrimination obligation and a transparency obligation including the publication of a reference offer in line with BEREC Guidelines on the minimum

Figure 4 - (a-b) SMP regulatory situation (2021-2025) (a) Access product market 1/2020, (b) Access product markets 3b/2014 and 2/2020



Source: BEREC RA Database 2025

In Table 1 NRAs that have removed regulation concerning the specific product since 2021 are reported (in parentheses the annual change is given considering the RA database time reference).⁴⁴ NRAs that have introduced the regulatory obligations since last year are also reported. A strong trend in regulatory reduction is visible for bitstream products (market 3b/2014) and FTTC access services that start to be de-regulated, particularly when a geographical approach to regulation is not taken into account. Civil infrastructure access has increased in relevance. In blue are the NRAs that have modified the approach since last year.

criteria for a reference offer (BoR (19) 238) has been imposed. The access obligation has not been imposed in the sense that the SMP operator is not obliged to build up the network on request, but should allow to replicate the own retail offer (Commission decisions DE/2022/2385 for VULA-H and DE/2022/2413 for Bitstream FTTH).

⁴⁴ Comparisons with past year's report are in homogeneous terms, that is: if data inconsistencies are detected for the past years, findings are appropriately taken into account over the time series available.

Table 1 - NRAs deregulating specific product/market since 2021 RA report (in parentheses the year of the RA report in which changes in regulatory obligations have been registered in the RA database)⁴⁵

	ULL	SLU	TS (SMP)	FLLU	VULA-C	VULA-H	DF	DA	BTS_Legacy	BTS_NGA_FTTT	BTS_FTTH	LL_Legacy	LL_NGA_Ethern
EU NRAs that removed regulation since last three years	DK (2022); AT(2023); IE(2024); LV(2024); MT(2024); PT(2024); SE(2024); EE(2025); ES(2025)	EE(2022); HR(2022); AT(2023); LV(2024); MT(2024); SE(2024); ES(2025)	IE(2025)	DE(2024); IE(2024)	AT(2023); LV(2024)	AT(2023); ES(2025)	DK (2022); HR (2022); LV(2024)		AT (2023); CY(2022); CZ(2023); DK (2022); IE(2024); IT(2024); LV(2024); PT(2024); SK (2024); EE(2025); ES(2025)	AT(2023); CY(2022); CZ(2023); DK(2024); IE (2024); IT(2024); LV(2024)	AT(2023); CZ(2023); IE(2024); IT(2024); ES(2025)	CZ(2022); FI(2022); HR(2022); LU(2023); MT(2022); NL (2022); PT(2024)	CZ(2022); FI(2022); MT(2022)
NRAs that introduced the obligation since the 2024 year monitoring exercise (BoR(24)166)			LV	IT; PT		DE	AT	BG*; HR; PL			EL; DE; PT		

Source: BEREC RA Database 2025

Summarising the previous tables considering NGA and VHCN (FTTH), SMP regulation, also with different rules for each product as reported in the following part of the present report, has been applied by most NRAs:

- 24 NRAs out of 30 have applied SMP regulation to FTTC and/or FTTH and at least one symmetric: BE, CY, CZ, DE, DK, EE, EL, FI, FR⁴⁶, HR, HU, IE, IT, LI⁴⁷, LT, LU, LV, MT, NO, PL, PT, RS, SE, SI, SK.
- Duct access SMP regulation has been imposed by 20 NRAs (17 EU NRAs).
- VULA FTTH is the most regulated active service, by 17 NRAs (BE, CY, CZ, DE⁴⁸, EE, EL, FI, HR, HU, IE, IT, LU, LV, MT, NO, SI, SK), as well as passive FLLU (19 NRAs, as last year: BE, CZ, DK, EE, FI, FR⁴⁹, HR, HU, IT, LI, LT, LU, LV, NO, PL, PT, SE, SI, SK).⁵⁰
- 5 NRAs have applied regulation to Market 1 NGA/VHCN products⁵¹ (VULA products) and not on market 3b on FTTC and FTTH networks (CY, CZ, IE, IT, NO);
- 9 NRAs regulate both VULA and bitstream on both FTTC and FTTH (BE, DE, EE, EL, FI, HR, HU, SI, SK);

⁴⁵ The year reported in the table refers to the year of modification of the information collected in the RA database (i. e. 2025 means that the information changed for the 2025 RA report in comparison to the previous RA report, and so on). The date can be different from the effective year in which the regulatory obligation is lifted or introduced (also considering the cut-off date of 1st April considered for the present report and on the declaration on the annual survey reported). In this case, the date reported is only indicative of the new situation reported. This is also due to the fact that in some cases there are transitional periods for the decision taken.

⁴⁶ FR is included in this group due to the fact that it applies access obligation to the terminating segment of FTTH on a symmetrical basis as reported in the previous paragraph.

⁴⁷ LI regulates a national FTTH/B access (fibre unbundling), effective from Jan 2024.

⁴⁸ For the purpose of the present report DE is classified as one of NRAs that regulate the VULA-FTTH and BTS-FTTH in light of the decisions DE/2022/2385, DE/2022/2413 where an enforcement of the VULA and BTS-H obligation and implementation have been introduced recently - different from previous RA reports (including 2023 RA report). Moreover in the same decision DE/2022/2385 the access obligation of FLLU has been removed.

⁴⁹ FR is included in this group due to the fact that it applies an obligation of access to the terminating segment of FTTH on a symmetrical basis at a concentration point.

⁵⁰ 12 NRAs apply both FLLU and VULA over FTTH (BE, CZ, EE, FI, HR, HU, IT, LU, LV, NO, SI, SK).

⁵¹ Independently from legacy product (LLU, SLU) or FLLU regulation.

- 5 NRAs have applied regulation only to VULA/FLLU over VHCN, (LI, MT, NO, SE, FR⁵²) while 4 NRAs consider both VULA/FLLU and bitstream only over VHCN (DK, LT, LV, PT); in such cases no regulation has been applied to the FTTC network.

Where no FTTC deployment is present, regulation for bitstream is less frequent. Market 3b/2014 is most frequently regulated where market 1/2020 products are regulated. This year's survey confirms that central access products (market 3b/2014) can still be relevant in some countries where virtual or physical access products at local level is imposed, but access demand remains low (BE, HR, DK, CZ⁵³).

Where VULA FTTH access is regulated, the regulation of the corresponding product in market 3b/2014 for VHCN is more frequent in line with past year's findings: 11 of 16 NRAs (68%, it was 70% in 2024) that regulate both VULA and central access product over FTTH (BE, DE, EE, EL, FI, HR, HU, LU, LV, SI, SK). A specific case is DK where market 3b/2014 over FTTH is available in three main different geographical markets.⁵⁴

In Figure 5, as in the previous report, NRAs are ordered ranked by the number of regulatory obligations (at least one) in WLA and WCA (former market 3b); civil infrastructure market is reported as well. NRAs have been ranked taking into account the following scale of product remedies: i) VULA-C; ii) VULA-H; iii) FLLU; iv) BTS_FTTC; v) BTS_FTTH; vi) M1_duct access; vii) BTS cable. ULL and BTS legacy are also shown. In most countries legacy copper products are less and less relevant.⁵⁵

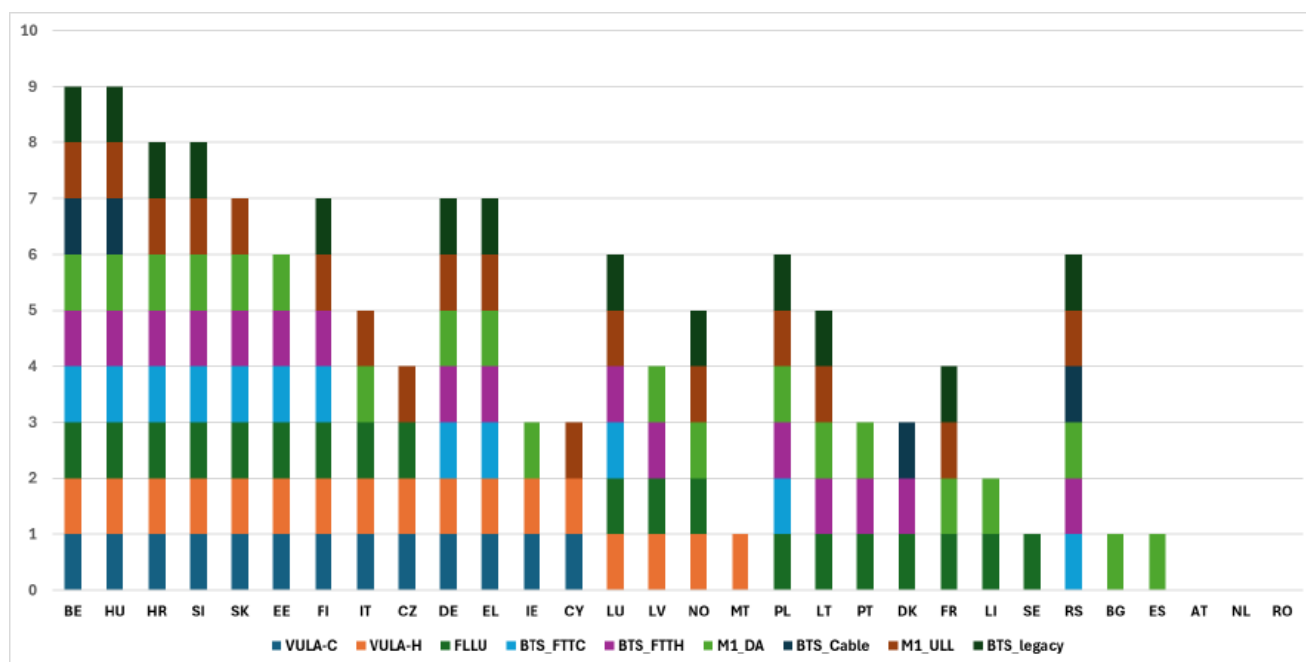
⁵² FR is included in this group due to the fact that it applies an access obligation to the terminating segment of FTTH on a symmetrical basis as reported in the previous section.

⁵³ In CZ only a commercial offer is available. SMP central access products have been deregulated since 2023. In IT since the deregulation in 2024, merchant wholesale bitstream services are widely available on a commercial basis from the previous SMP operator, also for new lines where no transitional period is imposed, as well as from competitors both on own networks or using market 1/2020 VULA and FSLU input products.

⁵⁴ In the most extended part (about 80 % of households), the product is available on a commitment base from 4 SMP operators; in a second area it is available on an SMP basis provided by a vertically integrated operator (about 10 % of households); and in a third part of the country, it is available from a wholesale only operator (about 5 % of households). Only non-discrimination and transparency obligations and no access obligations have been imposed on the SMP operators in market 3b/2014 over FTTH. A form of price control has been imposed considering benchmarking in line with the commitment price or on fair and reasonable price for the wholesale only.

⁵⁵ In FR legacy copper is still relevant in an area where VHCN is not yet deployed even if regulation on decommissioning is already in place.

Figure 5 – SMP-regulatory situation (remedies applied)



Source: BEREC RA Database 2025

Regulation, competition and investment outcomes

Country cases are grouped (as for the last four Reports), considering the regulatory remedies imposed in combination with the main competitive and investment situations. Thus, countries are ranked on the basis of the regulatory pressure on the SMP operator/s, considering the proportionality principle related to the imposed obligations, at least in some parts of the country.

The classification of the countries is reported in combination with main indicators on the technology outcome mainly related to the relevance of the copper network, on the NGA provision, the level of competition, by the SMP operator retail market share, the relevance of the cable network and the corresponding level of VHCN coverage.

Where VHCN, in terms of take up and coverage, is still behind the EU average, NRAs tend to provide a regulatory framework that includes all remedies available at least in market 1/2020, including VULA-H and/or FLLU.

For a first group of countries (BE, HU, EE, SI, SK, FI, HR, IT, CZ) where both NGA and VHCN access is mandated it is less common to focus on civil infrastructure access, and FLLU is also an option for competition in the long run. Among those countries, it is also frequent to experience a certain level of parallel infrastructure competition (BE, HU, IT). Within this first group, two countries experience full separation of the SMP operator (IT, CZ⁵⁶) and three where multiple SMP are present (HU, BE, FI). This group is characterised by a certain heterogeneity at the geographical level in combination with heterogeneous technology provision (fibre, cable, copper FTTC, FWA). In this group of countries infrastructure competition and OAO investment have more relevance (i. e. HR, IT, CZ which included FSLU).

⁵⁶ For CZ the wholesale/infrastructure SMP operator (CETIN) is a legally (vertically) separated entity from its former retail arm O2. Nevertheless, both companies CETIN and O2 have the same ultimate owner – PPF Group.

In a second group of countries (CY, DE, EL, IE), the focus of regulation is still mainly based on FTTC regulation and four out of five main regulatory obligations for NGA are imposed on market 1/2020, and sometimes also on market 3b/2014 (DE, EL). In this group VULA FTTH is mandated without FLLU as the main product for a VHCN obligation. In this group the cost-based anchor pricing approach applied on copper based over FTTC in combination with civil infrastructure access is also adopted as an instrument to promote competitive access. In this case – except for Germany – the investment in VHCN is mainly driven by the SMP operator, and the civil infrastructure access can play the role of the long-run tool for OAO to fully replicate the retail offer of the SMP operator. In this circumstance the imposition of passive access service as FLLU can be perceived by some NRAs as a disincentive for investment so this obligation is imposed in combination with more flexibility on VHCN prices.

A third group of countries (LU, LV, NO, MT, PL, LI, PT, DK, LT, SE, FR⁵⁷) sees FTTH and not FTTC as the main deployed architecture for NGA, and no specific local access obligations for FTTC have been imposed. In such cases VULA FTTH or FLLU are the only SMP products, sometimes in combination with remedies in market 3b/2014. The technological choice for investment simplified the outcome, first of all reducing the uncertainty of the investments, the corresponding risk and sustainability. In this group of countries, the SMP regulation seems to play a less central role.

In case of PT⁵⁸ BTS_FTTH and FLLU are only ancillary in some part of the country, less than 5 %, as the duct access is the main instrument for regulatory purposes for VHC networks.

The fourth and last group, AT, NL and RO⁵⁹ do not impose remedies in market 1/2020 and market 3b/2014. In ES and BG (in this case, with a suspended decision) only civil infrastructure access is present. For DK the relevant regulation relates only to a market 3b/2014 product, while FLLU regulation is relevant only in less than 5 % of the country and commitment agreements are the main instrument of regulation.

Summing up, the first two groups include NRAs that regulate NGA over FTTC, FTTH, and copper in markets 1/2020 and 3b/2014, while the third group applies 'lighter' regulation on FTTH. In the first two groups the cost orientation obligation is used more frequently as there is still an incentive for the SMP operator to use unfair cross-subsidisation that can reduce investment incentives for OAOs, or use its SMP to selectively distort investment business cases of alternative operators.

The survey asked, in line with last year's report, about the relevance of the regulated products in order to determine the degree by which the regulatory obligations can directly or indirectly affect the competitive outcome (Table 2).

In line with the past year NRAs that have considered the regulated product (excluding duct access) to be "very relevant" for the access seekers' retail competition are those where the transition to VHCN is still in progress and/or the copper network of the incumbent is still relevant for the access market. In the table, leaving out civil infrastructure access, the options "relevant", "moderately relevant" or "relevant in a future perspective" were mainly chosen by countries in the first two groups of countries (red and black labels).

⁵⁷ FR is included in this group due to the fact that it applies access obligation to the terminating segment of FTTH on a symmetrical basis

⁵⁸ PT applies symmetric obligation to civil infrastructure independently of the BCRD provision.

⁵⁹ In RO, ANCOM has identified in 2020 strong infrastructure competition at the retail level. The copper-based incumbent strongly competes with an alternative operator who has deployed a widespread national fibre optic network, plus there are cable networks all over the country, in general trebling the infrastructure available. The main technologies used are xDSL - ADSL/VDSL, coaxial cable - DOCSIS 3.0, UTP/FTP cable - FTTx, fibre optics - FTTH and radio/FWA.

Therefore, replies indicate that where VHCN transition is driven by OAO investment in combination with the investment of the incumbents, a reduction in the scope and relevance of ex-ante SMP regulatory obligations on VHCN follows (this is different from the case where the legacy copper network is still present).

Table 2 also provides information on the “relevance of the regulated product” as reported by the NRAs in combination with the number of operators that have at least 3 % of the fixed retail broadband market share (when available/not confidential).⁶⁰ No specific differences are being observed since the last year report.

In countries where civil infrastructure access is the main instrument for competition and where a passive access obligation is imposed, the market outcome is more concentrated. The opposite can be seen when the regulatory framework is mainly based on active products such as VULA, providing an easier way to market entry (this is consistent with the findings on the wider availability of bitstream access where VULA is also available).

When “not relevant” is considered as the main reply for access services, the motivation is related to the fact that infrastructure competition is present, and operators rely on their own-network (BG, HU, LV). In other cases (CZ, DK) the main motivation, other than infrastructure competition, is the availability of a commercial alternative at central access level (bitstream).

Table 2 - Relevance of the SMP market/product regulated and number of Operators with retail market share greater than 3 % (from 0 to >5)⁶¹

	ULL (copper)	SLU (copper)	Optical TS (SMP)	FLU	Fibre SLU	VULA-C	VULA-H	DF	DA	Pole	BTS_Legacy	BTS_NGA_FTT	BTS_FTT_H	BTS_Cable
very relevant for competition as OAO actually use the product	1	1	0	1	0	3	3	1	5	2	2	1	2	1
moderate relevant as OAO actually use the product marginally	1	1	0	0	0	0	2	2	2	2	3	1	3	1
very relevant as can be relevant for future regulatory objective	0	0	0	2	1	0	1	0	1	0	0	0	1	0
no relevant any more, but used in the past	5	1	0	1	0	0	0	0	0	0	3	1	1	1
no relevant	3	4	3	6	3	4	4	5	2	1	0	1	1	0
very relevant for competition as OAO actually use the product	(FR-3)	(FR-3)		(LI-)		(DE-) (IE-4) (IT->5)	(DK-) (IE-4) (NO-4)	(LI-)	3) (EE-) (LT-) (PT-2) (RS-3)	(ES-) (PT-2)	(BE-1) (DE-)	(BE-1)	(BE-1) (DK-)	(BE-1)
moderate relevant as OAO actually use the product marginally	(NO-4)	(DE-)					(LV-2)	(AT-) (RS-3)	(IT->5) (LI-)	3) (EE-) (IT->5) (RS-3)	(CZ-3) (LT-) (LV-2)	(CZ-3)	(CZ-3) (LT-) (LV-2)	(DK-)
very relevant as can be relevant for future regulatory objective	(DE-) (HU-4) (IT->5) (RS-3)	(IT->5)		(BE-1) (IT->5)	(IT->5)		(IT->5) (DE-)		(LV-2)				(DE-)	
no relevant any more, but used in the past				(DK-)							(HU-4)	(HU-4)	(HU-4)	(HU-4)
no relevant	(BE-1) (CZ-3) (LT-)	(CZ-3) (HU-4) (LT-) (NO-4)	(HU-4) (IT->5) (LV-2)	(CZ-3) (EE-3) (HU-4) (LT-) (LV-2) (NO-4)	(CZ-3) (HU-4) (LT-)	(BE-1) (CZ-3) (EE-3) (HU-4)	(BE-1) (CZ-3) (EE-3) (HU-4)	(CZ-3) (DE-) (HU-4) (PT-2)	(DE-) (HU-4)		(EE-3)	(EE-3)		

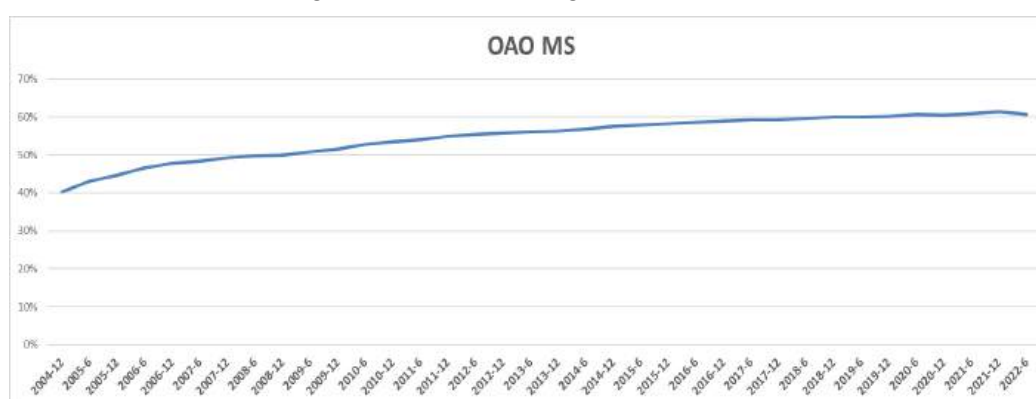
Source: BEREC RA Database 2025

⁶⁰ The data has the scope to provide some information on the level of “concentration” in the retail broadband market. NRAs were asked to specify “How many OAOs have a retail fixed broadband market share >3 %”, independent from the specific product.

⁶¹ The market share refers to the general retail market share not the market share reached by the product. In this picture the following was correlated: i) relevance of the wholesale product and ii) status of the market in term of concentration.

Figure 6⁶² reports the market share of OAOs as collected from DESI at European level. Progress in retail competition may indicate that the application of a general ex ante regulation seems to decrease in a number of countries (also considering the constant reduction of the number of relevant markets). It is important to stress that in some countries, competition at the retail level is possible due to ex ante regulation. The detailed product by product analysis on the wholesale access level has shown that ex ante regulation is applied by NRAs in a more targeted way using the flexibility of the EECC provisions to tailor the regulatory obligations to the specific competition and infrastructure situation identified in the market analysis (also from a geographical point of view).⁶³ The increase of retail market shares of OAO is flattening in recent years, which may suggest the need to monitor and address competition problems in the retail markets more effectively.

Figure 6 - OAO average market share



In the light of the four identified groups of NRAs, as proposed in the past years' reports, five main indicators have been considered in figure 7 as update in the structural data chapter as reported in the present report: i) the weight of DSL over retail BB market share⁶⁴ in order to understand the relevance of the legacy copper (including DSL and VDSL based on FTTC/E); ii) the SMP operator's overall retail market share with information collected in the Structural data database 2025; iii) VHCN coverage (%) as reported in the last DESI report; iv) FTTP coverage (%) as reported in the last DESI report; v) Take-up of cable and FTTP as collected in the Structural data chapter⁶⁵.

The average values have been calculated including only EU member states (the values estimated for the group of previous years are also reported in parentheses).

Results confirm the evidence commented in past years reports.

The following considerations should be read as main characteristics of each group of countries, that in any case can be different between each member in the same group; moreover, this analysis

⁶² DESI indicator Market share is based on fixed broadband subscriptions (lines). New entrants mean operators that did not enjoy special and exclusive rights or a de-facto monopoly for the provision of voice telephony services before the liberalisation.

⁶³ Since the DESI report 2023 this indicator is no longer collected.

⁶⁴ The DESI data was used in previous report (<https://digital-strategy.ec.europa.eu/en/policies/desi>). Starting from this year data collected in the Structural data section will be used, as DESI no longer publishes statistics for those indicators in line with the reduced relevance of the legacy copper network in aggregate term.

⁶⁵ For confidentiality reasons, the averages of SMP market shares and other indicator are given in a range; moreover, the scope of the analysis is providing characteristic of the group not to assess the specificity of each single country.

is influenced by the fact that the update of the regulatory obligation may be not timely to the changes in market conditions, (e.g. take-up and coverage of VHCN can quickly change).

The first group combines a high FTTH/cable coverage (FTTC is less relevant) in combination with an intermediate stage of the SMP average market share and take-up not polarised on a specific technology (cable and FTTP).

The second group of countries (IE, EL, CY, DE) is characterized by the fact that NGA over FTTC network is still relevant and the competitive situation (SMP operator's market share) is at an intermediate stage. On average, the first group shows a lower take-up rate of cable and FTTP, also as a consequence of on average a lower wide spread cable and/or VHCN coverage. In all of these countries a single SMP operator is present and SMP regulatory obligations are generally focused on the copper network that warrants NGA services provision.

Where two competing networks (NGA and VHCN) that are closer in the chain of substitution are managed by the SMP operator, regulatory intervention by the NRAs has to balance three main effects: wholesale revenue effects, business migration effects and replacement effects. In such situations copper prices on the legacy network for NGA can still be relevant to incentivise further investment in VHCN and take-up migration of VHCN.

In the third group of countries competition conditions are more favorable, as FTTP is already the main technology, i. e. there is no intermediate step between NGA and VHCN, but rather a direct transition from the legacy copper network to VHCN. Here, the transition to VHCN has been driven by OAO operators including municipal networks (SE⁶⁶) or via co-operative approaches (FR). SMP obligations are then focused on specific geographical areas and are generally lighter.

The fourth group represents specific country cases of deregulated markets or that are focussed only on civil infrastructure access. Relevant infrastructure competition by cable is present with a higher penetration of this technology on average, i.e. a more direct competitive constraint (AT, NL). FTTP is at an advanced stage both in terms of coverage and take-up in RO, BG, ES full deregulation of market 1/2020 was possible, not including civil infrastructure access and that completed also the full switch-off of the corresponding copper network. Here, duct access has been considered sufficient for competition (BG, ES) or full deregulation is currently in place (NL, RO); in other cases, binding commercial agreements are the preferred approach to address any potential market failure, due to the failure of the three criteria test for imposing an SMP position (AT).

It should be noted that, on average, there is a reduction in the xDSL share in all groups, in combination with a stable market share of SMP operators. In addition, where there is infrastructure competition and/or a clear commitment to VHCN investment, for example via co-investment agreements or effective commercial agreements, the standard SMP framework is less relevant (i. e. NL, FR, ES, DK). In that sense, the market share of the SMP operator alone cannot explain the regulatory framework applied.

⁶⁶ For SE information at 1st of April 2024 relates to the last market analysis, which dates back to 2015. However, the copper access regulation has been lifted and the decision entered into force on 21st April 2023. For existing wholesale agreements (active lines), the obligations to offer access to the copper network shall continue to apply during a transition period of 12 months from the date of the decision.

Figure 7– SMP-regulatory approach vs network evolution and SMP market share.⁶⁷

	%DSL (Take-up)	%SMP (market share)	%VHCN (coverage)	%FTTP (coverage)	%cable (Take-up)	%FTTH (Take-up)	
Countries where all remedies are applied on VHCN	(BE-1)-2018						Competition condition still at an intermediate stage, NGA provided by a more technology mix (cable and FTTP, FTTC) copper network still present
	(HU-4)-2017						
	(HR-)-2023						
	(SI-)-2022	[20-25%]	[45-50%]	[75-80%]	[65-70%]	[20-25%]	
	(SK-)-2018	[30-35%]	[45-50%]	[70-75%]	[55-60%]	[20-25%]	
	(EE-3)-2025	[30-35%]	[50-55%]	[70-75%]	[55-60%]	[20-25%]	
Countries where not all remedies are applied on VHCN	(FI-5)-2018						Copper over FTTC is still a relevant competitive constraint, lower level of FTTP coverage and take up
	(IT-5)-2024						
	(CZ-3)-2025						
	(DE-)-2019	[45-50%]	[40-45%]	[70-75%]	[60-65%]	[15-20%]	
	(EL-)-2023	[55-60%]	[40-45%]	[65-70%]	[55-60%]	[15-20%]	
	(IE-4)-2024	[55-60%]	[45-50%]	[50-55%]	[40-45%]	[10-15%]	
Countries where small set of remedies are applied on FTTP	(CY-)-2022						FTTP is wider spread also with respect to cable; competition condition are in more advantage stage; copper network no relevant for NGA deployment
	(LU-3)-2019						
	(LV-2)-2024						
	(NO-4)-2018						
	(MT-)-2013						
	(PL-)-2019						
Mainly deregulated market/ no remedies on market 1/ only Civil infrastructures	(LT-)-2019	[10-15%]	[40-45%]	[85-90%]	[80-85%]	[15-20%]	Cable competition is more relevant in combination with high level of FTTP coverage and take-up, competition condition are in a more advantage stage
	(PT-2)-2023	[15-20%]	[40-45%]	[85-90%]	[75-80%]	[15-20%]	
	(DK-)-2021	[20-25%]	[40-45%]	[80-85%]			
	(FR-3)-2023						
	(LI-)-2023						
	(SE-)-2015						
	(RS-3)-2022						
	(BG-)-2024						
	(ES-)-2025	[15-20%]	[30-35%]	[90-95%]	[80-85%]	[25-30%]	
	(AT-)-2022	[20-25%]	[30-35%]	[85-90%]	[75-80%]	[25-30%]	
	(NL-)-2023	[20-25%]	[35-40%]	[85-90%]	[75-80%]	[25-30%]	
	(RO-)-2020						

Source: BEREC RA Database 2025

The SMP regulatory remedies generally apply to a single SMP operator that can be national in scope.

In some cases (BE, HU, FI) the SMP regulation has been applied to more than one SMP operator. HU considers 3 SMP operators in market 3a/2014 and 3b/2014 for all technologies; FI considers >4 SMP operators in market 1/2020; BE considers 3 SMP operators in case of bitstream over cable network.

Where more than one SMP operator is present, they mostly operate in the same geographical area, but use their own infrastructure (FI, HU). In HU the network of SMP operators have an overlapping coverage, but there is only one SMP operator per geographically separated area. In BE the cable operators, designated SMP operators in market 3b/2014, operate in different geographical areas over cable network.

In all cases where more than one SMP operator has been designated to have SMP in access markets, the motivation for regulation is not based on the legal basis of Joint Dominance in the context of Art. 63 paragraph 2. of EECC.⁶⁸

⁶⁷ In parentheses, for each country information collected and explained in the previous section, about the number of operators that have a market share greater than 3 % in the retail broadband market share, is reported. This provides an indication of the level of market concentration. The cell values in brackets represent the averages of the indicator for the EU countries in each group listed on the left of the table. For each group the averages stay in the reported range (lower and upper bound). This representation tries to determine if each group of countries ranked through the remedies-based classification can be “characterized” by looking at the averages of some relevant indicators. The last market review date is also reported.

⁶⁸ The application of Joint Dominance (JD), as considered in comparable way of provision of Art. 63 paragraph 2 of the EECC, has been applied only by ACM, NL in their market review of September 2018. This analysis has been annulled by the Dutch Trade and Industry Appeals Tribunal, which found that the theory of JD would not be easy to prove, even

Geographical regulation

This section updates the information on the geographical scope of the regulation which provides a better description of the regulatory context taking into account the fact that the remedies picture previously reported can be differentiated for each country.

A differentiated geographical approach to regulation generally reflects the level of competition reached in each part of the country; it provides insight into the impact of the SMP regulation where a market has been partially deregulated.

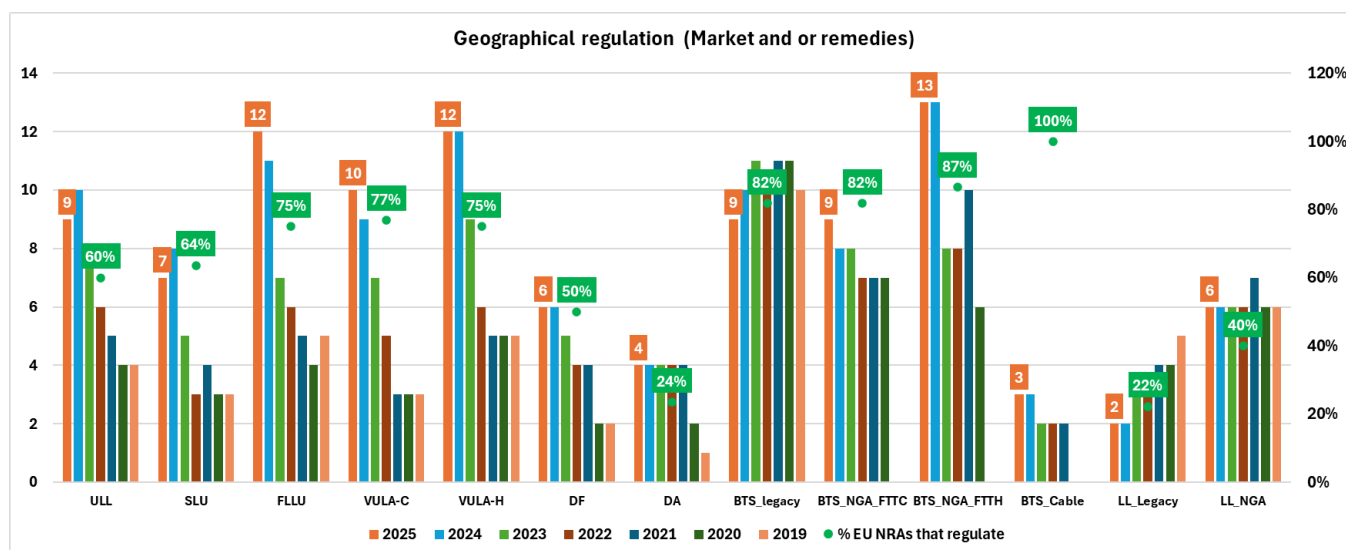
In Figure 8 the number of NRAs, and the percentage of EU NRAs, that have applied some form of geographically differentiated approach is provided for each market and product for 2025 and previous years.⁶⁹ In the same figure the percentage of EU NRAs that apply a geographical approach to regulation is also given with respect to all EU-NRAs that regulate the product market.

The number of NRAs that have identified different competitive conditions across the national territory justifying a geographically differentiated approach (in terms of market definition and/or remedies application) has increased in line with the trend experienced in previous years, for most markets/products. When an NRA is removed, the motivation is that ex ante regulation has been removed since last year, passing from a geographical approach to a fully deregulated market.⁷⁰ In comparison to the last year there is an increase of NRAs that apply a geographical approach to regulation in comparison to NRAs that apply an SMP ex ante approach: more than 70 % of NRAs that regulate market 1/2020 apply a geographical approach to regulation for NGA/VHCN product (in 2023 this was less than 50 %). The increasing trend of a locally targeted regulation still prevails notwithstanding the deregulation cases with respect to NGA and VHCN product.

when using economic models, due to the fact that these models must take into account the specific characteristics of the relevant undertakings and markets concerned as far as possible. Moreover, according to the Tribunal, the modified greenfield approach in the SMP assessment phase, applied by ACM, should have taken into account the incentives and possibilities of commercial agreements between undertakings even in the absence of regulation.

⁶⁹ In the context of symmetrical regulation only FR apply a geographical differentiation of the symmetrical access remedy: the access to the terminating segment (inside buildings) is available only in less than 20 % of households (more competitive areas) and in the rest only symmetrical access beyond the first concentration point is available.

⁷⁰ The replies of the previous years are homogenous with the current report.

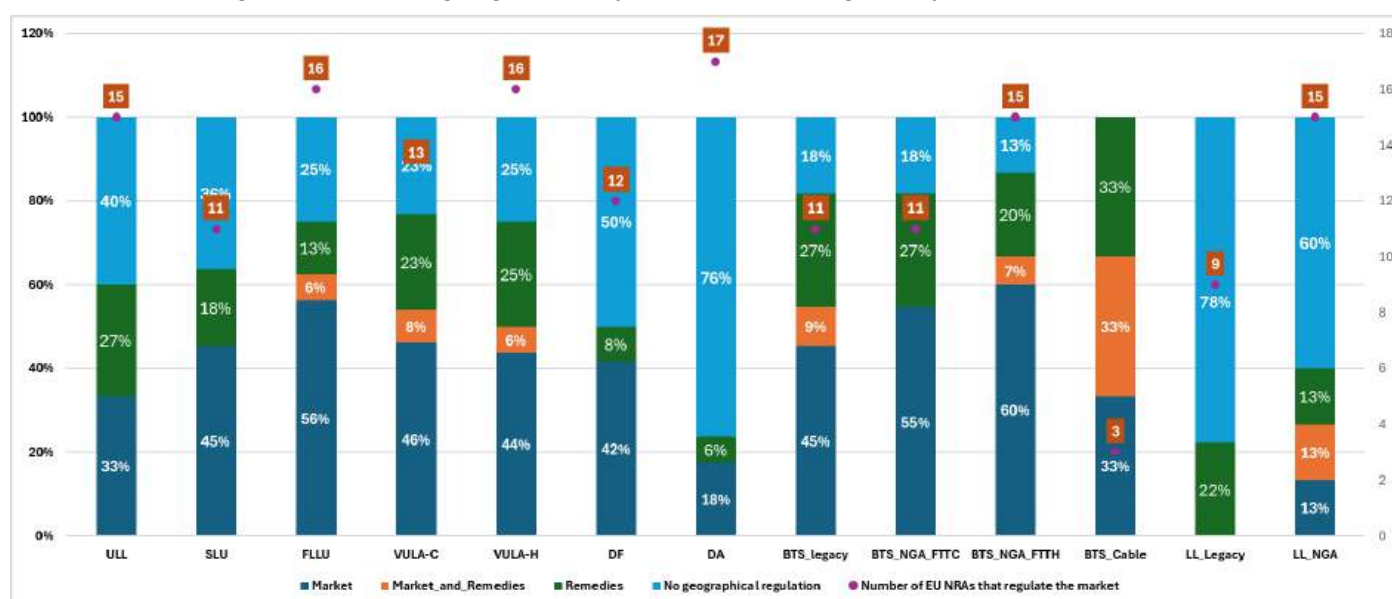
Figure 8– SMP - geographically differentiated regulatory approach⁷¹

Source: BEREC RA Database 2025

In Figure 9 the percentage of EU NRAs (27 NRAs) that apply a geographical approach to regulation is given for 2025 for those NRAs that regulate the market in question; in the illustration the percentage is provided for: i) market; ii) market and remedies; iii) remedies. “Market” means that NRAs apply a differentiated approach in different geographical markets: in that case there is a geographical area where regulation is lifted and a second geographical area where remedies are applied due to SMP findings (or alternatively, different geographical markets are identified for different SMP operators); “Market and remedies” means that NRAs apply, in a differentiated geographical market approach, differentiated remedies; “Remedies” means that there is one national geographical market, but remedies are differentiated. A geographical approach to regulation is less relevant for civil infrastructure access and, in general, for market 2/2020 products, in all other case specifically on VHCN, NGA the majority of NRAs that still regulate the market, experience different competitive condition at the geographical level that justify a geographical approach to regulation.

⁷¹ Where 100% is provided this means that all NRAs that regulate the specific product also apply a geographical regulatory approach.

Figure 9 – SMP - geographically differentiated regulatory approach



Source: BEREC RA Database 2025

The NRAs that apply a differentiated approach to regulation are reported in Figure 10. In the table the percentage of households falling under geographical regulation is shown. For each product/market the percentage of deregulated areas (market regulation) and the competitive areas (remedies differentiation) is provided. The reported percentage of competitive areas have to be considered in addition to the deregulated areas.⁷²

The same picture shows that deregulated areas range from 5 % of households up to 95 % for local access products and central access products, more often between 20 % and 50 %, in line with last year's report.⁷³ In red the updated values are given: a geographical regulation approach is becoming very common with an increase of the levels of deregulated areas as well as an increase of the incidence of the more competitive areas. The percentage of households falling under a geographical regulation in combination with less regulatory obligations was increasing in a number of countries in 2024 (HR, IT⁷⁴, IE, CY, LV, ES, PL, PT) in line with a regulatory path where a geographical regulation is applied to avoid non-proportional regulation (the order of countries in Figure 10 follows the one reported in Figure 7). Since last year EE in 2025 adopted new measures at geographical level. In the table below the new regulatory decisions since last year are few and reported in red.⁷⁵

⁷² A missing value in the table means that there is no regulated product. For FR the geographical approach has been reported in the category FLLU even if it refers to the symmetric approach as described in the previous paragraph.

⁷³ PT applies a differentiated market and remedies approach in market 2; as this is a market targeted to companies (small, medium and large) the percentage of households covered (by regulated and/or deregulated areas) is not relevant. In PT some regulatory obligation on ULL and Bitstream FTTH is present in a small part of the country. FI: Former Market 3a has 150 relevant geographic wholesale markets. Remedies have been differentiated by SMP operator (3 large operators have stronger remedies than 18 small operators), not geographically.

⁷⁴ In IT the new market review proposal of July 2025 shows a larger area where the SMP condition can be removed.

⁷⁵ ES fully deregulates the WCA and WLA markets and so it is removed.

Figure 10 – Households in deregulated/competitive areas

	FLLU		VULA FTTH		Market 3b FTTH		VULA FTTC		Market 3b FTTC		ULL		Market 3b legacy		M2 NGA		Duct access		FTTH
	Deregualt ed areas	Competiti ve areas	Deregualt ed areas	Competiti ve areas	Deregualt ed areas	Competiti ve areas	Deregualt ed areas	Competiti ve areas	Deregualt ed areas	Competiti ve areas	Deregualt ed areas	Competiti ve areas	Deregualt ed areas	Competiti ve areas	Deregualt ed areas	Competiti ve areas	Deregualt ed areas	Competiti ve areas	State Aid
	(Market regulation difference)	(remedies ation)	(Market regulation difference)	(remedies ation)	(Market regulation difference)	(remedies ation)	(Market regulation difference)	(remedies ation)	(Market regulation difference)	(remedies ation)	(Market regulation difference)	(remedies ation)	(Market regulation difference)	(remedies ation)	(Market regulation difference)	(remedies ation)	(Market regulation difference)	(remedies ation)	plan
(BE-1)	0	<5%	0	<5%	0	<5%	0	<5%	0	<5%	0	<5%	0	<5%	0	<5%	0	0	<5%
(HU-4)	<20%	0	<20%	0	<20%	0	<20%	0	<20%	0	<20%	0	<20%	0	<20%	0	<20%	0	<5%
(HR-)	<40%	0	<40%	0	<40%	0	<40%	0	<40%	0	0	0	0	0	0	0	0	0	<10%
(SI-)	0	<5%	0	<5%	<50%	0	0	<5%	<50%	0	0	<5%	<50%	0	0	0	0	<5%	0
(EE-3)	<30%	0	<30%	0	<30%	0	<30%	0	<30%	0							0	0	<10%
(FI->5)	<5%	0	<5%	0	<5%	0	<5%	0	<5%	0	<5%	0	<5%	0					
(IT->5)	<5%	0	<5%	<10%			<5%	<10%			<5%	0			<5%	<20%	<5%	0	<50%
(CZ-3)	<90%	0	<90%	0			<90%	0			<90%	0							<5%
(DE-)		0	0	0	0	0	0	0	<5%	0	0	0	0	<5%	0	0	0	0	<5%
(EL-)				(criteria defined)		(criteria defined)	0	0		(criteria defined)	0	0		(criteria defined)	0	0	0	0	0
(IE-4)		<20%	0			<20%	0								0	0	0	0	<20%
(CY-)		0	<10%			0	<10%				0	0			0	0			<20%
(LU-3)																			
(LV-2)	<40%	0	<40%	0	<40%	0											0	0	<5%
(NO-4)																			
(MT-)																			
(PL-)	<50%	0			<50%	0			<50%	0	<50%	0	<50%	0			<50%	0	0
(LT-)	0	0				(criteria defined)	0				0	0		(criteria defined)	0	0	0	0	0
(PT-2)	<95%	0			<95%	0									<20%	0	0	0	<10%
(DK-)	<95%	0			<20%	0													<5%
(FR-3)	0	<20%									0	<50%	<20%	<70%	0	<30%	0	0	<50%
(AT-)															<80%	0			<20%

Source: BEREC RA Database 2025

Where different geographical markets are identified, two areas have generally been specified: one which is not regulated and another where an SMP operator is identified. The same applies to geographical remedies (one competitive area and one non-competitive area). More than two geographically differentiated areas have been identified by four NRAs as reported in the following figure in line with last year's report.

Figure 11 – More than two geographical areas (market or remedies)

Country	Numbers of markets/Remedy areas	Market/product	Notes
DK	>4_markets	Market 1 and market 3b	The low-capacity copper network is a single national market with a single SMP, in such a case binding commitment have been accepted by the NRA without imposing any remedy; for high-capacity market (NGA/VHCN) instead >4 SMP operators have been identified in different geographical areas. Four operators active in retail and wholesale markets are regulated in different geographical market through commitment only and are subject only on transparency and non-discrimination in the geographical regulated areas; Four operators are wholesale only and are regulated in corresponding geographical areas with only non-discrimination obligation; Two vertical operators are regulated over market 3b (FTTC) and Fibre LLU applying, non-discrimination, transparency, obligation to publish a reference offer as well as price control (based on the commitment proposed by other operators);
FI	>4_markets	For all markets/product with geographical differentiation	Market 3a/2014 and 3b/2014 contains 150 relevant geographic wholesale markets. Remedies have been differentiated by SMP operator (3 large operator have stricter remedies than 18 small operators), not geographically. Competitive areas have been completely deregulated. SMP operators operate also in same geographical area, but on own different infrastructure
HU	>4_markets	For all markets/product with geographical differentiation	Only geographical market regulation: 3 regulated+3 deregulated markets. Non differentiated remedies applied on regulated markets.
FR	3_remedy_areas	ULL/SLU/LL (market 2)	1) Cost orientation (by default) 2) non-excessive pricing: at least 95% of premises connected for more than 9 months 3) Tariff remedy lifted and pricing replicability testing obligation in case of tariff higher than non-excessive area: commercial closure in place for more than 6 months and technical shutdown announced in less than 2 years

Source: BEREC RA Database 2025

In line with last year's report more information is provided on the implementation of the regulatory framework, on the topic of the geographical market/remedies application, on the criteria used by NRAs to define geographical market and/or remedies and on the frequency of updates. The information provided by NRAs is shown in the table below per single country updating the information from last year's report. Criteria for defining different geographical markets are generally the same as for local and central access products when regulated, they can be different from the criteria adopted for market 2. The market definition has normally been updated for the market reviews; in case of remedies the frequency of update can be shorter than the market review process and more frequent "yearly". In case of the geographical market definition, the criteria adopted include coverage of alternative networks in combination with the retail market share or structural parameters that address the issue of the sustainability of the infrastructure competition (FR). In case of remedies differentiation, a more straightforward approach based only on the number of alternative networks in combination with coverage is often adopted, sometime independently of the level of the retail and wholesale market shares measured.

The criteria for geographical market definition or remedies differentiation take into account that more than two alternative networks are present in the relevant geographical areas. This does mean that the alternative networks should fully overlap. In case the level of coverage of alternative network is ubiquitous or the alternative network is managed by a wholesale only operator, no condition on a third network is generally included to define the geographical market or remedies differentiation with the scope to find potential homogeneous deregulated areas or areas where obligations can be relaxed.



Table 3 – Geographical approach to regulation

	Geographical market definition		Time of update	Remedies differentiation			Time of update
	Market 1 and 3b	Market 2		Market 1	Market 3b	Market 2	
AT	-	Combination of: i) Number of alternative networks; ii) coverage threshold; iii) retail market share threshold	Only between market review				
BE	-	-		<p>Number of operators + coverage threshold. Specific rules for new deployments in white zones do also apply</p> <p>The CRC has differentiated the remedies geographically according to the circumstances:</p> <ul style="list-style-type: none"> - in areas where at least three independent NGA operators (i.e. offering speeds of 30 Mbps and above) are present regulation will partly be lifted; If 3rd NGA is present with its own infrastructure or based on commercial passive access, some M3a remedies may be modulated. - regulation will also partly be lifted in the areas that are currently less well covered by high-speed infrastructures (those areas represent approximately 5% of households in Belgium). Operators are thereby stimulated to invest in these areas 	If 3 NGA are present, M3b is deregulated	<p>Number of operators + coverage threshold. Differentiation at CO level depending on the volume and spread of connected endpoints. Price control lifted in the most competitive areas.</p>	Yearly for market 2 and Other for other market/product
CY				Number of competitive VHC networks			Other
CZ	v. combination combination of criteria retail market shares and coverage threshold	-	Only between market review ⁷⁶				
DK	Coverage, presence of infrastructure, variation in retail products caused by alternative operators, only one threshold (5%) for significant presence.	-	Only between market review				

⁷⁶ Or in case of significant change on the market (incl. market concentration)

	Geographical market definition		Time of update	Remedies differentiation			Time of update
	Market 1 and 3b	Market 2		Market 1	Market 3b	Market 2	
EL				Combination: Alternative network and coverage (The existence of alternative FTTH infrastructure with 80% coverage of the active broadband subscribers of the LE)	Combination: Number or alternative networks and coverage (The existence of at least two network infrastructures to cover all the area of LE)		three years for market 1 and yearly for market 3b
EE	ii) coverage threshold iv) wholesale market shares		Only between market review				
FR		-		Geographical market differentiation depends on the density ("very dense areas" and "outside of very dense areas") List of communes considered to be in very dense areas was drawn up by Arcep on December 10, 2013.	In the market "outside of very dense areas", there are 2 zones for remedies. The "less competitive area" (not an Arcep name) is where there is no equivalent offer from a competitor of the SMP	ZC1: competitive area (at least one alternative wholesale provider at the MDF) ZC3: limited competition (no alternative wholesale provider at the MDF)	yearly
HR⁷⁷	Number of alternative networks; retail market share threshold For HAKOM the following conditions should be met: 1) At least one alternative operator has VHCN infrastructure (minimum. 2) The VHCN infrastructure of the alternative operator covers a minimum of 33 percent of user units in the geographical area. 3) HT Group's retail market share in that geographical area is less than 50 percent.		two years				
HU	At least two significant alternative operators, with at least 15% market share each and 50%	-	Only between market review				

⁷⁷ HR has defined a low-capacity market that is defined as national in scope. Based on thorough geographical market analysis and chosen criteria for assessing the level of competition, HAKOM concluded that separate geographical markets should be defined for high-capacity market. Two submarkets were defined: one competitive and the other not competitive. The geographic units chosen for detailed geographical analysis were cities and municipalities, with exception of the City of Zagreb which was additionally divided in city districts. In total 572 geographic units were subject to detailed geographical analysis.

	Geographical market definition		Time of update	Remedies differentiation			Time of update
	Market 1 and 3b	Market 2		Market 1	Market 3b	Market 2	
	combined. Coverage threshold: 60% for each alternative network.						
IE	No. of competing operators, coverage and Market Shares		Only between market review				
IT ⁷⁸	Retail Market share<30%; wholesale market share including self-production <50%; alternative wholesale only network>80%; FTTH take up >40%	Market share including self-production <30%; alternative FTTH wholesale only network>60% applied only in municipality where a materiality threshold of >50 leased lines are sold	Other		Retail Market share<38%; wholesale market share including self-production <70%; alternative wholesale only network>70%; FTTH take up >30%	Alternative FTTH wholesale only network>70% applied only in municipality where a materiality threshold of >50 leased lines are sold	yearly
LT	<p>Criteria to delineate geographic markets:</p> <p>1) At least for two of the three relevant retail markets (internet, pay TV, fixed telephone) in a given municipality:</p> <p>-At least three (including Telia) retail operators, and;</p> <p>- One alternative operator shall have a retail market share of at least 25 % and;</p> <p>- Telia's retail market share does not exceed 40 %, or if the market share exceeds 40 %, another alternative operator's market share is less than Telia's market share by no more than 15 percentage points or greater than Telia's market share; and</p> <p>2) Each of at least two alternative operators in that municipality shall have developed its landline network of at least 50 % of the residencies of that municipality, and</p> <p>3) The coverage of the three operators in that municipality shall result in the duplication of at least 70 % of the residences in that given municipality</p> <p>Taking into account the Lithuanian particularity that alternative operators build their networks using ducts (access to ducts together with other market 3a products is regulated in market 3a), there is also an additional need in market 3a to evaluate which part of the networks of alternative operators is built using access to ducts (4th criterion)</p>	-	Other				

⁷⁸ In the new market review the retail market share has been omitted due to the full separation of the previously vertically integrated SMP operator.

	Geographical market definition		Time of update	Remedies differentiation			Time of update
	Market 1 and 3b	Market 2		Market 1	Market 3b	Market 2	
	4) No more than 40 % of the retail users are accessible via another operator's access to physical infrastructure.						
LV	Demographic situation; Retail market shares; wholesale market shares; Number of alternative networks;		Other				
PL	Orange Polska S.A. market share in retail fixed broadband is less than 40% there are 3 active operators At least 65% of households have access to at least three operators (this includes cable networks, even though cable is excluded from the relevant wholesale market) fewer than 10% households with no internet access		Only between market review				
PT	Civil Parishes where at least one of the following criteria is met: i) Presence of 3 networks with at least 15% coverage; ii) Presence of 2 operators with at least 90% coverage; iii) Civil Parishes located in Predominantly Urban Areas and iv) Civil Parishes where the leader's shares are between 40.0% (inclusive) and 50% (exclusive), and the leader's shares are falling (since 2019), or parishes where the leader has a share of less than 40%	Civil parishes that meet the following criteria: i) The existence of at least two alternative operator networks; ii) Two alternative operators with accesses installed/provided; iii) SMP operator's market share is less than 50 percent.	other				

Source: BEREC RA Database 2025

Single remedies application

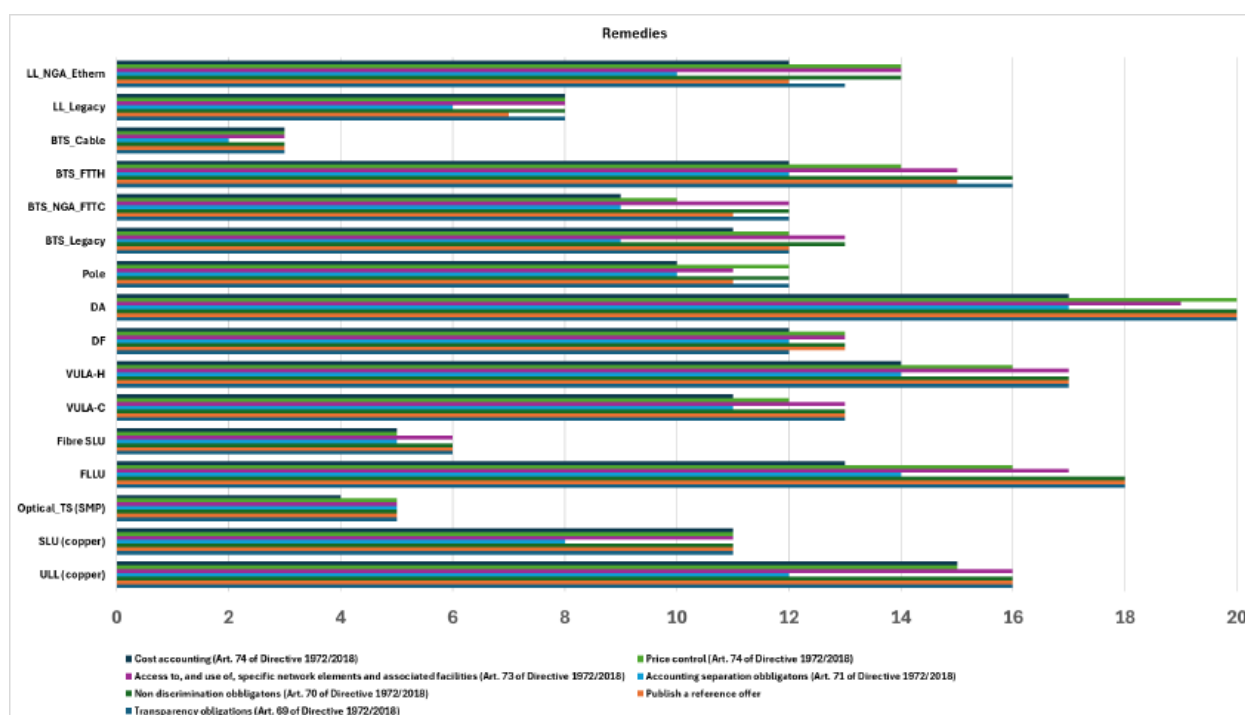
In this section, an overview of the application of the set of remedies imposed for each product (Ex Art. 69-74 of the EECC) is given in non-competitive areas in case remedies differentiation is in charge (also in case of national market). The specific cross-reference to the Access Directive has been made in continuity with the previous reports, in parallel with the European Electronic Communications Code (EECC) due to the fact that in some cases the legal basis of the market review and remedies framework is still based on previous directives, as reported in the timetable for update. The remedy sets “Transparency”; “Non-discrimination”; “Accounting separation”; “Access”; “Cost accounting” and “Price control” are still available in the EECC.

Figure 12 – EECC art. 69-74

Article	Obligation
Art. 69 (Ex. Art. 9)	Transparency
Art. 70 (Ex. Art. 10)	Non-discrimination
Art. 71 (Ex. Art. 11)	Accounting Separation
Art. 72	Access to civil infrastructure
Art. 73 (Ex. Art. 12)	Access to and use of specific network facilities
Art. 74 (Ex. Art. 13)	Cost accounting
Art. 74 (Ex. Art. 13)	Price control

The absolute number of NRAs (including both EU and non-EU member states) that have applied a single obligation is reported considering that when the product is regulated at least the access obligation is imposed.



Figure 13 – Application obligations Art. 69-70-71 and 74 EEC⁷⁹

Source: BEREC RA Database 2025

Figure 13 shows that different sets of remedies have been applied to each product.

Most NRAs apply the whole set of remedies where SMP regulation is imposed on a specific product/market, and where an access obligation in combination with non-discrimination and transparency obligations are the most frequently applied remedies.

Focusing on regulatory accounting, accounting separation is the less commonly used remedy and often imposed together with the cost accounting obligation. Some NRAs consider it necessary to impose both obligations in order to ensure that robust regulatory accounting information is available for each product. This rationale is related to the fact that accounting separation is useful for vertically integrated undertakings by using cost models to supplement price control measures in order to prevent unfair cross-subsidies (e. g. if the result of the cost model is higher than the cost derived from the accounts of the SMP operator), and when the regulatory framework, in perspective, can become less strict.⁸⁰

In line with the past year, considering the regulated but “competitive” areas where geographical remedies differentiation is applied to some products (BE, CY, DK, EL, FR, IT, SI), the set of remedies that are applied in more competitive areas can be divided into three groups of NRAs: i) the price control obligation has been eliminated or more flexibility is granted, holding all other SMP

⁷⁹ Labels indicate relevant markets according to the 2014 Rec when needed. For LT cable operators are regulated only in the way of granting access: if an alternative operator has its own wholesale access products, it must provide access to other operators (SMP included) if required. Cable operators are regulated only on the basis of a legal act (Access granting rules).

⁸⁰ In IT the accounting separation obligation is going to be removed since the SMP operator fully separate. In DE there is no legal requirement for SMP operators to maintain (and audit) separate accounting systems for the SMP markets. However, pursuant to S. 34 of the German Telecommunications Act, the SMP operator has to submit separate accounts for rate approval which literally leads to having separate accounts for each regulated service.

remedies (SI, IT, FR⁸¹, EL); ii) only access and transparency obligations/publication of a reference offer have been maintained (BE); iii) all sets of remedies in the same geographical market have been completely eliminated (CY, DK).

The following figure 14 reports information that is relevant to determine the rationale for the remedies imposed in light of the geographical market/remedies declination.

Information is reported always in the same order of countries already grouped, as in previous sections. Separately, for the four groups of countries, and for each technology (copper, FTTC, FTTH), the average number of remedies applied by NRAs (transparency; obligation to publish a reference offer; non-discrimination; accounting separation; price control; cost accounting) to different access technologies is reported;⁸² for the same four groups of countries and technologies the extent of competitive areas and deregulated areas in terms of average households measure is also given⁸³ taking into account information on deregulated areas/more competitive areas previously reported.

From the averages evaluated in the three out of four groups (the last group, where deregulation has already taken place) we can see the following outcome, consistent with past year.

- ✓ In countries where FTTH is less available in terms of coverage and take-up and the technology mix is still prevalent on copper (second group), the regulation appears to be lighter on VHCN, i. e. using a more flexible approach with the aim to incentivise investment in VHCN. Regulation mainly addresses the copper/NGA network with a reduced average number of remedies applied to FTTH. In combination, the amount of areas that are deregulated/more competitive is lower in comparison to all other groups of countries. This is in line with the fact that generally – with the exception of Germany – investment in VHCN is mainly driven by the SMP operator as a first mover (CY, IE, EL, DE)⁸⁴
- ✓ In countries where the technology mix is more balanced (first group), the obligations on VHCN are widely imposed in comparison to the NGA network group. In such a group there is a wider deregulated/competitive area (generally increasing) in comparison to the previous group considered.
- ✓ In countries where the VHCN coverage and take up is at an advanced stage (third group) regulatory pressure is lower and regulation, when present, is focussed on VHCN as expected with a wider level of deregulated/competitive areas on average in comparison to what is measured in the previous group of countries.

In combination with the outlined information the corresponding main driver of competition is reported for the three main areas, according the following options:

- ✓ previous SMP operator's commitments;

⁸¹ In market 3b the obligation to publish a reference offer is removed in the “competitive areas”

⁸² The average for copper considers the sum of the remedies applied for ULL + market 3b legacy remedies; for FTTC considers the sum VULA FTTC+FTTC market 3b remedies; for FTTH, the sum VULA FTTH+FLLU+FSLU+FTTH market 3b and over cable, remedies.

⁸³ The average has been evaluated considering “0” where regulation is in charge without combining any geographical approach to regulation in market 1 and/or 3b. In case of geographical differentiation, the maximum % of households have been considered for products in access markets (local and central) as reported in Figure 8; “100 %” of flexibility where no regulation is present on the corresponding technology is considered. Only EU countries have been considered when calculating averages.

⁸⁴ The level of coverage and take-up is not static and different situations of member states grouped together can be due to a regulatory framework that it not updated yet, this means that the evolution of the competitive situation can modify the regulatory outcome; the updated information related to indicators used and reported in the present report refer to the current situation.

- ✓ co-investment;
- ✓ infrastructure competition via access to previous SMP civil infrastructure;
- ✓ 'symmetric' framework (i.e. Art. 61 (3) of the EECC);
- ✓ infrastructure competition through cable platform/own FTTH network;
- ✓ third party wholesale only operators;
- ✓ others (e. g. by commercial agreements of the previous SMP operator; or through reciprocal active/passive access (Open access model))

According to the relevant competitive/remedies framework see different business models by operators are observed. This is in line with the fact that the EECC provides a different tool set to address, through targeted application, the same connectivity objectives.

In line with past year's data, infrastructure competition is the main driver in deregulated or more competitive areas -the first option for almost all countries.

More relevant is the fact that SMP civil infrastructure access is much more frequent in the third group of countries where VHCN is already at an advanced stage: it is mentioned as a first or second option more often over the three potential areas (deregulated, more competitive, and regulated).

If we consider all countries in the first two groups (namely, i) countries where the technology mix is more balanced and ii) countries where the copper network is still relevant for NGA), we observe the following: in the first group SMP civil infrastructure access is mentioned only 2 times over 27 records (3*9 countries) with a score of 7 % while for the second group the score is 0 %.

In countries where the transition to VHCN is already at an advanced stage, competition in access can be more frequently driven by access to civil infrastructures where SMP regulation is applied, eventually in combination with access to symmetrical access services, or regulated VULA remedies. This is relevant in only few countries. In most of these countries, a model based on SMP FLLU plays a less important role to foster competition also due to technical non-availability even if imposed as a remedy (10 NRAs over 11).⁸⁵

⁸⁵ Only in LI a model based FLLU provided by the SMP operator is effectively relevant for competition.

Figure 14 – Combination remedies-geographical scope of regulation⁸⁶

	Regulatory pressure: Average remedies applied			Average level of deregulated areas			Main driver of competition (Deregulated Areas)	Main driver of competition (More competitive areas)	Main driver of competition (Regulated areas)
	copper	FTTC	FTTH	copper	FTTC	FTTH			
Countries where all remedies are applied on VHCN	(BE-1)						-infrastructure competition through cable platform/own FTTH network	-infrastructure competition through cable platform/own FTTH network	-SMP Regulation
	(HU-4)						-infrastructure competition through access SMP civil infrastructures;		-infrastructure competition through cable platform/own FTTH network
	(HR-)						-infrastructure competition through own FTTH network		
	(SI-)	[65-70%]	[65-70%]	[75-80%]	[25-30%]	[30-35%]	-infrastructure competition through cable platform/own FTTH network;		
	(SK-)	[70-75%]	[65-70%]	[65-70%]	[25-30%]	[30-35%]	-others (e.g. by commercial agreements of the previous SMP operator; through reciprocal active/passive access (Open access model))		
	(EE-3)	[80-85%]	[65-70%]	[75-80%]	[30-35%]	[30-35%]	-infrastructure competition through access to previous SMP civil infrastructures;		
							-by infrastructure competition through cable platform/own FTTH network	-by infrastructure competition through cable platform/own FTTH network	-by SMP regulation
	(FI->5)						-third party wholesale only operators;	-third party wholesale only operators;	-SMP regulation;
	(IT->5)						-infrastructure competition through cable platform/own FTTH network;	-SMP regulation	-third party wholesale only operator
							-competition from other infrastructures (including wireless technologies)		-SMP regulation
Countries where not all remedies are applied on VHCN	(CZ-3)								
	(DE-)								
	(EL-)								-SMP regulation
	(IE-4)	[50-55%]	[65-70%]	[35-40%]	[0-5%]	[10-15%]			
		[55-60%]	[70-75%]	[30-35%]	[0-5%]	[15-20%]			
		[80-85%]	[85-90%]	[35-40%]	[10-15%]	[10-15%]			-SMP regulation
	(CY-)							-by infrastructure competition through cable platform/own FTTH network	
	(LU-3)						-commercial agreements of previous SMP operator		
	(LV-2)						-infrastructure competition through mainly aerial fibre cables by alternative operators;		
	(MT-)						-infrastructure competition through access to previous SMP civil infrastructures		-infrastructure competition through cable platform/own FTTH network
Countries where small set of remedies are applied on FTTP	(NO-4)								
	(PL-)	[40-50%]	[20-25%]	[45-50%]	[35-40%]	[50-55%]	-infrastructure competition through cable platform/own FTTH network		
	(LT-)	[40-50%]	[20-25%]	[40-45%]	[50-55%]	[50-55%]			
	(PT-2)	[80-85%]	[40-45%]	[40-45%]	[50-55%]	[40-45%]	-infrastructure competition through access to previous SMP civil infrastructures.		
							-infrastructure competition through cable platform/own FTTH network;	-infrastructure competition through access SMP civil infrastructures;	-SMP regulation
	(DK-)						-infrastructure competition through cable platform/own FTTH network	-infrastructure competition through cable platform/own FTTH network	
	(FR-3)							-symmetric framework	-symmetric framework
	(LI-)								
	(SE-)								
	(RS-3)								-SMP regulation
Mainly deregulated market/ no remedies on market 1/ only Civil infrastructures	(BG-)						-infrastructure competition through cable platform/own FTTH network;		
							-infrastructure competition through access to previous SMP civil infrastructures;		
	(ES-)	0%	0%	0%	100%	100%	-previous SMP operator's commitments		
	(AT-)						-others (e.g. by commercial agreements of the SMP operator; or through reciprocal active/passive access (Open access model))		
	(NL-)						-infrastructure competition through cable platform/own FTTH network;		
	(RO-)						-infrastructure competition through cable platform/own FTTH network;		

Source: BEREC RA Database 2025

The survey outlines also that commercial agreements are quite common, in principle not only with the SMP operator, but also based on a reciprocal base within an Open access model where operators grant access to each other (AT, FI, SI). This is more frequent when the market is more fragmented and wholesale active services are more relevant with respect to the passive ones.

This year BEREC also collected information about the following descriptors of the VHCN competition:

- who is the first mover on VHCN investment;⁸⁷
- the most frequent situation in terms of the number of retail offers at the premises of VHCN services;
- the most frequent situation in terms of the type of retail offers at the premises of VHCN services as specified hereafter.

⁸⁶ In the label country the values of the number of operators that have >3 % of the market share is reported as described in previous section. In parentheses the information of previous year's report calculation of the main indicators.

⁸⁷ NRAs were asked to provide information about "Which operator is the first mover for VHCN deployment. The following options were given: i) Previous SMP; ii) OAO; iii) Cable operators; iv) Utilities; v) Previous SMP&OAO coordinate.

For the question “most frequent situation for the provision of VHCN” the following options were given, that strive to measure the “impact” of infrastructure competition in the corresponding retail market (from full replication to full wholesale provision):

- 1) Operators that build up own passive network (including co-investment) provide the retail service.
- 2) Operators that build up own passive network (including access to third party civil infrastructures or co-investment) provide the retail service.
- 3) Operators that build up own passive network (including access to third party civil infrastructures or co-investment) and few other local/national ISPs that are granted access to the infrastructure provide the retail service (this is selected when there is a restriction/exclusivity between the access provider (owner of the access network) and the retail ISP).
- 4) Operators that build up own passive network (including access to third party civil infrastructures or co-investment) and most other national ISPs that are granted access to the infrastructure provide the retail service (this is the case when there are no restrictions and an open access model is agreed between the access provider (owner of the access network) and the retail ISP).
- 5) The national and local ISP operators that use access to operators that build up the network on a wholesale only model.

Concerning the question “the most frequent situation for the provision of VHCN service where it is available”, options 1-3 are relevant in case retail competition is based mainly on infrastructure access:

Option 1: the alternative operators are replicating the full network with no access to third parties present/used;

Option 2: the network is replicated through access to civil infrastructure of a third-party operator (the SMP);

Option 3: some access to third party ISP is available;

Option 4: full access to third party ISP is provided without restrictions by vertical integrated operators on a voluntary/commercial basis (“open access”);

Option 5: the wholesale only model drives the access model for the retail competition and in this specific case the increase in the number of access seekers is enhanced by the competition model itself.

The comments and results of the survey are reported hereafter, keeping in mind the fact that the number of replies may not allow stable conclusions.

Option 4 has been chosen by (CZ, AT, NL): NRAs that have fully (AT and NL) or mostly (CZ: 90 %) deregulated the market 1/2020. In the latter case the SMP operator is no longer vertically integrated (since 2015) and competition conditions are affected by pressure from the mobile sector. Option 5 has been chosen by IT (under public consultation), where the vertical separation of the SMP operators allows infrastructure competition between network operators in wide areas (when no infrastructure competition is present the SMP operator is, in any case, no longer vertically integrated). In all these cases OAO are generally declared first mover for investment in VHCN⁸⁸.

Option 2 has been chosen by (HU, CY, LV, PT), Option 3 has been chosen by ES. In those cases, the SMP operator is also the first mover for investment, and retail competition is fully or partly driven by access to the civil infrastructure of the SMP operator.

Therefore, the information provided is consistent with the following evidence: when Options 4 and 5 are chosen the number of retail offers available to end users are higher ≥ 4 at least in deregulated and more competitive areas. This is consistent with the fact that a wholesale model is working to

⁸⁸ For NL the OAO Reggefiber was the first mover for FTTH that was acquired by the incumbent.

provide access to third parties in a profitable way in the market, as expected, favouring the new entrant at lower scale. This is mainly true for the first group of countries where the regulatory pressure appears to be more relevant.

This is consistent with the fact that when a working wholesale model with active services is present, based on commercial offers or an open access model, barriers to entry are reduced and more service competition is present (IT, CZ, AT, FI). That means that the number of operators that join the market is higher. At the same time the counterpart is a lower level of VHCN coverage due to a competitive model that favours the SMP operator to compete on an enhanced copper network in a faster way as a main technological choice.

One other element is that VHCN investments are mainly driven by OAO operators as first mover that also affect the welfare (in terms e. g. of lower prices) outcome (RO, CZ, IT, LV, AT).⁸⁹

From the survey outcome regarding geographical regulation, it emerges that no specific relation between retail outcome (option from 1 to 5 previously reported), and a specific regulatory regime seems to exist. In that sense it is possible to have both option 4 (NL, AT) and option 1 (RO) in a fully deregulated market.

Looking at the replies from countries in the third group, where the copper network is no longer relevant for the NGA services, the most common situation would be that access to civil infrastructure can play a major role (options 2 and 3) in combination with a more concentrated retail market compared to markets with competition based on mandated wholesale access due to a lower number of retail offers available, with respect to the previous cases mentioned.

The previous consideration is consistent with the fact that market and infrastructure conditions in the Member States are not homogeneous, and a flexible application of the available instruments by NRAs is needed to achieve the same regulatory outcome starting from different circumstances.⁹⁰

⁸⁹ <https://www.point-topic.com/post/european-broadband-operators-and-tariffs-benchmark-report-q2-2025> looking at the last report on benchmark of fixed retail prices done by Point Topic, median and average retail prices are lower in countries where the investment are frequently driven by OAO.

⁹⁰ BoR (24) 100 “BEREC’s input to the EC public consultation on the White Paper “How to master Europe’s digital infrastructure needs?”

Figure 15 Competitive outcome

Countries	Deregulated areas (first mover for investment - number of Retail Offers available)	More competitive areas (first mover for investment - number of Retail Offers available)	Less competitive areas (first mover for investment - number of Retail Offers available)	Most frequent retail condition
(BE-1)		SMP	SMP->5	
(HU-4)	CO- 2	--	CO- 1	2) The operators that build up the own passive network (including the one built up through access to third party civil infrastructures or co-investment) provide the retail service (in deregulated areas) 3) The operators that build up the own passive network (including the one built up through access to third party civil infrastructures or co-investment) and few other local/national ISPs that are granted access to these infrastructures provide the retail service (this case has to be chosen when there is a restriction/exclusivity between the access provider (owner of the access network) and the retail ISP) (in less competitive areas)
(SI-)	OAO- 3	OAO- 3		
(FI->5)	SMP&OAO_cord->5	SMP&OAO_cord->5	SMP&OAO_cord->5	
(IT->5)	OAO- >5	OAO- >5	OAO->5	5) The national and local ISP operators that use access to operators that build up the network on a wholesale only model.
(CZ-3)	OAO - >5		SMP- 3	4) The operators that build up the own passive network (including through access to third party civil infrastructures or co-investment) and most of other national ISPs that are granted access to these infrastructures provide the retail service (this case happens when there is no restriction and open access model is in use charge between the access provider (owner of the access network) and the retail ISP)
(CY-)		SMP- 4	SMP- 4	2) The operators that build up the own passive network (including the one built up through access to third party civil infrastructures or co-investment) provide the retail service
(LV-2)	OAO			2) The operators that build up the own passive network (including the one built up through access to third party civil infrastructures or co-investment) provide the retail service
(PT-2)	SMP- 3			2) The operators that build up the own passive network (including the one built up through access to third party civil infrastructures or co-investment) provide the retail service
(ES-)	SMP- 3			3) The operators that build up the own passive network (including the one built up through access to third party civil infrastructures or co-investment) and few other local/national ISPs that are granted access to these infrastructures provide the retail service (this case has to be chosen when there is a restriction/exclusivity between the access provider (owner of the access network) and the retail ISP)
(AT-)	OAO- >5			4) The operators that build up the own passive network (including through access to third party civil infrastructures or co-investment) and most of other national ISPs that are granted access to these infrastructures provide the retail service (this case happens when there is no restriction and open access model is in use charge between the access provider (owner of the access network) and the retail ISP)
(NL-)	SMP- 3			4) The operators that build up the own passive network (including through access to third party civil infrastructures or co-investment) and most of other national ISPs that are granted access to these infrastructures provide the retail service (this case happens when there is no restriction and open access model is in use charge between the access provider (owner of the access network) and the retail ISP)
(RO-)	OAO- 2			1) The operators that build up the own passive network (including the one with co-investment) provide the retail service

Source: BEREC RA Database 2025

The following comments have been reported from the NRAs that have replied to the previous questions:

	Comment received
(FI)	The number of alternative operators varies from city to city
(IT)	In wide area the retail competition is sustained by a wholesale infrastructure competition based on a third party wholesale only operator that build up a VHCN network as first mover. In wide areas where infrastructure competition is present there is a strong competition at retail and wholesale level. The retail market is characterized by a relevant number of operator that are able to access to the services in WLA and WCA market of the third party wholesale only operator, as well as, to the old SMP operator wholesale offer. Moreover the availability of the WCA offers provided by more than three operators (two wholesale infrastructure operators and one from third party wholesale offer provided through the use of wholesale input of third party), warrant strong flexibility and market counter power to all retail operators, that are able to experience a wide variety of wholesale offers (passive and actives) that provided full flexibilities in the corresponding retail fixed market. Since the 1 July 2024 the old SMP operator sold all the access network and a new wholesale only company become active in the wholesale fixed access market. Agcom opened a new market analysis that is under consultation about the new regulatory regime that should be applied in the new market context of wholesale only operators.
(CZ)	It should be considered that the situation is different in each geographical unit, depending mainly on availability of coverage by alternative operators.
(CY)	In practice the provision of VHCN offer to all households is offered through a Commercial Agreement between the SMP and all ANOs
(LV)	SMP operator uses own legacy and newly built passive infrastructure while alternative operators have deployed mainly areal cables
(AT)	VHCN/FTTB/H-Deployment: Often OAOs are first movers but in several cases also the incumbent. Users can choose between several ISPs which have access to the incumbent's network based on the commercial agreements or access to OAOs open access networks.
(NL)	In the Netherlands the copper incumbent has reached 65% of the total households with its new fibre network and has as goal to reach 75% to 80%. There are 2 additional bigger fibre alt nets of which only one also provides a retail offer. The cable incumbent with a 95% household coverage of docsis 3.1 (VHCN) is upgrading its network to docsis 4. The biggest access seeker has a fixed footprint of 10-15%. While the incumbent is on the national basis a first mover, many of the more competitive areas the OAOs (wholesale only) drove acceleration on fibre roll out. Early on one of the more aggressive OAO (Reggefibre) was acquired by the incumbent which slowed down fibre roll out.
(RO)	<p>In 2020, ANCOM upheld the deregulation of wholesale local access provided at a fixed location (market 3a) and wholesale central access provided at a fixed location for mass-market products (market 3b).</p> <p>Since the retail market for fixed broadband internet access services was found to be effectively competitive in the absence of ex ante regulation of wholesale access, ANCOM did not consider necessary to formally define the corresponding relevant wholesale markets. The relevant product market at retail level is the market for the provision of fixed broadband internet access services. The market comprises the supply of asymmetric broadband internet access services over copper, coaxial cable, UTP/FTP cable, optical fibre and wireless technologies, irrespective of the contention ratios or the transmission speeds, provided to end users – both businesses and natural persons, at fixed locations.</p> <p>The criteria based on which ANCOM concluded that the retail fixed broadband access market is effectively competitive are presented below:</p> <ul style="list-style-type: none"> • Market structure and its dynamics: Although having a market share of over 50%, RCS & RD S.A. is heavily challenged mainly by Telekom Romania Communications S.A., Orange România S.A., Digital Cable Systems S.A. and UPC Romania S.A. (currently, Vodafone Romania S.A.). The market volume is increasing constantly, for most of the important operators, being far from saturation. There is a favourable context for competition since commercial agreements for network access have been concluded between Orange România S.A. and Telekom Romania Communications S.A., respectively between Vodafone Romania S.A. and RCS & RD S.A.; • Barriers to entry and expansion: Barriers to entry and expansion have been significantly reduced over time and are expected to be lower over the time horizon of the analysis, especially in urban areas; • Switching costs: Switching costs are low. Typically, end-users are highly satisfied with their broadband services – quality, prices etc., as well as with the operators (as shown by the market research studies); • Product innovation and differentiation: There is a high degree of product innovation and differentiation evidenced by a wide range of products, various service speeds and various offers comprising competitive prices; • The tariffs for asymmetric internet access services provided at fixed location have stagnated between 2015 - 2019, but the quality of the services has improved considerably. • There are indirect competitive constraints from the mobile broadband market.

According to the new regulatory tools in the EECC, NRAs were asked to provide, in, information on the following: i) experience with co-investment agreements or co-operative deployment of fixed VHCN networks and if and how the regulatory framework has been affected by this (i.e. Art. 76-79 of the EECC); ii) if there are commercial wholesale agreements offered by SMP for VHCN/NGA with respect to the specific product/market and how they affect the regulatory context (i.e. Art. 68); iii) the imposition of functional separation (Art. 77 of the EECC); iv) if voluntary separation of the SMP operator has been presented and evaluated (Art. 78 of the EECC); v) if there are other wholesale only operators in the market and if and how those operators have affected the regulatory framework (i.e. Art. 80 of the EECC).

The replies from NRAs are limited, showing that the new provisions in the EECC still have a limited application.

A relevant case is FR, where the commercial offer in the form of co-investment is a core provision of the symmetric regulation outside the high-density areas. It prevented the imposition of remedies other than access to civil infrastructures. In other cases, the project of co-operative deployment can shape the corresponding regulatory context not ex-ante, but ex-post, increasing the areas where deregulation or a more flexible regulatory context can be applied (i.e. PT, IT).

In the table below the following replies are reported: 9 countries declared specific forms of co-operative deployment (AT, DE, FR, PT, IT, BE, CZ, ES, RS), largely in line with last year's report. In one case the agreement can involve the SMP operator or only OAO (PT); four other countries have stated that the SMP operator has specific commercial offers (SE, PL, FI, HU). For FR the co-investment agreement is an obligation in non-competitive areas in charge of the infrastructure operator in a symmetric framework obligation of access. In CZ co-investments involve the VULA FTTH products, whereas for all other countries co-operative deployment or commercial agreements are related to passive access such as FLLU. In case of PT and ES, SMP access to

civil infrastructure as a main instrument for competition, has incentivised the co-operative deployment of the networks and reciprocal access services. In all other cases co-operative deployments are still under consideration or not yet considered to have an impact on the corresponding regulatory framework, as reported in the following country cases.



	Are co-investment /co-operative deployment or commercial agreements present in the market?	Specific information	Impact on the regulatory framework
AT	Commercial agreements in all relevant areas (excluding state aid areas)	Wholesale access agreement concerning access to newly built VHCN infrastructure (no co-investment)	The commercial agreements (concluded for five years) were considered sufficient to deregulate markets 3a-b.
BE	Cooperative deployments (JVs) but no co-investment in the sense of Art. 76 EECC	Telenet/Orange FTTH and HFC commercial agreement	Still not considered
CZ	Yes, in all relevant areas (excluding state aid areas) (VULA) (co-investment or co-operative deployment)		
DE		Telekom Deutschland GmbH (SMP operator in market 3a/2014) established a joint venture (Glasfaser NordWest GmbH&Co.KG) with EWE AG in order to share investment and investment risks. The joint venture was approved by the national competition authority which imposed certain remedies. The joint-venture in principle is subject to markets 3a and 3b, but a new remedy decision was not adopted since its establishment. It also has to be noted that the new German Telecommunications Act transposing the EECC is not in force yet. Therefore, any regulatory considerations are still carried out under the old German Telecommunications Act.	No specific impact
ES	Yes, in less densely areas (co-operative deployment and commercial agreement)		
FI		SMP operators provide wholesale access on commercial basis outside of their SMP areas. There are also new fibre network operators who provide access products on commercial basis	Under consideration
FR	In less densely areas (co-investment)	Orange is designated SMP in the M1 2020 current market analysis decision, and also in the M1 2020 market analysis decision project (which is under public consultation). Orange offers commercial wholesale agreements in the form of co-investment in some areas. Orange offers such agreements to "fibre commercial operators" (retail operators) to comply with its obligations as "infrastructure operator" (opérateur d'infrastructure) that are provided for in the symmetric regulatory framework.	SMP remedies designed and provided for in market analysis decisions taking into account competition circumstances of the market and remains coherent with the symmetric framework.

	Are co-investment /co-operative deployment or commercial agreements present in the market?	Specific information	Impact on the regulatory framework
HU	In less densely areas (commercial agreements)	Yes, outside the regulated area for market 3b products the SMP operator provides national bitstream on commercial basis in deregulated areas (i.i. e. not in SMP position)	Still not considered
IT	In some principal cities	<p>A joint venture between the SMP operator and one main vertically integrated alternative operator happens between 2018 and 2021. During this first tranche of investments, the scope of intervention involved 29 main cities (about 15%- 20% of national households).</p> <p>In summary the co-investment takes the form of access in unbundled form (passive unbundling) to the secondary fibre optic network from the cabinet currently used to supply the SLU services over copper network up to the end user customer's side. Since 1 July 2024 the previous SMP operator is not any more vertically integrated.</p>	<p>Competition Authority authorized the Joint venture and next agreements after 2021.</p> <p>AGCOM has imposed obligation to the SMP operator to provide access to passive fibre services (Semi-GPON and Full GPON) in line with the technical products already available in the commercial agreements, at fair and reasonable price and all other set of remedies including the publication of a reference offer.</p>
PL	Yes, in all relevant areas (excluding state aid areas) (commercial agreement)		The new proposed market review (consultation until August 2025) intends to fully deregulate the market also in light of the fact that access services in WCA and WLA are acquired, where no state aid is present on commercial offer
PT	Yes, in all relevant areas (excluding state aid areas) (co-investment, cooperative deployment)	<p>In Portugal, several bilateral sharing agreements have been signed in less dense areas: for example, fixed network sharing between Altice and Vodafone Portugal in 2014, as well as between NOS and Vodafone at the end of 2017 and 2024. With this agreement around 3.9 million Portuguese homes will be connected through sharing agreements between the three main electronic communications operators.</p> <p>The co-investment agreement for the construction of a fibre optic network between Vodafone and NOS aimed to reach around 2.6 million homes. The agreement to develop and share a nationwide infrastructure thus enabled the two operators to make their commercial offers available under the shared network from 2018. With this partnership, NOS intended to exceed 4.4 million homes passed by the end of 2018 and make Gigabit Internet available to its customers. Vodafone, on the other hand, planned to reach 1.3 million more families and businesses, totalling around 4 million homes passed with NGA.</p>	Due to the commercial agreement signed by Altice (operator with SMP) with another operator in 2023, more civil parishes began to meet the coverage criteria that led to deregulation (FLLU and BTS_FTTH).

	Are co-investment /co-operative deployment or commercial agreements present in the market?	Specific information	Impact on the regulatory framework
		In July 2019, the same operators announced the establishment of autonomous agreements with DS Telecom - a regional wholesale-only (State-aid) operator - for access to the new fibre optic network to be built by this wholesale supplier, covering 1.2 million homes. The main aim of this agreement was to build a new fibre-optic network in areas of the national territory that were not covered at the time and were not subject to coverage plans under the agreement between Vodafone and NOS.	
RS	Yes, in all relevant areas (es. excluding state aid areas) (co-operative deployment as well as commercial agreement)	-	-
SE	Yes, in all areas. (commercial agreements)	SMP offers VHCN/fibre wholesale products according to regulation, but also 3b-like access to its fibre network based on commercial offer	

Functional separation

No NRA has imposed the application of Art. 77 of the EEC (functional separation) (former Art. 13-bis 2002/19/CE), but two NRAs have assessed a voluntary separation of the SMP (IT and CZ) (art. 78 of the EEC former Art. 13-ter 2002/19/EC).

In IT's last market review (2024) the incumbent operator proposed a legal separation project that could enhance the equivalence model in charge (functional separation): extension of full Eol implementation on civil infrastructure access and all other access services such as VULA-C services previously based on a partial Eol model. The regulatory outcome with respect to the implementation of this new enhanced Equivalence model resulted mainly in the relaxation of the replicability test in the public tender procedure, AGCOM has considered that the competitive impact of the legal separation model proposed was not relevant for the competitive outcome, as the control of the legally separated entity remained in charge of the SMP operator. Since the 1st of July 2024 the SMP operator is structurally separated and this project is analysed in a new market analysis taking into account the procedure of Art. 80 point 2 of the EEC. The Remedies framework established in the current market analysis decision applies to the wholesale structurally separated entity that is in charge of the wholesale provision until the new market analysis will be finalised. The condition of full separation with the creation of a wholesale entity not vertically integrated, has been verified and the actual effect of the full separation is the removal of the replicability test for retail offers of the previous SMP operator, as the old retail arm is no longer an SMP operator according to the actual provision of the current market analysis. A new market analysis is ongoing following Art. 80 point 2 of the EEC.⁹¹

In CZ the SMP operator is a legally separated entity. Voluntary separation took place in 2015, before the introduction of the Code, and therefore Article 80 of the Code could not be taken into account directly. Furthermore, the SMP operator is a legally separated entity (however not fully meeting all the criteria in Art. 80 point 1 of the EEC) and provides on its network only wholesale services. Obligation of Eol is in charge apart from non-discrimination, not imposed because it was implemented by a vertically separated SMP. All wholesale partners (incl. the former retail arm) are using the same ordering systems and service provision.

In DK the former incumbent TDC is in a process of voluntary functional separation, as last year.

The general role of wholesale only operators (SMP or not) has thus been described by NRAs:

(BE) A pilot project by a utility provider based on FTTH LLU, with a wholesale-only model, is ongoing with a very limited footprint. The deployment has ended after an agreement with a cable SMP operator.

(HR) A few smaller operators provide wholesale services in a limited area; therefore, they don't impact wholesale competition. In Market 2 there are several competitors at wholesale level competing with the SMP which may be very relevant with respect to the competitive outcome. This has been taken into account in the new market analysis that was adopted by HAKOM in June 2025. The new market review has shown that effective competition in the market is present, specifically in urban areas with more business customers.

⁹¹ The regulatory framework proposed will maintain a geographical approach to regulation (SMP and non SMP areas) and a general fair and reasonable pricing approach is proposed (including non-discrimination), in SMP areas, for all products in market 1. In a sub-group of municipalities more competitive areas in the SMP area, the removal of fair and reasonable pricing obligations is proposed. Since the beginning of 2025 a proceeding opened by the NCA on the compatibility of the MSA, is under investigation with the objective to remove some clauses that are potentially detrimental to competition.

(IT) The presence of a national wholesale only operator is having a very relevant impact on the competitive outcome in the market, allowing a competition model based on infrastructure in more densely areas since 2018. AGCOM has chosen to apply a detailed geographical regulation, in principle updating competitive areas on an annual basis. The previous incumbent operator has been fully separated since 1st July 2024; a new consultation has been launched to assess whether competition conditions are fully based on wholesale only operators that provide access services to retail operators. The new market analysis will address the new condition of the previous SMP operator taking into account art. 80-2 provisions.

(PT) There are 2 regional wholesale-only (State-aid) operators with FTTH networks in areas where the SMP operator has a smaller FTTH footprint. The presence of the two regional wholesale-only operators influenced the analysis of Market 1 conducted by ANACOM in 2023. Their presence enlarged the footprint of the retail operators, leading to an increase in the number of civil municipalities meeting the coverage criteria that resulted in deregulation.

3. Outline of the Results for Regulatory Accounting

3.1 Regulatory Accounting methodologies (definitions)

In this section a focus on the regulatory accounting methodologies is given. When useful, the information on regulatory accounting methodologies has been integrated using information on other elements which are considered to have a relevant impact on pricing and regulatory accounting. These are instruments which are provided by the NDCM Recommendation⁹² as adapted from the Gigabit Recommendation⁹³ such as: i) the availability of an economic replicability test (ERT); ii) the imposition of non-discrimination obligations including the technical replicability test; iii) the adoption of the pricing flexibility principle in combination with anchor pricing.

With reference to regulatory accounting methodologies, a set of pre-defined options has been used in order to improve data comparability while providing a more detailed picture over the years. Information is related to non-competitive areas or a national geographical market, (where available and relevant information on more competitive areas is provided).

⁹² Commission Recommendation 2013/466/EU on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment.

⁹³ Commission Recommendation 2024/539/EU on the regulatory promotion of gigabit connectivity.

Price control

For the price control methodology, the following categories and sub categories have been considered (Figure 16).

Figure 16 - Price control categories and sub-categories

Price control Main category	Subcategory 1 Cost orientation	Subcategory 2 Retail minus	Subcategory 3 Benchmarking
Cost_Orientation	Cost orientation alone	Ex - ante retail traditional MS test	Benchmarking in compliance with Recommendation of 11 Sept 2013 (access market)
Retail_minus	Price cap alone	Ex - ante wholesale MS test	
Benchmarking		ERT (Economic Replicability Test)	
Others/Combination		Fair and reasonable pricing	
No price control/Price Flexibility		Retail minus	

Source: BEREC RA Database 2025

The subcategory “price cap” is included in the subcategory “cost orientation” as it is derived from a cost computation.

For the purpose of this report, the two sub-categories, Economic Replicability Test (ERT) and Margin Squeeze Test (MST) are defined as follows: ERT is a “lighter” test (in comparison to MST) providing more price flexibility to the SMP operator (according to the relevant provisions of the Commission NDCM Recommendation to promote competition and enhancing the broadband investment environment 2013/466/EU). The same concept of ERT is included in the gigabit Recommendation 2024/539/EU.⁹⁴ The traditional ex ante MST currently applied by NRAs serves mainly as a complementary tool to price control. It defines a strict level of parameters within which NRAs can presume that alternative operators have enough scope for fair competition, i. e. if these limits are passed a margin squeeze is found (i. e. the test failed) and the price setting of the SMP operator can be considered anti-competitive.

Allocation Methodologies

With reference to the cost allocation methodology used for regulatory decisions, the following categories and sub categories have been set (Figure 17).

⁹⁴ The Gigabit Recommendation entered into force on 24th February of 2024. The legal basis of the information provided are based on NDCM Recommendation when relevant, as only one NRA has explicitly founded obligation on pricing issue on the legal basis of the Gigabit Recommendation at the time of data collection for the present report.

Figure 17 - Allocation methodology: categories and sub categories

Main categories	Sub-categories
LR_A_IC	TD-LR(A)IC+
	BU-LR(A)IC+
LRIC	Pure LRIC
	TD-LRIC
	BU-LRIC
FDC	

Source: BEREC RA Database 2025

The LR(A)IC and LRIC categories refer to a modelling approach used for estimating the cost of the services in both cases; FDC refers to the fact that the cost of the services has been determined taking into account the results of the regulatory accounting system of incumbent operators. LR(A)IC and LRIC categories have been differentiated for the inclusion of common and joint costs in the final cost of services. It is expected that if an NRA chooses LR(A)IC or LRIC categories a bottom up or a top-down approach is in use.

For a bottom-up asset base we refer to the fact that the asset and operative costs included in the service cost calculation are taken from a theoretical network model. In a top down approach, the asset and/or operating cost information is taken directly from the incumbent operator's cost accounting data, thus incorporating the efficiency level of the incumbent operator in providing the services⁹⁵.

Differences between FDC and LR(A)IC or LRIC are mainly related to the fact that in the first case the prices are determined as a result of the incumbent operator efficiency, eventually using some adjustments prescribed by the NRAs, while in the other cases a modelling approach is used by the NRAs to address the service calculation using as prevalent methodology an allocation method not fully dependent on the SMP case.

Cost base

For the used cost base, the traditional categories of HCA and CCA have been identified (Figure 18).

Figure 18 - Cost base categories and sub categories

Cost base
HCA
CCA

Source: BEREC RA Database 2025

⁹⁵ The replies to the questionnaire refer to the "main" allocation methodology in use for each product market, even if the whole approach for service calculation can be a mix of methodologies that can refer to more than one category or sub-category in the final decision.

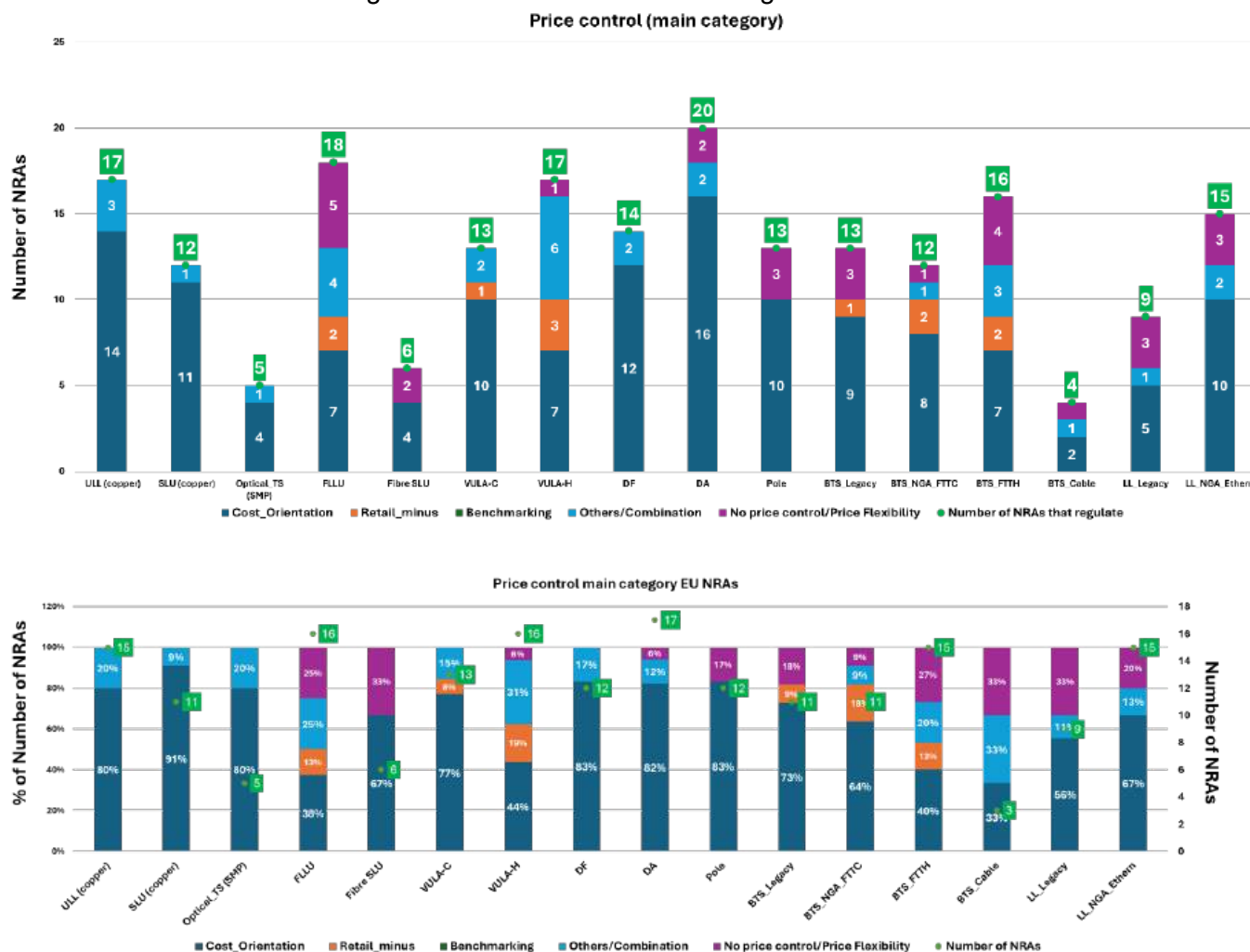
3.2 Price control methods

This section gives an overview of the price control methods used by NRAs in 2025 to regulate markets and products according to the main categories and sub-categories, which have been previously reported.

The absolute number of main categories chosen by all NRAs that replied to the questionnaire and that regulate the specific product market. The percentage of the main category for the price control method in use taking into account only NRAs that regulate the market is given for EU countries alone (in the appendix more detailed information per country is given).

In terms of main categories of price control, cost orientation remains the most frequently used method, and it has been applied mainly to legacy products and duct access (Figure 19). Retail minus is sometimes applied to VULA FTTH products or in market 3b. Looking at EU NRAs about 19 % (in reduction from 20% last year) of NRAs that regulate VULA FTTH declared Retail minus whereas 44 % of the 16 NRAs that regulate the corresponding product use cost orientation. This trend is due to the fact that deregulation happens from an ERT approach.

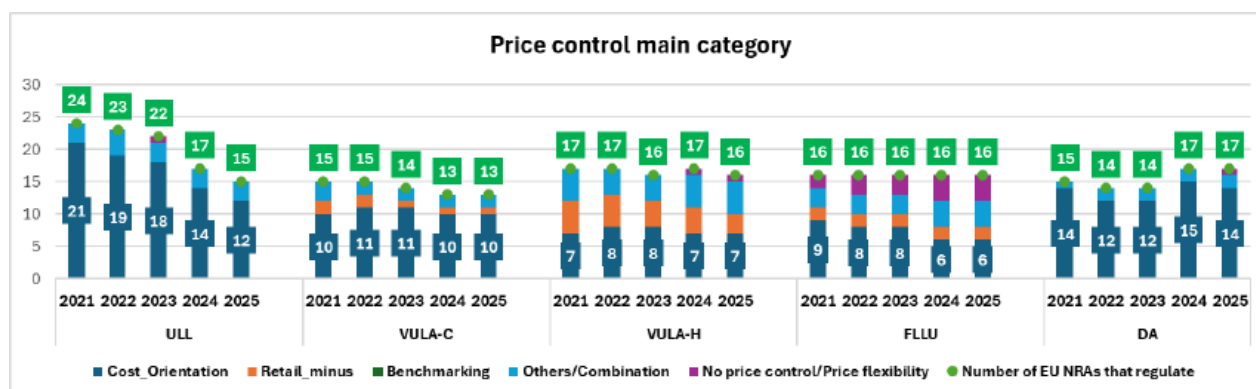
Figure 19 - Price control main categories



Source: BEREC RA Database 2025

In Figure 20 the time series for EU NRAs have been considered over the last five years, starting from 2021.⁹⁶

Figure 20 - Price control main categories time series



Source: BEREC RA Database 2025

The recorded changes in the five years are summarized as follows: there are only very few changes of pricing approach in market 1/2020, and changes are mainly due to the deregulation of some products (AT, DK, IE, LV, PT, SE, EE, ES)⁹⁷ or due to the fact that the regulatory period is no longer relevant. Therefore, a price control obligation as a general remedy, even if imposed, has not been implemented for some products. The situation is quite stable and even if the number of NRAs that regulate the markets/products are generally decreasing, cost orientation (strict cost orientation or price cap) is still relevant for some NRAs that maintain the regulation of the product/market. For VHCN it is more frequent that full deregulation or full flexibility is derived from an ERT price control application rather than from cost orientation.

Figure 21 - Price control major changes 2022-2025 (market 1/2020 main categories)⁹⁸

Product	2025	2024	2023	2022
ULL	ES (removed regulation from CO), EE (removed regulation from CO)	IE (removed regulation from CO), LV (removed regulation from CO), PT (removed regulation from CO), MT (removed regulation), SE (removed regulation from CO)	AT ⁹⁹ (removed regulation from Other) MT (removed price control from cost orientation as not anymore relevant)	DK (removed regulation from cost orientation), SI (Started to regulate Other/ from cost orientation)
VULA FTTC	-	LV (removed regulation from CO)	AT (removed regulation from Retail minus)	FI (introduced cost orientation from other combination)
VULA FTTH	ES (removed regulation from Retail minus/ERT,)		AT (removed regulation from retail minus)	FI (introduced cost orientation from other combination)
FLLU	-	DE (removed regulation from CO), LV (from CO to Other combination)		DK (removed cost orientation with no price control),
DA	BG (Decision not in force due to Court appeal ongoing from CO)	PL (reintroduced the regulation of DA with CO); HR (reintroduced CO); BG (introduced CO)	HR (no more CO)	SI (Started to regulate Other/ from cost orientation) PL (removed regulation)

Source: BEREC RA Database 2025

⁹⁶ Only EU NRAs have been considered. The time series is adjusted in case a more accurate replay is provided.

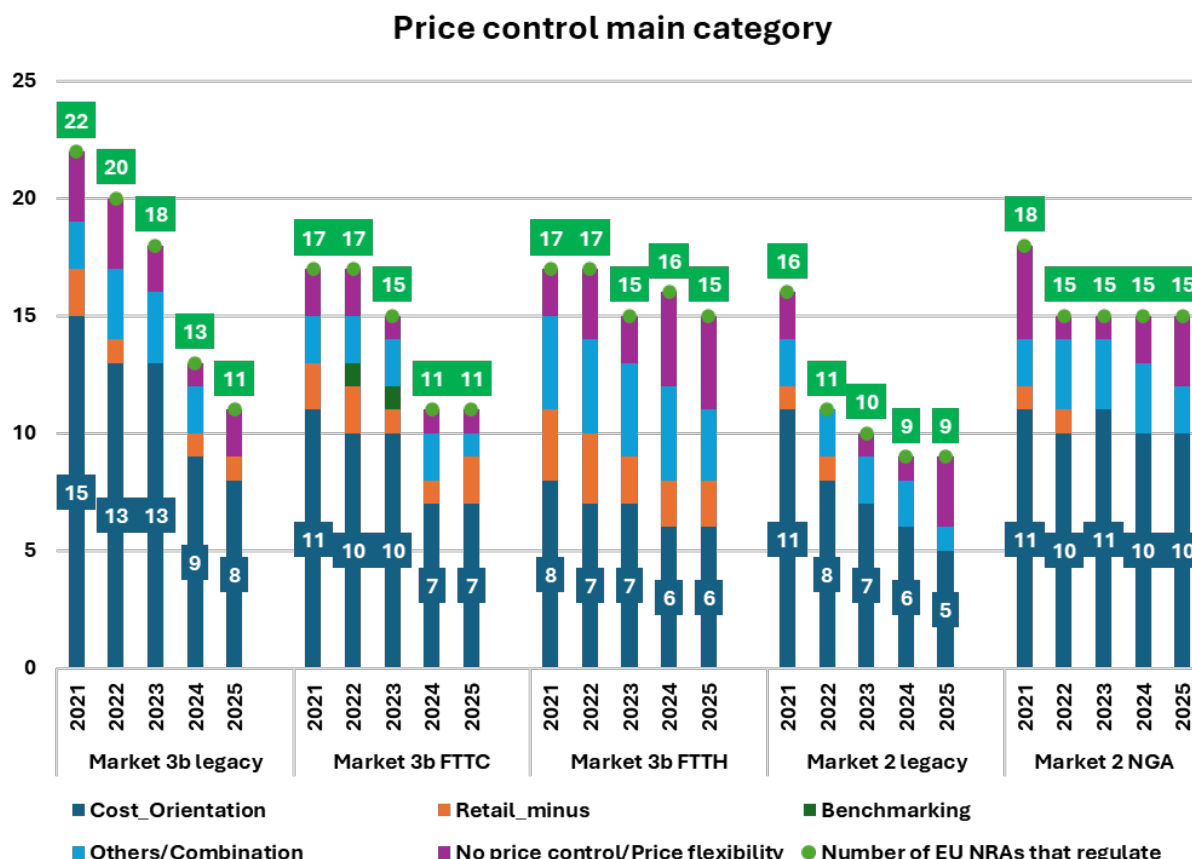
⁹⁷ MT in a draft decision will remove the ERT obligation from VULA-H.

⁹⁸ The historical series have been adjusted where a misspecification or material errors incurred along the years. Therefore, the last reported values are the best indicators for the analysis. The year reported refers to the corresponding RA database updated (inclusion/exclusion) that can differ from the year of the NRA decision.

⁹⁹ AT had taken a decision in 2022. The RA report 2023 is the first to report this new situation.

Considering the products in market 3b/2014 and 2/2020, as reported in Figure 22, cost orientation is reducing year by year. A decrease of regulatory obligations for market 3b/2014 over legacy network and a constant number of NRAs that implement an FTTH price control is shown. Over the years, a decrease in the application of cost orientation is recorded. An evident decrease of price control obligation is seen in market 2/2020 legacy network and for bitstream over legacy and FTTC technology.

Figure 22 - Price control main categories time series (market 3b/2014 and 2/2020)



Source: BEREC RA Database 2025

NRAs have been ranked by the remedy set imposed: from a full range of all products remedies in market 1 to complete deregulation. Cost orientation is more frequent where a legacy network based on copper is relevant for NGA products (e. g. FTTC). This corresponds to a stronger interrelation between prices for old and new technology, since there is a stronger substitution effect with respect to the legacy copper product. As shown before, “cost orientation” is not decreasing for NGA products and might play a role in migration to VHCN.

The application of cost orientation for FTTH products has the objective to prevent anti-competitive behaviour and discrimination of end-users and competitors as a result of the SMP’s pricing strategy; it provides a neutral make-or-buy signal to encourage investment by all operators in new FTTH networks. In the absence of this intermediate step, the “wait and see” option is less relevant for the SMP operator, because no intermediate steps like FTTC for VHCN transition are present. In such

cases it seems to be more popular to apply a more flexible approach to FTTH regulation, via the application of ERT, but mostly by not applying cost orientation.

In case the intermediate technology (FTTC) is present and is a competitive constraint, the cost orientation of VHCN is an option to incentivise take-up and migration to VHCN.

Analysing the replies to main categories of price control of the four groups of NRAs for copper ULL, VULA –FTTC and FLLU /VULA over FTTH this assertion can be confirmed.¹⁰⁰ Figure 22 shows the average percentage of replies for each category of price control in each group of countries and technologies. Cost orientation (also for FTTH) is more frequent in countries in the first two groups, specifically where FTTC (or the full copper network) is still relevant for NGA deployment. This situation should also be considered in light of investment commitment to VHCN investments as well as on the first mover for investment. A cost-oriented price for VHCN can address a classical hold-up problem giving certainty to investors and overcome a strategic wholesale price strategy of the SMP operator trying to reduce investment incentives of OAO operators (i. e. IT, HU, FI).

This result is not in contrast with the one reported in figure 14 (Combination remedies-geographical scope of regulation) where the amount of obligations imposed on the respective technologies are calculated with respect to the maximum number of obligations applied to all markets/products.

As shown before, price flexibility is used by NRAs where availability of effective retail price constraints provided by alternative infrastructures is present, as infrastructure competition is considered the main driver of competition in deregulated areas and in more competitive areas. Price flexibility is also more common in countries where full SMP obligations are still in force in non-competitive areas. In the third group of countries where VHCN is already at an advanced stage, cost orientation is also less common in less competitive areas.

¹⁰⁰ The averages exclude non-EU countries.

Figure 23 – relation of price control main categories and general group of NRAs¹⁰¹

	ULL			VULA/FTTC			VULA/FTTH/LLU			LLU		
	Cost_Orient	Retail_min	Others/Co	Cost_Orient	Retail_min	Others/Co	Cost_Orient	Retail_min	Others/Co	Cost_Orient	Retail_min	Others/Co
Countries where all remedies are applied on VHCN	(BE-1)											
	(HU-4)											
	(HR-)											
	(SI-)											
	(SK-)	56%	0%	33%	67%	11%	22%	56%	11%	33%	44%	11%
	(SE-3)	(67%)	(0%)	(33%)	(67%)	(11%)	(22%)	(56%)	(11%)	(22%)	(44%)	(11%)
	(FI->5)											
Countries where not all remedies are applied on VHCN	(IT->5)											
	(CZ-3)											
	(DE-)											
	(EL-)	75%	0%	0%	100%	0%	0%	50%	0%	25%	0%	0%
Countries where small set of remedies are applied on FTTP	(IE-4)	(75%)	(0%)	(0%)	(100%)	(0%)	(0%)	(50%)	(0%)	(25%)	(0%)	(0%)
	(CY-)											
	(LU-3)											
	(LV-2)											
	(NO-4)											
Mainly deregulated market/ no remedies on market 1/ only Civil infrastructures	(MT-)											
	(PL-)	44%	0%	0%	0%	0%	0%	22%	22%	11%	22%	11%
	(LT-)	(50%)	(0%)	(0%)	(0%)	(0%)	(0%)	(20%)	(20%)	(10%)	(20%)	(0%)
	(PT-2)											
	(DK-)											
	(FR-3)											
	(LI-)											
	(SE-)											
	(RS-3)											
	(BG-)											
	(ES-)											
	(AT-)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	(NL-)											
	(RO-)											

Competition condition still at an intermediate stage, NGA provided by a more technology mix (cable and FTTP, FTTC) copper network still present

Copper over FTTC is still a relevant competitive constraint, lower level of FTTP coverage and take up

FTTP is wider spread also with respect to cable; competition condition are in more advantage stage; copper network no relevant for NGA deployment

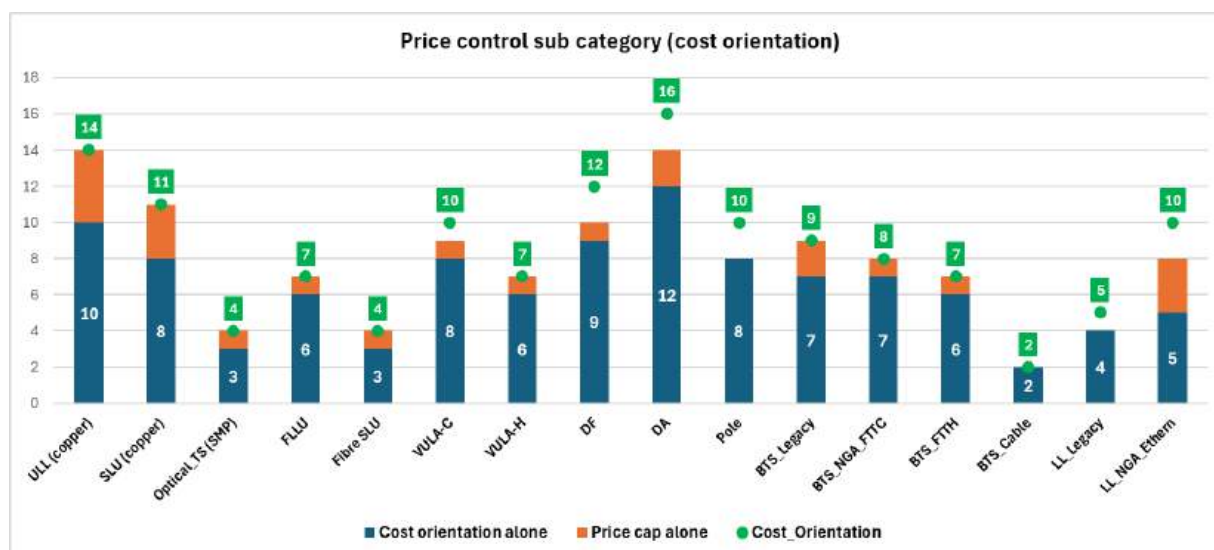
Cable competition is more relevant in combination with high level of FTTP coverage and take-up, competition condition are in a more advantage stage

Source: BEREC RA Database 2025

In the sub-categories, Figure 24 highlights that cost orientation alone is still the most frequent price control method used by NRAs, especially in case of civil infrastructures access.

¹⁰¹ In parenthesis the values of the last year have been reported in homogenous terms (if necessary, the whole time series is reviewed).

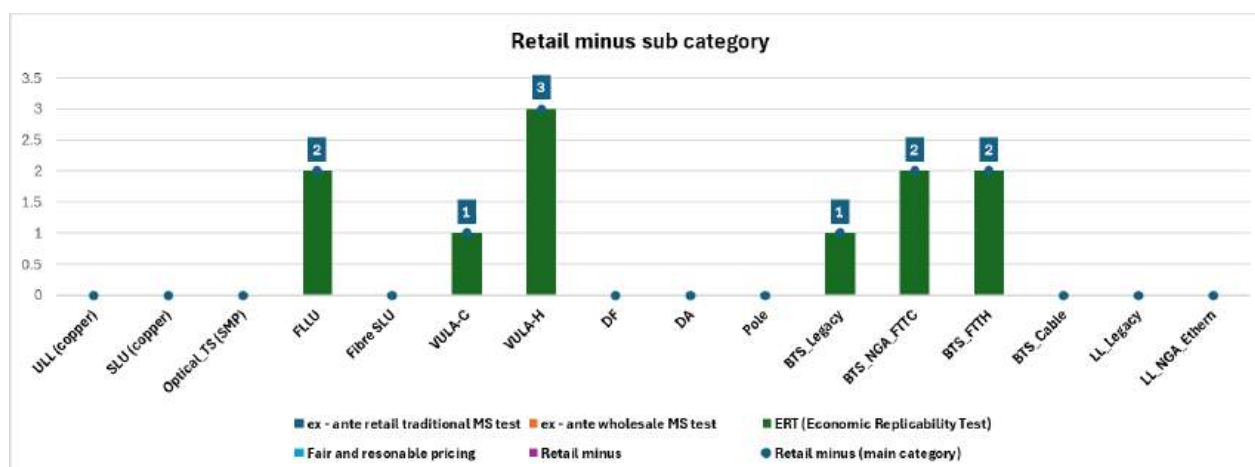
Figure 24 - Price control sub category Cost Orientation



Source: BEREC RA Database 2025

The ERT price control methodology has been mainly applied to NGA/VHCN products in line with the Commission Recommendation on Non-Discrimination and Costing Methodologies and the Gigabit Recommendation, it is relevant as a general approach for price control obligation.¹⁰²

Figure 25 - Price control via ERT sub categories

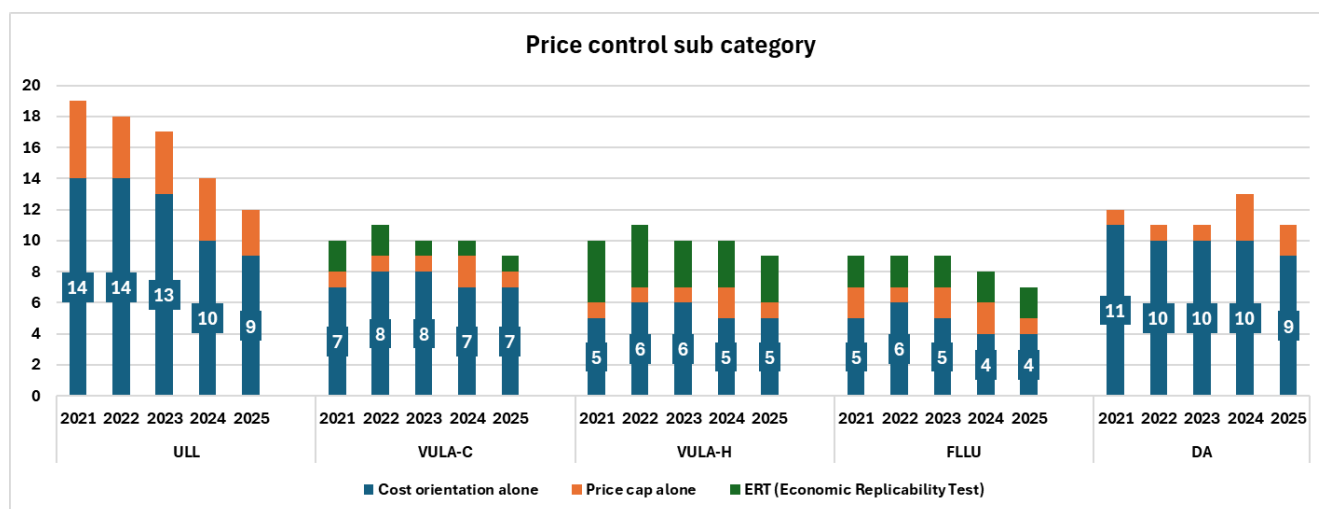


Source: BEREC RA Database 2025

Figure 25 shows the evolution of the price control sub-categories over time for EU countries for products in access markets within the last 5 years. The choice of price cap instead of cost orientation alone is more frequent when the legacy network is less relevant for NGA services (i.e. FTTC).

¹⁰² EE in its new market analysis and remedies review of 2025 is planning to implement ERT, even if in the meantime cost orientation based on top down FDC Historical cost has been applied as costing methodology.

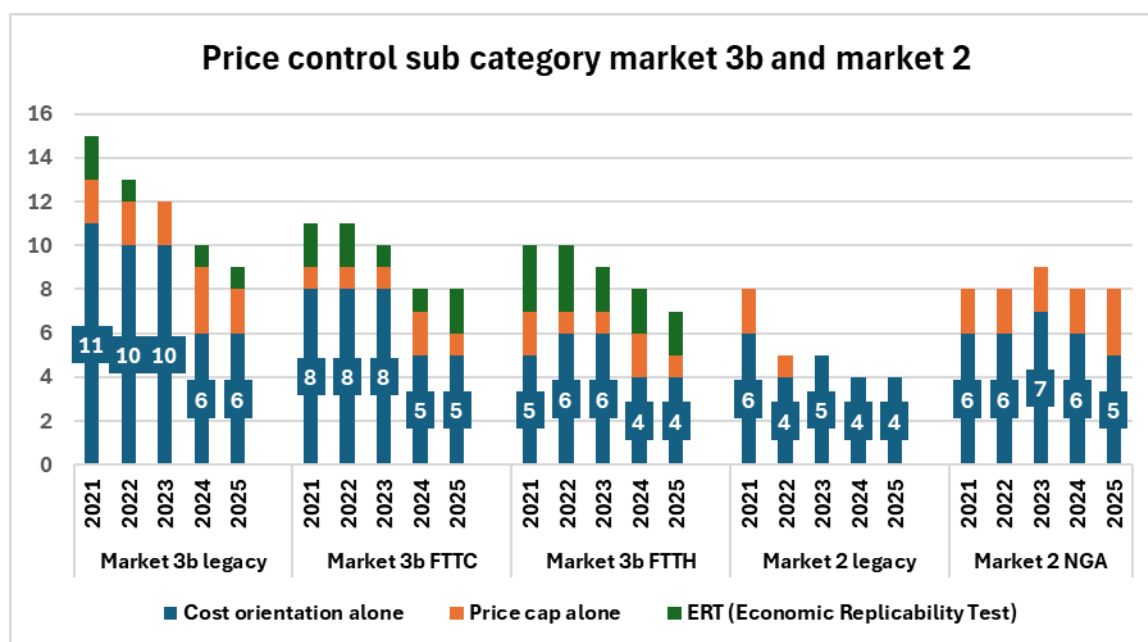
Figure 26 - Price control sub categories market 1/2020



Source: BEREC RA Database 2025

Looking at WCA and leased lines (market 3b/2014 and 2/2020) the following evolution can be observed, where the reduction is mainly related to the corresponding deregulation of the product market.

Figure 27 - Price control sub categories market 3b/2014 and 2/2020



The following part provides more information on the concept of price flexibility of the VHCN wholesale product, which is explicitly encouraged by the Gigabit Recommendation when some specific conditions are met.

Continuing from past year's report, price flexibility has been analysed following the provision of the recital 193 of the EECC.¹⁰³

The Gigabit Recommendation lists the conditions for not imposing cost orientation on the specific VHCN wholesale input. One of the options is the role of a regulated anchor service that satisfies points 41-45 of the Gigabit Recommendation (i. e. the anchor is a cost-oriented wholesale access product, which constrains VHCN prices in such a way that retail services cannot be priced independently from this wholesale input. The anchor can be a combination of copper and VHCN based products or a portfolio of products¹⁰⁴).

Thus, NRAs were asked to reply to these questions:

- In case of “no cost orientation/price flexibility”, did the regulatory decision take into account the presence of a regulated anchor?
- if yes, which is the product considered as anchor (providing information on the technical characteristics)?
- Did the price flexibility allow the SMP to apply lower prices than the anchor legacy product?
- In case of price flexibility did SMP commitments resulting from the geographic survey to cover a significant part of the area within the market review period play a role (eventually supported by effective access agreements to the civil engineering infrastructures controlled by the SMP operator)?
- In case flexibility is not allowed by regulation, have NRAs defined a regulated anchor? If not, for what reasons?

Independently from the legal basis of the Gigabit Recommendation, several replies help to focus on NRAs approach to regulatory flexibility. Replies are no different from past year's report.

A regulated anchor has been considered by NRAs where copper is still relevant for NGA services (IE, LU, DE)¹⁰⁵.

In IE the anchor product is the VULA over FTTC, based on cost-oriented prices based on BU-LRIC+ methodology. The price flexibility principle consents to apply a lower price to VHCN products in comparison to the anchor legacy product. To operate this mechanism, the SMP operator needs to provide evidence which will be subject to review for approval by ComReg. The FTTC based

¹⁰³ “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. 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, 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”.

¹⁰⁴ In case a copper-based anchor would no longer exercise a demonstrable retail price constraint, and in the absence of a demonstrable price constraint due to the existence of alternative networks or regulated access to civil engineering infrastructures, the NRA should define an entry level regulated product provided over VHCN in the relevant wholesale market that can be a virtually or actively regulated product, or both.

¹⁰⁵ In SE the copper ULL has been deregulated since 2023, but prior to that it was considered an anchor for price flexibility in combination with an ERT price control approach for FLLU. For ES until the full deregulation of WLA and WCA markets in July 2025, the anchor price was also provided over the FTTP network via an active VULA product up to 30 Mbit/s; the cost-oriented price for this anchor was a constraint on ULL price equal to 8.61 Euro/month. However, in ES there is still an ERT to control the prices of a business wholesale FTTH service in the market 2/2020.

anchor always acts as the price floor so, if the incumbent is given permission to lower the VHCN price below the current FTTC anchor price, it will also have to lower the FTTC price. The price control allows for the possibility of the incumbent seeking to lower the price floor. To operate this mechanism, the incumbent needs to provide evidence which will be subject to review, and the granting of approval by ComReg. Further in its retail FTTP offers (bundles and standalone), the SMP operator is subject to an obligation to exclude margin squeeze.

In case of LU, the copper LLU is currently considered an anchor for setting the price of VHCN product (FLLU/ VULA-H) by the SMP operator, and the prices of VHCN products have to pass an economic replicability test. However, following the recent market review, ILR considers this anchor no longer relevant especially given the ongoing migration from copper to fibre networks. Thus, ILR has proposed removing pricing flexibility by introducing stricter price control remedies.¹⁰⁶

In DE the anchor product is a VULA copper-based product that provides 100 Mbps speed, still the dominant product in the market. This product is an anchor both for the VHCN network on WLA and WCA market/product as it is the most widely used wholesale product and its price is cost orientated.

In case of DE and in the past for ES, the decision has been supported by a general commitment on the investment plan for the VHCN deployment of the SMP operator.

In relation to the question why price flexibility has not been allowed as a general principle even if an anchor pricing approach has been addressed, the case of IT has been reported. The competitive framework in the Italian market sees an emerging infrastructure competition, exercised by a wholesale only operator that has made specific investments in VHCN and acted as a first mover - not by the SMP operator. This is contrary to what happened in some other European countries.¹⁰⁷

The non-discrimination framework in the context of price control

The ERT (or the traditional margin squeeze test) has a two-folded nature: it can be used as a price control remedy (Art. 13 of the AD, now Art. 74 of the EECC), or as a non-discrimination remedy (Art. 10 of the AD, now Art. 70 of the EECC). This is in line with the principle that the ERT must be undertaken by NRAs in light of the regulatory objective to promote sustainable competition and efficient investment in new VHCN infrastructure - it must be based on the specific competitive concern identified in the market analysis. However, also a different case exists: Art. 13 AD/Art. 74 of the EECC is imposed in some cases even if “No price control” is declared as a price control method. In this case, Art. 13 AD is required as a legal basis to ensure that the cost orientation obligation may be tested ex-post without an explicit imposition of an ex-ante price control

¹⁰⁶ For further information, see case LU/2025/2590-91 of September 2025.

¹⁰⁷ In this context even if the FTTC product could be, in the current regulatory cycle, an anchor product, thus allowing in principle the conditions for establishing the flexibility over the VULA FTTH prices, flexibility has been considered potentially discouraging the adoption of VHCN and new investments. In particular, in areas where the alternative wholesale operator is investing -, and that for this reason are not yet considered to be contestable Municipalities, where instead the flexibility is allowed – the price flexibility on VULA-H prices would likely lead to discount, possibly affecting renegotiations of actual contracts with alternative wholesale operator by access seekers. This would put the investments of the alternative wholesale-only operator at risk and would slow down VHCN take-up. At the same time the SMP operator is allowed to present discount that should be approved by the NRA. On the other side, in the areas where only the SMP operator is present with its own VHCN network, the flexibility could translate into an increase in wholesale prices, which in turn would discourage the take-up of services on the FTTH network, also in light of the lack of greater willingness of consumers to pay for higher quality services. AGCOM has allowed in every case price flexibility on passive FLLU services. This is the outcome of the last market review ended in 2024, but the SMP operator has been structurally separated since 1st July 2024 and a new market review is on-going where the regulatory framework will be reviewed. Considering the new provision of Art. 80 of the EECC price flexibility conditioned to approval process in the SMP areas is under discussion.

methodology; otherwise, the general imposition of Art. 13 AD as legal basis is a tool to enforce the non-discrimination obligation and to ensure the availability of financial information on the regulated activity with the objective to provide certainty. The statement of the NDCM Recommendation on the ERT for NGA products as the alternative for ex ante price control has not been fully applied, as highlighted in the previous paragraph.

The new framework of the Gigabit Recommendation considers the application of the ERT test as an option to overcome price control for VHCN wholesale products. In point 38 (c) it mentions that one of the conditions for price flexibility is that: *“The NRA imposes obligations relating to the economic replicability test, applied in accordance with points 46 and 47 of this Recommendation”*;

Summing up, margin squeeze tests have been used mainly as a complementary measure for a price control method within the Article ex-13 AD legal framework. The given options were (see BoR (14) 190): i) ex-ante margin squeeze test; ii) ERT (Economic Replicability Test); iii) ex-post retail margin squeeze test. A combination of price control and a retail margin squeeze test/ERT test has been applied only for specific access products (e. g. the flagship wholesale products where a retail margin squeeze test has been applied). Almost all NRAs that declared to apply a margin squeeze test (ex-ante or ex-post), use the test in combination with a price control method applied, when cost orientation is present or in combination with price control or as instrument for price control as reported in previous sections (retail minus category).

SE applies an ex-ante test for one product without declaring a price control method and an ex-ante ERT test for FLLU products in combination with EoI.

ES for market 2/2020 NGA product considers applying a test on an ex-post basis (initiative of the NRA or following a dispute issued by an operator); this test (the business replicability test, Business Fibre product) is focused on the tailor-made bundled offers that address business customers and take into account the various wholesale access services that an alternative efficient operator would require to provide such a personalised offer. With regard to the terminating segment for leased lines, (ORLA Ethernet), a retail minus approach is applied.

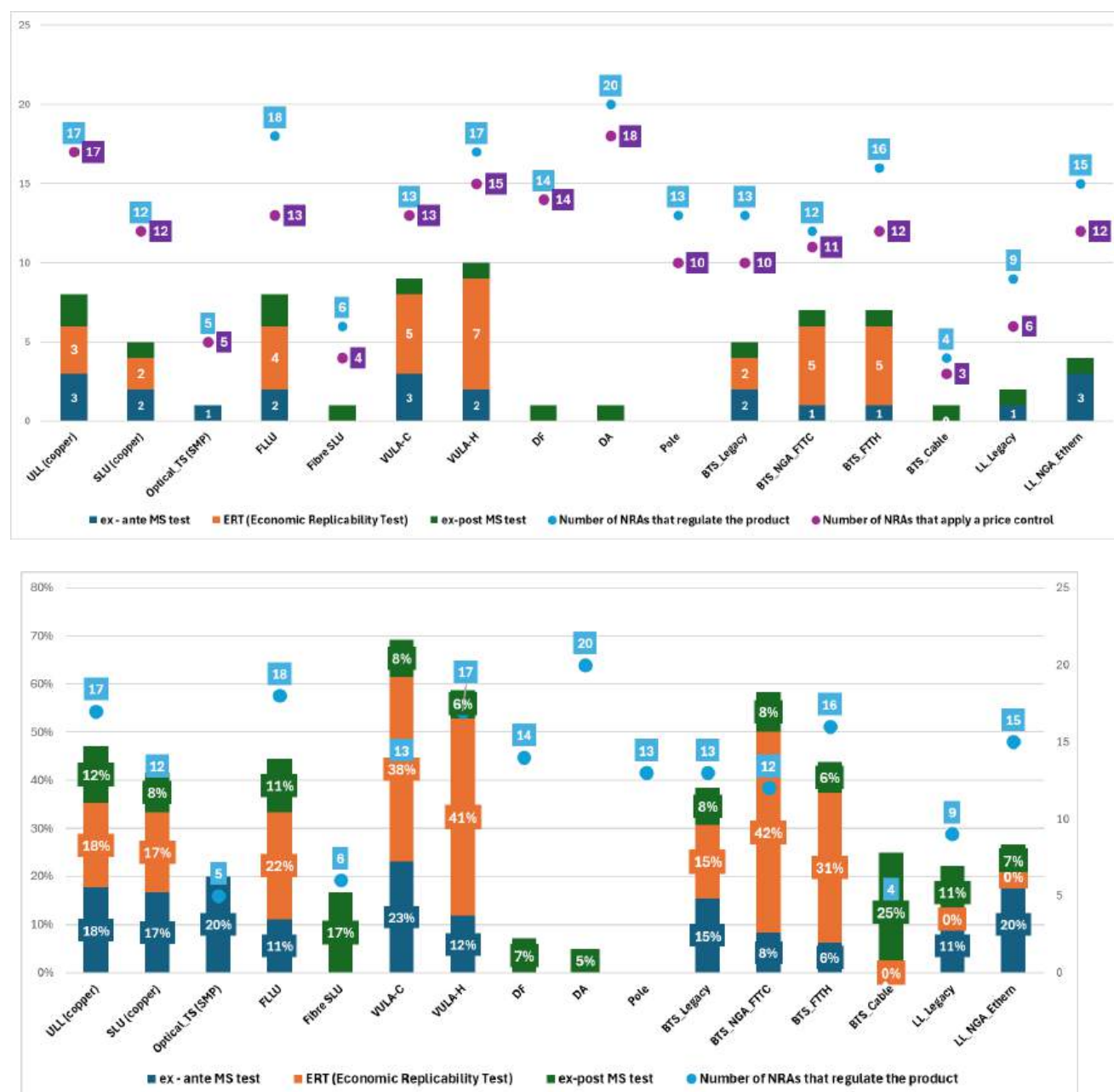
In all other cases where a price squeeze test is in force as a non-discrimination obligation, it is in combination with a specific price control obligation. In the figure below the updated survey results on the application of a margin squeeze test are provided (figure 28a).

Figure 28b shows that the presence of a margin squeeze test is more common for NGA/VHCN products: for regulated VULA FTTH 53 % of NRAs apply an ex-ante test or ERT test, indicating that the application of the margin squeeze test is relevant for NGA products in market 1/2020, in line with past year's report. So, in absolute terms, the VULA FTTH is the product where an ex ante test is applied more frequently. At the same time, in relative terms, the test is more frequent on VULA-C when also price control is applied. This is consistent with the fact that when the vertically integrated SMP operator operates two networks, tries to leverage the market power of the copper network to the fibre network.¹⁰⁸

¹⁰⁸ <https://www.econstor.eu/bitstream/10419/270988/1/1830268503.pdf> “The access fee gives rise to asymmetric pricing incentives for the entrant firm if she offers a legacy and new product in parallel. The entrant's price for the new product decreases in the access fee while its legacy price increases with the aim to induce intra-brand legacy-to-new migration of demand.”

Since last year's report, the following incurred: ES removed any obligation in access markets, including the replicability test. IT had removed the replicability test since the end of year 2024¹⁰⁹ due to the fact that the incumbent operator was no longer vertically integrated. Thus, only wholesale pricing remedies were applied to the new fully separated wholesale entity. EE introduced the ex-ante replicability test (ERT) even though it is not yet applied¹¹⁰. PL did not declare the ex-ante replicability test for bitstream products over FTTH, as their new market review proposed to fully deregulate all access markets.

Figure 28 a-b–Number of NRAs that apply margin squeeze tests and % of NRAs that apply a margin squeeze test



Source: BEREC RA Database 2025

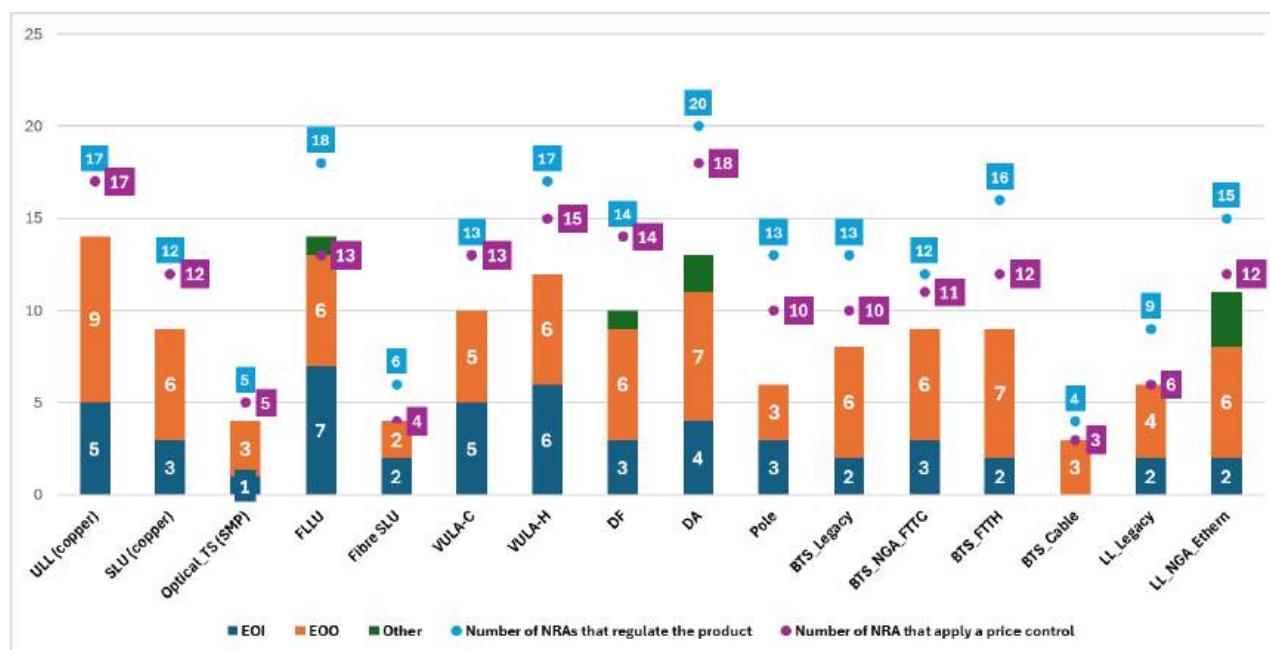
¹⁰⁹ Decision 406/24/CONS.

¹¹⁰ The process of procurement for it is ongoing and in the future, when available, ERT will become the instrument for price control obligation. To date EE apply a TD HC FDC model.

Equivalence model

The following section reports the results of the survey regarding the Equivalence models currently in force for different products. The options given are: EoI¹¹¹, EoO¹¹² and “Other”¹¹³. The situation is stable with respect to last year, with few changes: In IT, due to structural separation, all access services are provided on an EoI basis;¹¹⁴ ES fully deregulated all access markets and so no specific equivalence model is now applied for the VULA products.

Figure 29 – EoO-EoI equivalence model Number of NRAs



In Figure 30 the evolution over time is provided (only EU NRAs). A slight increase in the use of the enhanced equivalence model can be seen on Duct access products as well as on FLLU.

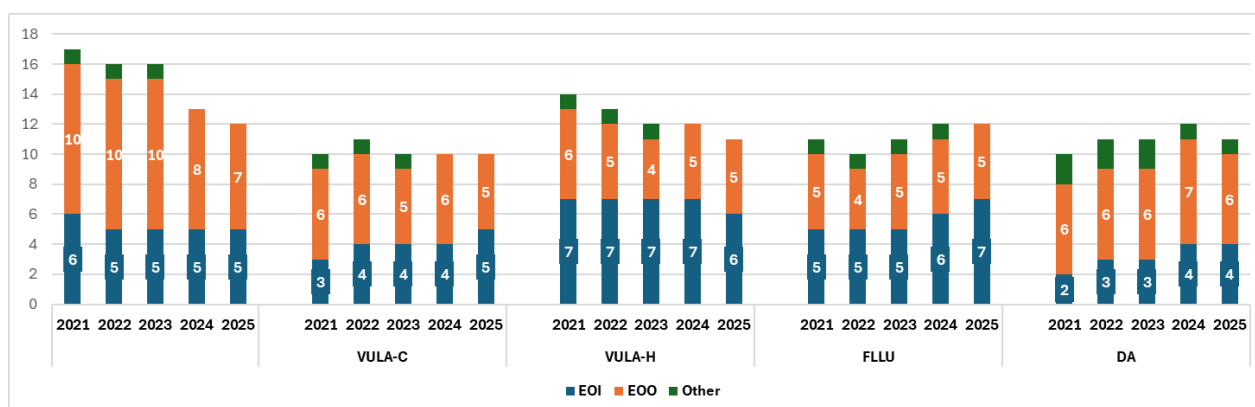
¹¹¹ ‘Equivalence of Input (EoI)’ means the provision of services and information to internal and third-party access seekers on the same terms and conditions, including price and quality of service levels, within the same time scales using the same systems and processes, and with the same degree of reliability and performance. EoI as defined here may apply to the access products and associated and ancillary services necessary for providing the ‘wholesale inputs’ to internal and third-party access seekers.

¹¹² ‘Equivalence of Output (EoO)’ means the provision to access seekers of wholesale inputs comparable, in terms of functionality and price, to those the SMP operator provides internally to its own downstream businesses, even if using potentially different systems and processes.

¹¹³ ‘Other’ is a residual option for enhanced non-discrimination obligation not properly filed under EoI/EoO.

¹¹⁴ The previous retail arm of the SMP operator compete using a specific set of access service that are provided through a full EoI basis with respect to all other operators.

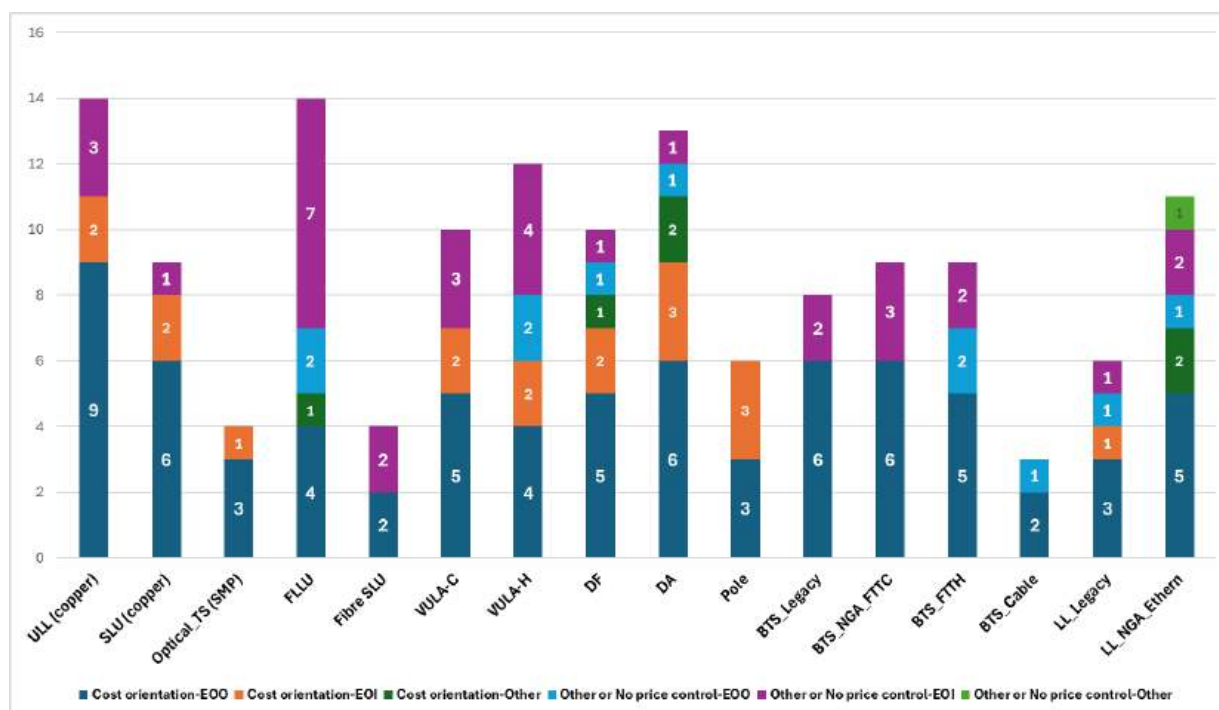
Figure 30 - Evolution over time of the Equivalence model applied (EU countries)



Source: BEREC RA Database 2025

In Figure 31 the number of NRAs that apply (or not) cost orientation in combination with the equivalence model EoI/EoO is reported. Among NRAs that replied to the questionnaire, the combination “cost orientation-EoO” is more frequent for legacy products or central access products whilst for FLLU/VULA-H “other/no price control-EoI” is also either frequent or most frequent.

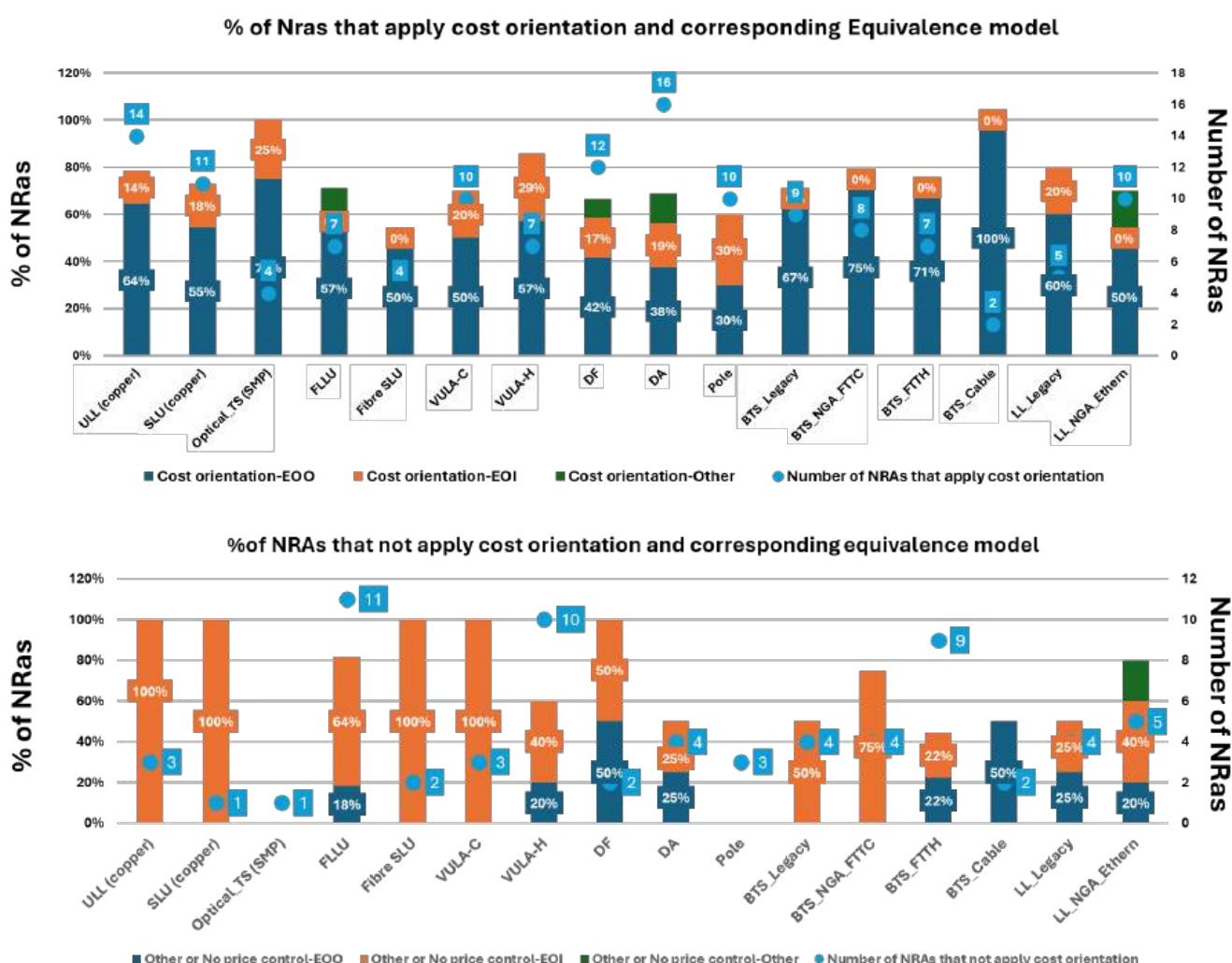
Figure 31 – EoO-EoI equivalence models with respect to the non-discrimination obligation



Source: BEREC RA Database 2025

Figure 32 reports the % of NRAs that apply a specific equivalence model in combination with cost orientation (a) and the % of NRAs that apply a specific equivalence model but do not apply cost orientation (b). It seems that a relation exists between EoO adopted where also cost orientation is in charge, and price flexibility in combination with an EoI model.

Figure 32 – EoO-Eol equivalence model with respect to cost orientation obligation (a)-(b)



Source: BEREC RA Database 2025

In line with past year's report the role of Eol as a prerequisite for not applying cost orientation is investigated in combination with other elements highlighted in the Gigabit Recommendation.

Eol as an equivalence model is chosen mainly in case of VULA-H by the majority of NRAs that impose a specific non-discrimination obligation. NRAs have been asked whether Eol has been imposed with the principal motivation for not imposing cost orientation.

The following table reports the replies provided by some NRAs that apply the Eol for the corresponding market/product, and the corresponding motivations with respect to the price control method. In general, Eol + ERT is a main motivation for not imposing cost orientation for fibre products following the indication of the Commission Recommendation of 2013 (SE, LU); in case of SI the Eol + ERT is also relevant for the legacy network product in combination with a technical replicability safeguard. In IT, CY, and PT the Eol did not prevent the imposition of cost orientation.

NRAs that apply Eol as equivalence model	Have you considered safeguard Eol as principal motivation for not imposing cost orientation?		ULL (copper)	SLU (copper)	FLLU	VULA-C	VULA-H	DA	Pole	BTS_Legacy	BTS_NGA_FTTG	BTS_FTTG	BTS_Cable	LL_Legacy	LL_NGA_Ethern
		Yes	2	1	4	2	3	0	0	1	2	1	0	1	1
		No	1	1	0	1	2	2	2	0	0	0	0	1	1
		Yes partially			1										1
		Yes	CZ SI	CZ	CZ LU SE SI	CZ SI	CZ LU SI			SI	LU	SI	LU	SI	SI
		No	IT	IT		CY	CY IT	IT PT	IT PT					ES	ES
		Yes partially			PT										LU
Motivation	Yes	CZ: The SMP operator is a legally separated entity which provides only wholesale services to all potential retail providers (providing same inputs). Non-discrimination obligation incl. economic replicability test (between M1 a M3b products) is more appropriate. SE-SI-LU: Eol + ERT													
	No	IT: The Eol model has contributed to enhancing the level playing field in the provision of wholesale services, effectively reducing the incentive to adopt technical discriminatory conduct, with the benefit of the competition also in a forward-looking manner providing efficient incentive to the operators to move up the ladder of investment. At the same time Eol doesn't prevent the incumbent operator from applying excessive prices that can be passed on to the end users or to prevent geographically selective price reduction under full efficient costs over the enhanced copper network, with the aim to prevent investment in VHCN network by competitors. The option to relax efficient cost orientation should be balanced with general take-up objective and efficient investment incentive in an enhanced quality network of all operators. Since 1st July 2024 the previous SMP operator has been fully separated at the same time obligation of non-discrimination has been confirmed in the ongoing market review and Eol provision for all access services in market 1. Because of this full separation Agcom proposed to move to a fair and reasonable pricing approach. ES: Eol included as a general criterion CY: Eol included as a general criterion taking into account the market maturity PT (DA and Poles): It was considered necessary to impose cost orientation to prevent the SMP operator from setting prices significantly higher than costs in order to lead to a margin squeeze strategy for alternative operators.													

The survey on the motivation behind the choice of the Equivalence model chosen highlights the cases of BE, AT, EE, PL where EoO is applied for some products: Eol has not been chosen due to a cost benefit analysis (Eol does not prevent wholesale price increases in combination with high cost of implementation) while EoO has been considered sufficient to prevent non-discriminatory practices, also in case of DA. In some cases, the low volume of wholesale access services does not justify the implementation of Eol (EE).

In DK commitments are in place so there is no need to impose a specific equivalence model; for FI, where no specific equivalence model is present, and a general non-discrimination obligation is imposed, Traficom considered that in an environment with multiple SMP operators, the application of Eol would not produce competitive benefit. In case of LI the equivalence model and the replicability test are not applicable as the SMP operator has no downstream activity and all passive access FLLU is offered to independent service providers, including the previous incumbent, which has no own network / fibre infrastructure.

Some further questions on the implementation of the non-discrimination obligation have been included in light of the provisions of the Gigabit Recommendation:

- ✓ Did you impose a technical replicability test¹¹⁵?
- ✓ Is it the task of the NRA or on the SMP operator to perform the test?

The focus is consistent with point 38 (b) of the Gigabit Recommendation where it is mentioned that a technical replicability test may be taken into account where Eol is not fully implemented to grant price flexibility.

The replies to the previous questions are the following.

	ULL (copper)	SLU (copper)	Optical TS (SMP)	FLLU	Fibre SLU	VULA-C	VULA-H	DF	DA	Pole	BTS_Leg acy	BTS_NGA _FTTC	BTS_FTT H	BTS_Cab le	LL_Lega cy	LL_NGA _Ethern
Yes	7	6	1	8	1	7	10	3	3	1	7	7	7	2	2	3
Technical replicability test and EOI	1	1	0	3	0	2	3	0	0	0	1	2	2	0	0	0
Technical replicability test and EOO	5	4	1	4	0	4	5	3	3	1	4	4	4	2	2	1
Yes	BE EL FI FR HU LU NO	EL FI FR HU LU NO	HU	BE EE FI HU LU NO SE SK	FI	BE CY EE EL FI HU SK	BE CY DE EE EL FI HU LU NO SK	EL FR HU	BE EL HU	HU	BE DE EL FI FR HU LU	BE EE EL FI HU LU SK	BE EE EL FI HU LU SK	BE HU	BE FR	AT BE FR
Technical replicability test and EOI	LU	LU		LU SE SK		CY SK	CY LU SK				LU	LU SK	LU SK			
Technical replicability test and EOO	BE EL FR HU NO	EL FR HU NO	HU	BE EE HU NO		BE EE EL HU	BE EE EL HU NO	EL FR HU	BE EL HU	HU	BE EL FR HU	BE EE EL HU	BE EE EL HU	BE HU	BE FR	BE

	ULL (copper)	SLU (copper)	Optical TS (SMP)	FLLU	Fibre SLU	VULA-C	VULA-H	DF	DA	Pole	BTS_Leg acy	BTS_NG A_FTT	BTS_FTT H	BTS_Cab le	LL_Lega cy	LL_NGA _Ethern
NRA	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
SMP operator	7	6	1	6	1	6	8	3	3	1	6	6	6	2	2	3
NRA							DE				DE					
SMP operator	BE EL FI FR HU LU NO	EL FI FR HU LU NO	HU	BE EE FI HU LU NO	FI	BE CY EE EL FI HU	BE CY EE EL FI HU LU NO	EL FR HU	BE EL HU	HU	BE EL FI FR HU LU	BE EE EL FI HU LU	BE EE EL FI HU LU	BE HU	BE FR	AT BE FR

The technical replicability test is carried out in few cases where Eol or EoO is not implemented, instead it is more frequent in case an EoO is already in charge. It is a substitute in case it is not applied in combination with an Eol model for the provision of the wholesale services. The technical replicability test is thought to be more of a procedural instrument to enforce the EoO model in charge.

The technical replicability test is more frequently applied by the SMP operator instead of the NRA. In BE, based on a case-by-case approach, the NRA may request the SMP to run a technical replicability test; in CY the NRA audits the SMP operator even if the responsibility lies with the SMP operator; in AT any changes in retail product characteristic have to be notified to the NRA and the SMP operator has to show that all (new) features are replicable. In FI the obligation for conducting the technical replicability test applies only for the 3 largest SMP operators. The technical replicability of the retail offer has not been imposed in CZ where the SMP operator is a legally separated entity which provides only wholesale services to all potential retail providers (providing same wholesale inputs, same quality and same ordering systems). Therefore, there is no need for a technical replicability test. In SE the technical replicability test has never been applied, since Eol

¹¹⁵ The technical replicability test has the objective to verify that SMP operators, which are subject to a non-discrimination obligation, to provide access seekers with regulated wholesale inputs, these allow the access seeker to effectively replicate new retail offers of the downstream retail arm of the SMP operator from a technical perspective. NRAs should ensure that internal and third-party access seekers have access to the same technical and commercial information on the relevant regulated wholesale input without affecting applicable rules on business confidentiality. The required technical replicability test can be carried out by either the SMP operator or the NRA. If the SMP operator conducts the technical replicability test itself, the NRA should require the SMP operator to provide it with the results of the test, including all information needed to demonstrate that technical replicability is fully ensured. Alternatively, if the NRA conducts the technical replicability test, it should require the SMP operator to notify to the NRA the details of the new retail offer that makes use of a relevant regulated wholesale input together with all the information needed for the NRA to assess replicability, with sufficient notice before the launch of such retail offers.

is the preferred equivalence model for fibre wholesale access. In LV, specific KPI reporting together with SLA and SLG have been imposed and considered proportionate in consideration of the current demand at wholesale level for enforcing non-discrimination and a level playing field.

To complete the survey, in the next table we summarise how the provisions of Art. 38 a-d of the Gigabit Recommendation that are already considered in the national regulatory framework in combination with some other relevant information concerning price flexibility of the VHCN product and cost orientation of the legacy NGA product, where present.

The first 7 columns summarise the information collected that can be attributed to article 38 a-d(iii) and the information referred to VHCN products (VULA-H and/or FLLU): i) Equivalence model adopted on VHCN wholesale product; ii) technical replicability test; iii) monitoring system; iv) availability of the Economic replicability test; v) Commitment of the SMP operator on VHCN investment plan; vi) the presence of an anchor product; vii) main driver on competition in regulated areas. The information on the presence of a cost-oriented legacy NGA product is also relevant even if the NRAs did not consider it explicitly as an anchor product in the sense of the Gigabit Recommendation. In the same table the status of the geographical regulation, as analysed in previous sections, as well as the relevance of the access to civil infrastructure is reported. For the first two groups of countries where the NGA legacy product is still available and remedies are applied including FTTC at local level, flexibility of VHCN is always accompanied by one or more provisions of the Commission Recommendation, more frequently the availability of EoI or a regulated anchor. When price flexibility is not applied the provision of the art. 38 are not in charge. For the group of countries where an anchor over NGA is not present the provisions of the Gigabit Recommendation are less relevant, as in this case commitments and commercial agreements, symmetrical regulation and civil infrastructure access can play a role.



	Art. 38 a	Art. 38 b		Art. 38 c	38 d(ii)	38 d (iii)	38 d(i)	cost orientation on VHCN?	cost orientation on VULA-C?	Competitive areas + Deregulated on geographical approach to regulation	Relevance of Civil Infrastructure access
	Equivalence model for FTTH/ functional separation separated	technical replicability	Monitoring system	Economic replicability test	Commitment from the SMP on VHCN Plan	anchor product	main driver of competition in non competitive areas				
(BE-1)-2018	EOO	Yes	Yes	ex-post MS test			SMP Regulation	No	Yes	<5%	No
(HU-4)-2017	EOO	Yes					infrastructure competition through cable platform/own FTTH network	Yes	Yes	<20%	No
(HR-)-2023	EOO			ex - ante MS test				Yes	Yes	<40%	Very relevant
(SI-)-2022	EOI			ERT (Economic Replicability Test)				No	No	<50%	
(SK-)-2018	EOI	Yes		ERT (Economic Replicability Test)				No	No		
(EE-3)-2025	EOO	Yes	Yes	ERT (Economic Replicability Test)				Yes	Yes	<30%	
(FI-5)-2018		Yes					-by SMP regulation -by infrastructure competition through cable platform/own FTTH network	Yes	Yes	<5%	No
(IT-5)-2024	EOI (Structurally separated)		Yes				-SMP regulation; -third party wholesale only operator	Yes	Yes	<15%	Small
(CZ-3)-2025	EOI (structurally separated)			ex - ante MS test			-SMP regulation	No	No	<90%	
(DE-)-2019		Yes	Yes	ex - ante MS test	Yes	Yes		No	Yes	<5%	Forward looking
(EL-)-2023	EOO	Yes	Yes	ERT (Economic Replicability Test)			-SMP regulation	Yes	Yes		
(IE-4)-2024				ex - ante MS test		Yes		No	Yes	<20%	Forward looking
(CY-)-2022	EOI	Yes	Yes	ERT (Economic Replicability Test)			-SMP regulation	Yes	Yes	<10%	Small
(LU-3)-2019	EOI	Yes	Yes	ERT (Economic Replicability Test)		Yes		No			
(LV-2)-2024								No		<40%	Forward looking
(NO-4)-2018	EOO	Yes	Yes	ERT (Economic Replicability Test)			infrastructure competition through cable platform/own FTTH network	No			Small
(MT-)-2013								No			No
(PL-)-2019	EOO							Yes		<50%	
(LT-)-2019				ex-post MS test				Yes			Very relevant
(PT-2)-2023	EOI		Yes					No		<95%	Very relevant
(DK-)-2021				A price squeeze test is an element in the commitments. The test is carried out by the operator			-SMP regulation	No		<95%	No
(FR-3)-2023		Yes						No		<50%	Very relevant to reach access point
(LI-)-2023	Structurally separated							Yes			Small
(SE-)-2015	EOI	Yes		ERT (Economic Replicability Test)				No			
(RS-3)-2022							-SMP regulation	Yes			
(BG-)-2024											Small
(ES-)-2025											Very relevant
(AT-)-2022											
(NL-)-2023											
(RO-)-2020											

3.3 Costing methodologies: Cost allocation methodologies, Cost base, annualisation

The section shows costing methodologies for each wholesale regulated product. It is important to understand, if the current regulatory framework adopted by NRAs on costing methodology already considers the provisions of the Gigabit Recommendation.

Cost Allocation

In the figure below the status of the main cost allocation methodologies used for each product are reported, considering both the main categories and sub categories taken into account.



Figure 33 - Cost Allocation methods main categories(a) sub categories (b)

	ULL (copper)	SLU (copper)	Optical TS (in-house wiring SMP regulation)	Fibre LLU	Fibre SLU	VULA (FTTC)	VULA (FTTH)	DarkFiber (Dark Fibre)	DA (civil infrastruc tures)	Pole Access (civil infrastruc tures)	BSA Legacy technolog y (copper)	BSA NGA (including FTTC)	BSA (FTTH)	BSA (Cable docsis >3.0)	LL(Legacy)	LL NGA (native Ethernet)
FDC	3	1	1	5	1	1	2	4	6	3	2	2	4	1	1	3
LR_A_IC	9	7	3	4	3	6	5	4	6	3	4	4	4	1	4	6
LRIC	3	2	1	1	0	1	1	3	4	2	2	1	1	1	1	2
FDC	FI LT RS	LT	LV	EE FI LT LV	LT	EE LV	EE LV	AT LT RS	EE LT LV	FR LT RS	EE LV	LT RS	EE LT LV	RS	FR	AT HU IE
LR_A_IC	BE CY DE EL FR HR IT	CY DE EL FR IT NO PL	IT	BE HR IT	IT	BE CY EL HR IE	BE CY EL HR IT	DE EL CZ PL	BE DE EL HR IT	DE PL	BE HR	BE EL HR PL	BE EL HR PL	BE PL	BE CY DE EL	BE CY DE EL HR IT
LRIC	HU LU	HU LU	HU	HU		HU	HU SI	HU SI	ES HU SK	ES HU	HU SI	HU	HU	HU	HU SI	LU SI

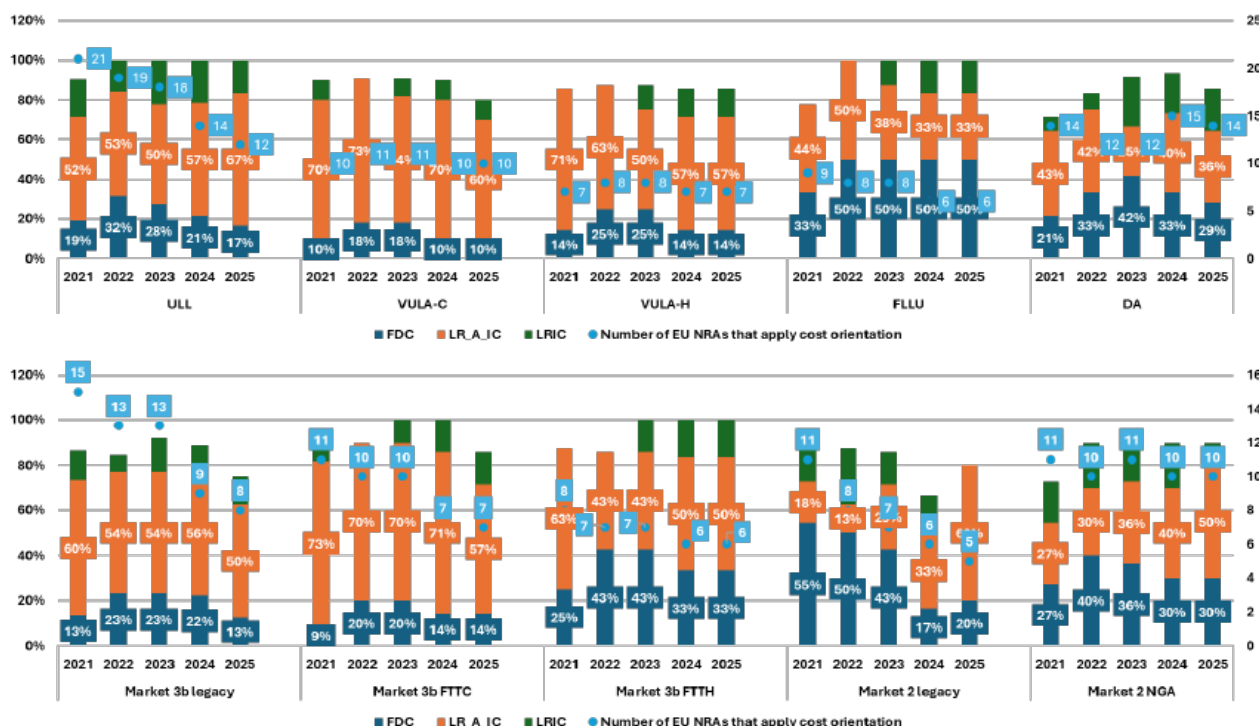
	ULL (copper)	SLU (copper)	Optical TS (in-house wiring SMP regulation)	Fibre LLU	Fibre SLU	VULA (FTTC)	VULA (FTTH)	DarkFiber (Dark Fibre)	DA (civil infrastruc tures)	Pole Access (civil infrastruc tures)	BSA Legacy technolog y (copper)	BSA NGA (including FTTC)	BSA (FTTH)	BSA (Cable docsis >3.0)	LL(Legacy)	LL NGA (native Ethernet)
TD- LR(A)IC+	2	2	1	1	1	0	0	2	2	2	1	1	1	0	1	1
BU- LR(A)IC+	7	5	2	3	2	5	5	2	4	1	3	3	3	1	3	4
BU-LRIC	2	1	1	1	0	1	1	3	4	2	2	1	1	1	0	0
TD- LR(A)IC+	DE PL	DE PL	PL	PL	PL			DE PL	DE PL	DE PL	PL	PL	PL		DE	DE
BU- LR(A)IC+	BE CY EL FR HR IT NO	CY EL FR IT NO	IT	HR BE IT	IT	HR BE IT	BE CY EL HR IT	EL CZ	BE EL HR IT	ES HU SK	IT HR	BE EL HR	BE EL HR	BE EL	BE CY EL	BE CY EL IT
BU-LRIC	HU SI	HU	HU	HU		HU	HU SI	HU SI	ES HU SK	ES HU	HU SI	HU	HU	HU		

Source: BEREC RA Database 2025

In figure 34 the time evolution over the last four years is reported considering all EU NRAs that have declared “cost orientation” as the main category for price control obligation.¹¹⁶

¹¹⁶ Where LRAIC is in use for duct access/pole access/dark fibre it is possible that this is applied only to new infrastructure for fibre deployment, instead cost for old infrastructure is evaluated through an FDC approach (i. e. IE). For ES the decision of July 2025 concerning the latest update of the prices for the access to the SMP operator’s physical infrastructure, CNMC continues setting the prices for civil engineering assets according to the BU-LRIC methodology in line with the past decision of 2021. As a result, the FDC methodology (based on the SMP operator’s regulatory accounting) is only applied to (i) assess the consistency of the results of the BU-LRIC methodology and (ii) obtain the level of depreciation of civil engineering assets. The latter (i. e. the percentage of the accumulated depreciation) is used to adjust the value (current costs) of the civil engineering assets for the depreciation.

Figure 34 - Cost Allocation methods main categories time series 2021-2025 (for EU NRAs that declared cost orientation as price control method)



Source: BEREC RA Database 2025

The most frequent cost allocation approach remains LRIC/LR(A)IC for almost all products/markets. FDC is a frequent approach for DA, but has been decreasing over time. Those NRAs that have removed regulation had applied a LR(A)IC approach in the past. FDC is also declared frequently for FLLU, this case is mainly related to the fact that even if the obligation is in charge, the effective availability and usage of FLLU is not common, and the obligation including cost orientation is in many cases only imposed for visibility reason. No changes from LR(A)IC to FDC can be observed over time.

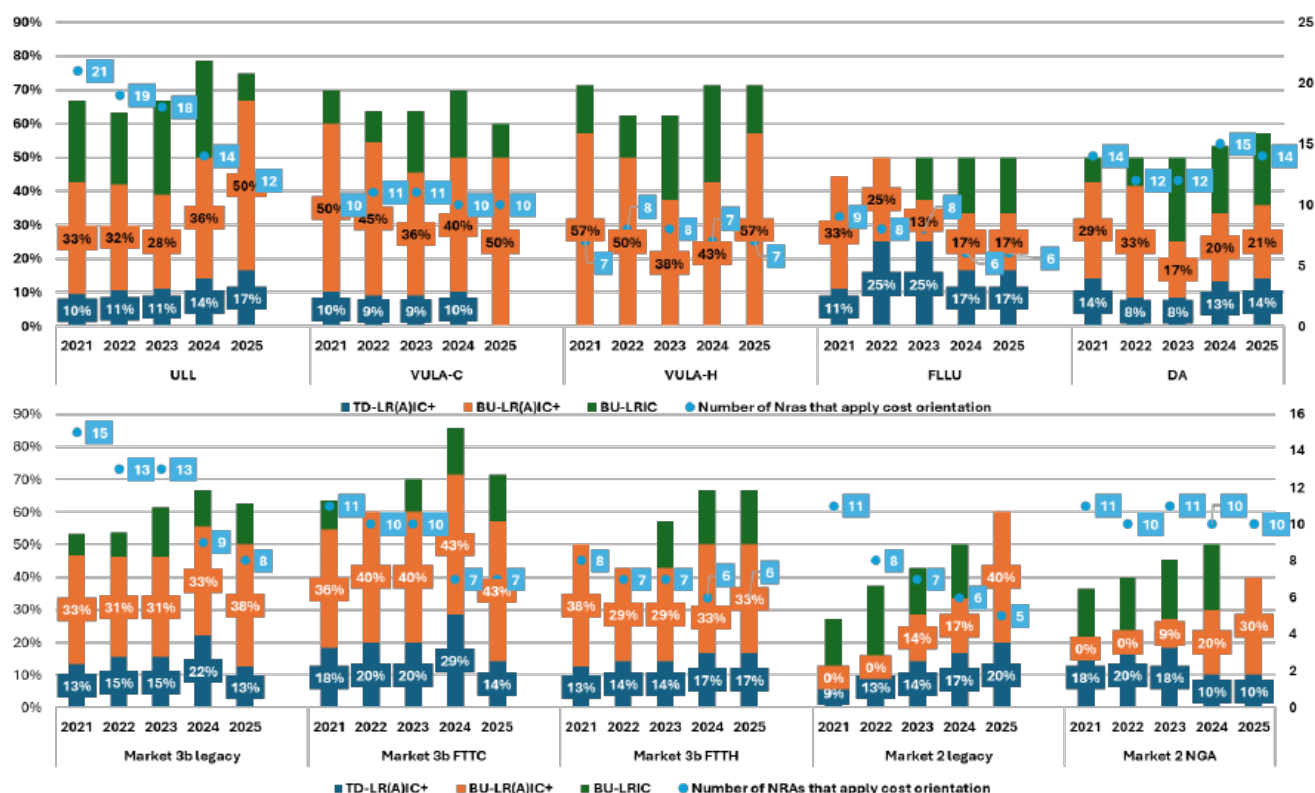
The modelling approach is generally the preferred option where cost orientation is applied as a price control method (the number of EU NRAs that apply cost orientation has been decreasing over time for legacy products i. e. for LLU 21 NRAs in 2021 to 12 NRAs in 2025 and for the legacy market 3b from 15 in 2021 to 8 in 2025)), confirming a reduction of the regulatory pressure as competitive conditions improve. This dynamic is less evident for VHCN products where the number of NRAs that apply cost orientation is stable, i.e. cost orientation is always a condition that is applied only in specific national circumstances, while for civil infrastructure access the number of NRAs that apply cost orientation is not decreasing. In this case the costing methodology is more balanced, as FDC is a relevant solution specifically for legacy infrastructure.

In Figure 35 the sub categories of allocation methodologies since 2021¹¹⁷ are reported in terms of the percentage of NRAs that apply cost orientation as a price control method. The main outcome

¹¹⁷ The sum for sub-categories is lower than the record for the main category where NRAs did not provide information on sub-categories.

is that when LR(A)IC/LRIC has been chosen as the main category, the most common approach is bottom-up: this is generally increasing.¹¹⁸

Figure 35 - Allocation methods LR(A)IC-LRIC sub categories



Source: BEREC RA Database 2025

Cost base

With reference to the cost base, Figure 35 shows that in 2024 CCA is still by far the most commonly used methodology for all markets, including DA. The situation remained stable in comparison to last year's survey.

In the following Figure 36 the type of cost base in use when cost orientation is applied as price control is shown. It should be noted that HCA is only chosen in combination with an FDC allocation method (even when there is a modeling approach where not all the asset base is evaluated at current cost, but already depreciated assets are taken into account).

In the corresponding figure the evolution over time of the cost base is given (considering only EU-NRAs) for those NRAs that use cost orientation as the main category of the price control. The use of CCA is the most used approach where cost orientation is applied.¹¹⁹ In market 2, HCA is still more frequent in relative terms where cost orientation is applied. The use of HCA is common where NRAs are at the early stage of regulation. They move to CCA before (eventually) deregulating.

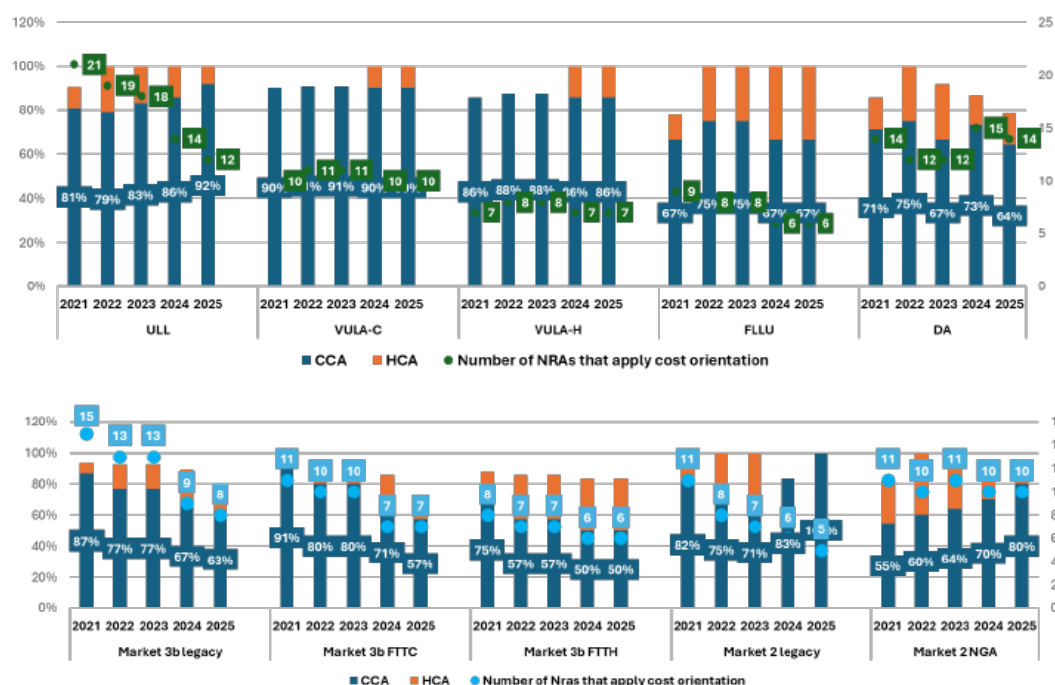
¹¹⁸ For DE a TD approach is applied where the consistency quantity of investment is mainly based on a TD basis, but the investment value is based on a bottom-up model.

¹¹⁹ When the percentage reported is less than 100 % it means that no information is available for NRAs that applied cost orientation over the years.

HCA is also used for civil infrastructure access (ducts and poles) but also for dark fibre when reusable civil infrastructure is included in the costing methodology.

Figure 36 - Cost base used

	ULL (copper)	SLU (copper)	Optical TS (in-house wiring SMP regulation)	Fibre LLU	Fibre SLU	VULA (FTTC)	VULA (FTTH)	DarkFiber (Dark Fibre)	DA (civil infrastructures)	Pole Access (civil infrastructures)	BSA Legacy technology (copper)	BSA NGA (including FTTC)	BSA (FTTH)	BSA (Cable docsis >3.0)	LL (Legacy)	LL NGA (native Ethernet)
HCA	2	2	0	3	1	1	1	2	3	1	1	1	2	0	0	1
CCA	13	8	5	6	3	9	8	9	12	7	6	5	6	3	6	9
HCA	LT NO	LT NO		EE LI LT	LT	EE	EE	LI LT	EE LI LT	EE	LT	EE	EE LT			HU
CCA	BE CY DE EL FI FR HR HU IT LU PL RS SI	CY DE EL FR HU IT LU PL	HR HU IT LV PL	BE FI HR HU IT LV PL	FI HR PL	BE CY DE EL FI HR HU IT	BE CY DE EL FI HR HU IT LV	AT CZ DE EL HU IT PL RS SI	BE DE ELES FR HR HU IT LV PL RS SI	DE ES FR HU IT LV PL	BE EL FR HU IT PL RS SI	BE EL HU PL RS	BE EL HU PL RS	BE HU RS	BE CY DE ELES FR SI	AT BE CY DE EL HR IE IT LU SI



Source: BEREC RA Database 2025

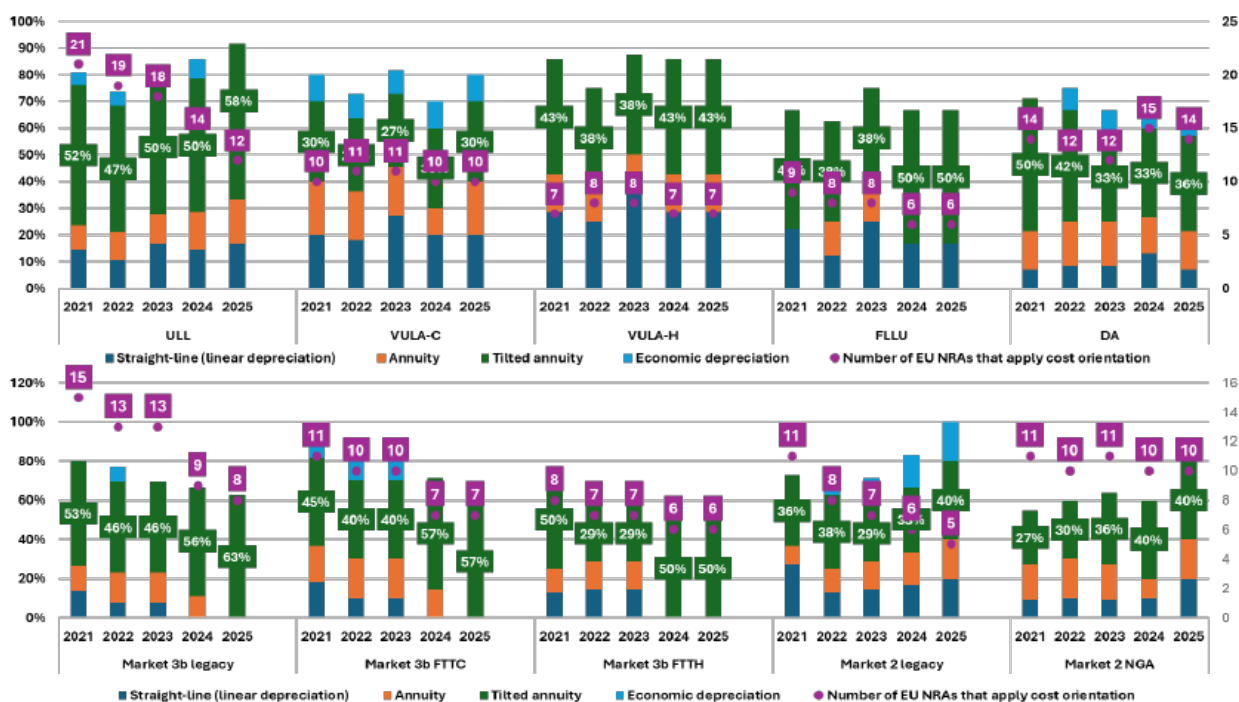
Annualisation

Annualisation methodologies within the CCA category are represented in Figure 37 when the price control method is cost oriented.

The most frequently used approach is the tilted annuity. Standard annuity and straight-line follow. The number of NRAs refers to the number of NRAs that apply cost orientation as the main category for the corresponding product. NRAs that deregulate the market had previously introduced an economic depreciation/tilted annuity approach as an economic cost signal.

Figure 37 – Annualisation method when price control method is cost oriented

	ULL (copper)	SLU (copper)	Optical TS (in- house wiring SMP regulation)	Fibre LLU	Fibre SLU	VULA (FTTC)	VULA (FTTH)	DarkFibre (Dark Fibre)	DA (civil infrastru- ctures)	Pole Access (civil infrastru- ctures)	BSA Legacy technology (copper)	BSA NGA (including FTTC)	BSA (FTTH)	BSA (Cable docsis >3.0)	LL (Legacy)	LL NGA (native Ethernet)
Straight-line (linear depreciation)	3	1	1	2	1	2	3	2	2	1	1	1	2	1	1	2
Annuity	2	2	1	0	0	2	2	2	2	2	0	0	0	0	1	2
Tilted annuity	8	5	3	3	2	3	3	5	6	3	6	4	3	1	3	5
Economic depreciation	0	0	0	1	0	1	1	0	1	1	0	0	1	1	1	0
RAV (Regulatory Asset Value)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Straight-line (linear depreciation)	CY FI RS	CY	LV	FI LV	FI	CY FI	CY FI	AT RS	LV RS	LV	RS	RS	LV RS	RS	CY	AT CY
Annuity	DE IT	DE IT	IT			DE IT	DE IT	DE IT	DE IT	DE IT					DE	DE IT
Tilted annuity	BE FR HU PL SI	EL FR HU LU PL	HR HU PL	HR HU PL	HR PL	EL HR HU	EL HR HU	CZ HU PL SI	EL FR HR HU PL SI	FR HU PL	BE FR HU PL SI	BE HU PL	EL HU PL	HU	EL FR SI	EL HR IE LU SI
Economic depreciation				BE		IE	BE		ES	ES			BE	BE	ES	



Source: BEREC RA Database 2025

3.4 Implementation of costing methodologies in light of NDCM Recommendation and Gigabit Recommendation

This section provides an update on the status of implementation of the NDCM Recommendation (2013/466/EU) with regard to costing methodologies for products mainly in market 1/2020. Information on the implementation of the provision of the Gigabit Recommendation (2024/539/EU), is also included independently of the relevant legal basis on which the methodology is implemented, considering the fact that most of the principles of the methodology of the Gigabit Recommendation were already stated in the previous 2013 NDCM Recommendation. Thus, benchmarking on the current status of the costing methodologies implementation at EU level is provided.

The Gigabit Recommendation does not modify the general framework already provided in the NDCM Recommendation concerning the costing methodology. Many elements that were already available in the NDCM Recommendation are still valid in the new framework.

First of all, the costing methodology should be applied to relevant cost-oriented products in market 1/2020 on legacy technology, NGA as well as VHCN. The Recommendation is therefore very relevant for all NRAs that apply cost-oriented prices on the legacy copper network, enhanced products on copper network, specifically when those products play the role of an anchor for VHCN. Most NRAs have not yet considered the new framework, as many current decisions are still based on the old NDCM framework.

To take this into account, since the 2024 report an updated questionnaire has been considered, for this purpose taking into account both the NDCM Recommendation and the Gigabit Recommendation.

Therefore, NRAs were asked, in continuity with past years, how they had implemented the framework of the NDCM Recommendation in Market 1, by choosing the following options: i) Rec. 30-37 (CCA-BU LRIC+); or ii) Rec. 40; iii) Rec. 42.

At the same time main points of the topic costing methodology in the Gigabit Recommendation have also been considered in the monitoring process¹²⁰:

¹²⁰ ☐ Rec. 48-49: "NRAs should adopt a BU LRIC+ costing methodology that estimates the current cost that a hypothetical efficient operator would incur to build a modern efficient network, which is a VHCN."

☐ Rec. 50: "When modelling a VHCN, NRAs should define a hypothetical efficient VHCN: capable of delivering the targets set out in Decision (EU) 2022/2481, in terms of bandwidth and coverage, as well as taking take-up into account; NRAs should include in the modelled network any existing civil-engineering assets that are generally also capable of hosting a VHCN; civil-engineering assets that will have to be newly constructed to host a VHCN; NRAs should not assume the construction of an entirely new civil-engineering infrastructure network for deploying a VHCN."

☐ Rec. 51-52: "Reusable civil-engineering assets should be valued taking into account the already depreciated value: NRAs should value civil-engineering assets and their corresponding RAB on the basis of the indexation method. Specifically, NRAs should set the RAB for that type of asset at the regulatory accounting value net of accumulated depreciation at the time of calculation, indexed by an appropriate price index, such as the retail-price index ('RPI') that will have to be newly constructed to host a VHCN."

☐ Rec. 53-54: "NRAs should lock in the RAB corresponding to civil-engineering assets and then roll it forward from one regulatory period to the next"; alternatively "they may decide to value reusable legacy civil-engineering assets and their corresponding RAB on the basis of current costs adjusted for depreciation over the lifetime of the assets."

☐ Rec. 56: "NRAs should adjust the cost calculated for the modelled VHCN to reflect the different features of wholesale access services that are not based on a VHCN. For that purpose, the NRAs should estimate the cost difference between an access product based on, for example, fibre to the home ('FTTH') and an access product based on copper by replacing the optical elements with efficiently priced copper elements, where appropriate, in the VHCN"

Only one NRA (HR) that had updated the costing methodology during 2024 has declared to be compliant with the Gigabit Recommendation; in all other cases the regulatory framework is still based on the previous NDCM Recommendation.

Figure 38 reports NRAs that apply the corresponding costing methodology. The information is given at the level of a single relevant product (ULL, FLLU, VULA-C, VULA-H and duct access) and the main category for price control chosen.¹²¹ It should be pointed out that, when NRAs apply the Commission Recommendation approach, the same is applied for all products/markets where a costing methodology is required to implement the corresponding price control. At the same time this does not mean that all products regulated with specific price control always apply the same costing methodology principles (i. e. for Duct Access); this is in line with the general principle that all access services are coherently priced along the network value chain. We can see that from the following analysis 21 NRAs have provided information on the fact that for some products/markets the regulatory framework in terms of costing methodology refers to the NDCM Recommendation (BE, CY, CZ, DE, EE, EL, ES, FI, FR, HR, HU, IE, IT, LI, LU, LV, NO, PL, RS, SE, SK).

Figure 38 - NRA implementation of EC Recommendations

	Cost orientation					other combination					Retail minus				
	ULL(copper)	FLLU	VULA-C	VULA-H	DA	ULL(copper)	FLLU	VULA-C	VULA-H	DA	ULL(copper)	FLLU	VULA-C	VULA-H	DA
Recommendation_2013_466_EU_NDC	11	3	6	4	9	3	3	2	4	1	0	0	0	0	0
Recommendation_2024_539_EU_GigabitRec	1	1	1	1	2	0	0	0	0	0	0	0	0	0	0
Recommendation_2013_466_EU_NDC	CY DE EL FI FR HU IT LU NO PL RS	FI HU LI	CY DE FI HU IE IT	CY FI HU IT	DE FR HU IE IT LI LV RS SK	CZ SI SK	CZ LV SK	CZ SK	BE CZ LV SK						
Recommendation_2024_539_EU_GigabitRec	HR	HR	HR	HR	EE ES										

	Cost orientation					Others/Combination				
	ULL(copper)	FLLU	VULA-C	VULA-H	DA	ULL(copper)	FLLU	VULA-C	VULA-H	DA
Recommends_30_37_CCA_BU_LRIC_P	7	2	4	4	2	1	1	1	2	0
Recommend_40	0	1	0	0	2	0	1	0	1	0
Recommends_30_37_CCA_BU_LRIC_P (NRAs)	CY EL FI FR HU IT LU	FI HU	CY FI HU IT	CY FI HU IT	IE IT	CZ	CZ	CZ	BE CZ	
Recommend_40 (NRAs)		LI			LI LV		LV		LV	

Source: BEREC RA Database 2025

engineering model. Where appropriate, NRAs could otherwise obtain the copper cost by modelling a VHCN overlay network, where two networks (copper and FTTH) share to an extent the same civil-engineering infrastructure.”

□ Rec. 62: “NRAs should update the data input into the costing methodology not more than twice during each market review period... NRAs should publish the updated outcome of the costing methodology and resulting access prices over the relevant two and-a-half-year period.”

□ Point 54: “NRAs should set individual prices for access to the newly built civil-engineering infrastructure assets, applicable within the area concerned. In principle, civil-engineering infrastructures which are merely repaired, renovated or maintained should not be considered as newly built.”

□ Point 55: “Active copper lines are decreasing as customers migrate to cable, fibre or mobile networks. Modelling a single, efficient VHCN for copper and VHCN access products would neutralise the inflationary volume effect that arises when, modelling a copper network, fixed network costs must be distributed over a decreasing number of active copper lines. It is possible to progressively transfer the traffic from copper to VHCNs by deploying – and switching to – VHCNs. Only traffic moving to other infrastructures (e. g. cable, mobile) would result in a rise in unit costs.”

¹²¹ The information is reported for all relevant products, even if the NDCM recommendation’s focus was only on copper legacy product such as ULL. This will better reflect the evolution of the regulatory framework of the Gigabit Recommendation, where the costing methodology is related to all cost-oriented product in access market.

Other specific remarks by NRAs are reported below.

Country	Comment on the application of the regulatory framework
BE	Copper prices were set prior to the 2013 Rec. VULA FTTH is still not available, however rental fees are set with a fair pricing (reasonable margin above costs) approach. A BU-LRIC+ approach have been consulted in line with the methodology of the Commission Recommendation for checking reason, but it has still not been adopted. VULA services are not available in BE
CZ	CTU follows the Recommendation where applicable, as the SMP operator CETIN has not been imposed a cost orientation obligation on LLU, in light of its structural separation. Recommendations are irrelevant in this respect. Nevertheless, this only reflects the current situation. Before lifting cost orientation on LLU in 2018, prices were set in line with the methodology set out in Recommendation.
DK	Currently, DBA does not apply LRAIC directly as no specific cost orientation is applied. However, LRAIC is used to benchmark two companies in the two pricing decisions to address the compliance with the fair and reasonable pricing principle.
FI	Due to a supreme court decision (11/2020) price caps are no longer valid and the current LRIC-model cannot be implemented for the 3 biggest operators. The update of the model is not yet decided.
HR	The BU-LRIC+ cost model on which basis costs of the regulated wholesale services are calculated was developed in 2020/2021 for application in 2022. Therefore, the Recommendation from 2013 was applied. Since there is no significant difference, it can be concluded that the Gigabit Recommendation is fully applied.
IT	The costing methodology adopted for cost orientation obligation had been consulted and adopted before the Gigabit Recommendation was finally adopted in 2024. An assessment of the compatibility of the new framework has been address finding no specific conflict in the costing methodology implementation in applying the regulatory framework of the 2013 Recommendation with respect to the new Gigabit Recommendation.
LI	The applied cost model meets Rec. 40. The SMP provider is an open access provider to fibre LLU and ducts without downstream activities. The fibre access network was built efficiently in a short period/one project in existing infrastructure (ducts). Therefore, the costing model is equivalent to the CCA BU-LRIC+ approach, even if price control is based on the FDC-HCA costing methodology in light of the fact that all depreciated reusable assets are excluded from computation and the short time of the construction.
PL	Cost orientation, but with a TD model the applied costing model Rec. 40.
NO	The model calculates asset requirements on a bottom-up basis with a mark-up to recover common cost. The model uses a RAB for all copper assets which means that the approach is not a LRIC calculation for the copper network
SI	Obligation of ERT and technical replicability test without cost orientation, BU-LRIC model is used for some input of the test and co-location
SK	Obligation of ERT without cost orientation, BU-LRIC model is used for some input of the test and co-location
MT	No longer relevant

From the previous remarks and information, we understand that the principles of the Commission Recommendations are in most part addressed by NRAs.

In the following, the year of the last methodology update as well as the last model update, where relevant, were requested. The choice of the methodology and the model update are not always synchronous for all services (highlighted in blue and red). For most NRAs the update of the methodology and/or the models is synchronous for all relevant products but in some cases there are differences: for DE the last update for VULA-C was in 2021 when for all other product it was in 2022; for IE the VULA-C was implemented in 2021, civil infrastructure in 2024¹²². Considering the last five

¹²² The VULA model has not been updated since 2021 as pricing continuity adopted, under which the incumbent can increase the FTTC VUA price by up to CPI-0, provided the FTTC VUA price does not exceed the lowest FTTH VUA price. https://www.comreg.ie/media/dlm_uploads/2024/01/ComReg2405.pdf

years, 11 NRAs updated their costing methodology and/or the model for VULA-C and FLLU, VULA-H services (BE, CZ, DE, DK, EL, HR, HU, IE, IT, LI, LV) out of 20 NRAs that provided the relevant information. In some cases, only copper LLU has been considered to be relevant for the costing methodology updates not considering civil infrastructures (FR, LU, NO,¹²³ SI, RS). Among the 11 NRAs that have updated the methodology or the model in the last five years, cost orientation is applied only by 6 NRAs over VULA-C (DE, EL, HR, HU, IE, IT)¹²⁴ and 5 over VULA-H/FLLU (EL, HR, HU, IT, LI).¹²⁵

Methodology Update			Model update	
2017	3	CY,FI,HU	1	EE
2018	1	SK	3	CY,NO,SK
2019				
2020	1	DK	2	EL,HU
2021	3	BE,IE,LU	5	BE,DK,IE,LU,RS
2022	3	DE,LV,SI	2	DE,SI
2023	3	EL,FR,LI	3	FR,HR,LI
2024	2	HR,IT	2	IT
2025				
Total	16		18	

With regard to procedural issues the questionnaire asked about the frequency of update of the model/methodology. Only few NRAs answered this question in line with past year report.

	ULL	FLLU	VULA-C	VULA-H	DA
three years	1	1	0	0	0
every market review	5	2	2	2	4
Other	3	2	1	1	2
three years (NRAa)	HR	HR			
every market review	EL FR HU IT NO	HU LI	HU IT	HU IT	HU IE IT LI
Other	BE DE LU	BE DK	IE	BE	DE ES

The majority of NRAs update prices and methodology in every market review. In some cases, there is also an annual adjustment for CPI (IE) or for civil infrastructure access products (CZ¹²⁶, IE). The

¹²³ For NO VULA-H where "other/combination" have been declared as main price control method, updated yearly.

¹²⁴ For BE cost orientation on VULA-C is imposed, but price is still not available and price for bitstream over FTTC that are also cost oriented has been defined before 2013.

¹²⁵ With respect to civil infrastructure access a model update has been applied by ES and IE in 2024 coherently with the provision of the Gigabit Recommendation.

¹²⁶ The annual update of the model is done for Dark fibre products.

process of update in every case generally follows a public consultation¹²⁷ and covers the full set of inputs of the cost model.

Based on the past provisions of the NDCM Recommendation and the new provisions of the Gigabit Recommendation, some relevant questions have been included to address other elements related to costing methodology that may have an impact on the outcome and can, in some way, be more controversial concerning the competitive outcome: i) how coverage and take up are addressed for cost calculation and which technology is used for estimating the costs, (Rec. 50 and point 55 of the Gigabit Recommendation); ii) if and how reusable civil infrastructure is taken into account (Rec. 52-53 of the Gigabit Recommendation); iii) if prices of new civil infrastructure are different from legacy prices (Rec. 54 of the Gigabit Recommendation).

The NDCM Recommendation suggested to define costs based on an efficient NGA network, capable of delivering the DEA target¹²⁸ and asking NRAs to address the issue of price stability with respect to the volume reduction due to the transition from the old to the new technology. A similar provision is included in the new Recommendation in relation to the transition to NGA and VHCN. An endogenous revenues neutral approach to regulation is promoted as it can overcome the trade-off between static and dynamic efficiency.¹²⁹

The take-up issue in the model refers to two other relevant points addressed explicitly in the Gigabit Recommendation:

- ✓ rec. 56 where the issue of the transition between legacy/VHCN should be considered to be consistent with a stability principle. This point is also related to how cost of services that are based on copper (ULL, SLU), or partially on copper (VULA-C), may be based on an architecture on which the services are effectively sold or, differently, based on the more efficient technology.
- ✓ the second point relates to the level of infrastructure competition that may be considered in the model itself (point 55).

The survey provided some interesting results. Three technologies, copper (LLU), FTTC (VULA-C), FTTH (FLLU, VULA-H) are reported separately (they are reported in an aggregated way when the distinction between technologies is not relevant). In line with past report, information on civil infrastructure access (duct) are reported.

In Figure 39 the take-up and coverage targets are addressed according to three main questions: i) "What target coverage and take-up do you consider in your model?"; ii) How does service take-up affect your model between legacy and NGA/VHCN transition? iii) 'How do you take into account demand/traffic on a third party network (i. e. mobile, cable)? (point 39 of NDCM Recommendation / point 55 of the Gigabit Recommendation).

¹²⁷ HR has updated the BU-LRIC model conducting two public consultations: one on which inputs were required to be updated and the other after the data collection which is prepared for input into the model regarding updated inputs and results of the update. The final version of the updated model has been used for calculating the new prices. The updated model is also used for input into the margin squeeze test model which is updated with own network costs and wholesale prices, both calculated on the basis of the updated BU-LRIC+ cost model. In IT the recurrent fee is updated in the market review instead some adjustments are made every year after public consultation in the reference offer approval process. A new approach on the review of the economic condition is proposed after the full separation of the incumbent operator considering the approval process without a public consultation but through a faster procedure that should verify only the fair and reasonable pricing principle of the fees.

¹²⁸ The coverage at least of 30 Mbps to 100 % of the population and take-up of the population at 50 % at 100 Mbps. The draft Gigabit Recommendation updates the take-up and coverage statement following the new "Gigabit target" in substitution of the "DEA target", moreover the price stability issue is still relevant specifically in case an "anchor product" based partially or wholly on copper is still present and relevant for the market.

¹²⁹ <https://sites.ualberta.ca/~klumpp/docs/openaccess.pdf>

The first question is related to the target coverage and take-up as addressed by the Recommendations; the second question addresses how the transition from copper to NGA/VHCN is taken into account within the same model. The third question concerns infrastructure competition, i. e. how traffic volumes on third party infrastructure are taken into account by NRAs.

The gathered results are reported in the following table and are similar to the ones of last year, i. e. no specific new implementation emerged.

Figure 39 - NRAs information on target coverage/demand

Questions	Options	copper	FTTC	FTTH	DA
What target coverage and take-up do you consider in your model?	NDCM 2013				
	DEA (2020 digital Agenda For Europe)	3 (FR, EL , HU)	1 (HU)	1 (HU)	1 (HU)
	Gigabit connectivity target		1 (IT)	1 (IT)	1 (IT)
	Other	3 (CZ, LU, RS)	2 (CZ)	4 (BE, CZ, DK)	
	Gigabit recommendation				
How does service take-up affect your model?	Gigabit connectivity target				
	Other	1 (HR)	1 (HR)	1 (HR)	
	Only volume on third party infrastructures affect the service take-up	1 (IT)	1 (IT)	1 (IT)	1 (IT)
	Economic depreciation are applied			2 (BE, DK)	1 (FR)
	Sunk cost are shared proportionally between services volume within a single infrastructure	3 (CZ, EL, HU)	3 (CZ, EL, HU)	3 (CZ, EL, HU)	2 (EL, HU)
How do you take into account demand/traffic that moves on third party network (i.e. Mobile, cable)? (point 39 of NDCM Recommendation/point 55 of Gigabit Recommendation)	Other	3 (FR, LU, HR)	1 (HR)	1 (HR)	
	only mobile is excluded	1 (FR)			
	only mobile and cable are excluded	1 (NO)			
	all traffic to other third party infrastructures is excluded	4 (HR, HU, IT, LU)	3 (HR, HU, IT)	5 (BE, DK, HR, HU, IT)	2 (HU, IT)

	What target coverage and take-up do you consider in your model?	How does service take-up affect your model between legacy and NGA/VHCN transition?	How do you take into account demand/traffic that moves on third party network (i.e. Mobile, cable)? (point 39 of NDCM Recommendation/point 55 of Gigabit Recommendation)
BE (VULA-H)	Target coverage based on deployment plans SMP operator. Take-up based on take-up of an efficient operator, presence of other VHCN infrastructures (i.e. coax) and migration from copper to fiber		Only the demand over the modelled infrastructure is taken into account
CZ (ULL, VULA-C, DF)	The model does not have any target coverage defined.		
DK (VULA-H)	With regards to coverage we're using the specific roll-out plans by the operators. Take-up is harmonized for all 3 modelled operators		
FR (ULL)	Use FTTH model	BULRIC+ Model: this model neutralizes the effects of copper network drainage. There are a depreciation in the civil engineering value (asset life : 50 years for duct)	
HR (ULL, VULA-C, VULA-H, FLLU)	In our BU-LRIC+ cost model for fibre network we consider coverage based on SMP operator real coverage plans (in BU-LRIC+ model is implemented methodological principle that modelled operator fibre network is similar to SMP's fibre network). On the other hand, demand for services over fibre network of modelled operator is calculated on the basis of assumption that take up rate in 2027 will be 43%.	Input in our BU-LRIC+ model is demand of copper based and fibre based retail and wholesale services. The demand is calculated on the basis of real coverage of both copper and fibre network provided by SMP operator, while demand for services over both networks is calculated on the basis of assumed take up rate of fibre network in 2027. Take rate means percentage of active fibre lines (retail or wholesale) over number of covered premises. Projection of take up rate is based on assumptions that some of the current copper lines will be migrated to the modelled fibre network, but also to the VHCN networks of alternative network operators. Because of that costs of modelled fibre network are shared between retail and whole services, but due to existence of alternative VHCN's and consequently lower take up rate of the modelled fibre network the costs are distributed on lower number of lines causing higher unitary costs of modelled fibre networks. On the other hand, taking into account that majority of civil engineering infrastructure is shared between copper and fibre networks, significant amount of costs are shared between modelled copper and fibre networks and VHCN's of alternative operators which are deployed on SMP's civil engineering infrastructure.	When modelling demand of modelled fibre network in the future we assume that some of the existing copper users will migrate to the modelled fibre network, but also to other alternative infrastructure e.g. VHCN's of alternative operators, including also possible 5G solutions. Also it should be taken into account that in Croatia we have relatively significant number of end users who have already migrated from the copper network to fixed solution over mobile networks and which are expected to partially migrate to fixed VHCN's in the future.
HU (ULL, VULA-C, VULA-H, DA)			When calculating costs using LRIC method, it is necessary to identify only those fixed and variable costs that would not be incurred if the group of services were no longer provided to third-party operators and retail subscribers. The avoidable costs of the group of services increment may be calculated by identifying the total long-run cost of an operator providing its full range of services and then identifying the long-run costs of the same operator in the absence of the group of services being provided to third parties retail subscribers. This may then be subtracted from the total long-run costs of the business to derive the defined increment.
IT (ULL, VULA-C, VULA-H, DA)	The model consider for all services a VHCN FTTH national network and for estimating the cost of each service the architecture is adapted for estimating copper based services. If higher cost is found the most efficient technology is used for estimating the price	There is only one network so the efficient cost is shared by the same whole number of active lines for all services. This means that the take up rate of copper/NGA/VHCN doesn't affect the corresponding cost, but only the whole number of active lines affect the costs	In the national situation the infrastructure competition is emerging from an alternative operator that is building own network independently mainly without using the civil infrastructure of the incumbent operator that are not widespread and accessible, moreover new civil infrastructures of the SMP are very recent. In this perspective a neutral make or buy signal can be achieved taking into account that volumes on third party infrastructures in line with the Commission Recommendation (FWA and FTTH) are excluded to evaluate unitary cost.
LI (FLLU, DA)	100% coverage (full replacement of copper access network, forced migration), ca. 80% take up. There is only one P2P-FTTB network of the SMP operator. There are no legacy copper or coax infrastructures any more. There is no competition in network infrastructure)		
NO (ULL)			Only copper and fibre demand are included in the model
RS (ULL, DA)	actual coverage of SMP operator		

Source: BEREC RA Database 2025

To better figure out how the three main issues previously addressed are taken into account, the following information has been collected: i) type of architecture considered for estimating costs of the services; ii) the main coverage considered in the model to understand if national in scope or not; iii) if this coverage is related to the SMP and/or OAO target; iv) if the price is a national average or not; v) if the price calculated takes into account state aid received.

Figure 40 - NRAs information main implementation issue

Questions	Options	copper	FTTC	FTTH	DA
Architecture considered for cost calculation of the service	FTTH	4 (DE,HR, FR, RS)	2 (HR, IT)	5 (BE, DK, HR, IT, LI)	3 (DE, IT, RS)
	FTTE-FTTC-FTTH	2(CY, HU)	2 (CY, HU)	2 (CY, HU)	1 (HU)
	FTTH-FTTC	1 (EL)	1 (EL)	1 (EL)	1 (EL)
	FTTE-FTTC		1 (IE)		
	FTTE	2 (BE, IT)			
Main coverage	Other				
	National	13 (BE, CY, DE, EL, FR, HR, HU, IT, LU, NO, PL, RS, SI)	5 (CY, EL, HR, HU, IT)	7 (CY, EL, HR, HU, IT, LI, PL)	11 (DE, EE, EL, ES, HU, IE, IT, LI, PL, RS, SI)
	Sub national			2 (BE, DK)	
Coverage NGA (FTTC/FTTH) Target Time	Other				
	Forward Looking	8 (CY, DE, EL, FR, HR, HU, NO, PL)	5 (CY, EL, HR, HU, IT)	9 (BE, CY, DK, EL, HR, HU, IT, LI, PL)	5 (DE, EL, HU, IT, LI)
	As is	3 (IT, LU, RS)			1 (RS)
Coverage (NGA (FTTC/FTTH))	Other				
	SMP coverage	8 (BE, CY, EL, HR, NO, PL,RS, SI)	3 (CY, HR)	5 (BE, CY, HR, PL)	4 (PL, RS, SI)
	OAo coverage				EL
	SMP+OAo coverage	1 (DE)	1 (EL)	1 (EL)	1 (DE)
	National	2 (FR, HU)	2 (HU, IT)	3 (HU, IT, LI)	3 (HU, IT, LI)
	Sub national				
Cost calculation	Other				
	National average	12 (BE, CY, DE, EL, FR, HR, HU, IT, LU, NO, RS, SI)	6 (CY, EL, HR, HU, IT)	6 (CY, EL, HR, HU, IT, LI)	9 (DE, EE, EL,,ES, HU, IT, LI, RS, SI)
	Target areas where regulation is in charge	1 (PL)		3 (BE, DK, PL)	1 (PL)
Do you take into account state aid plans in your model?	Other				
	Yes we exclude target areas that is financed	2 (EL, HR)	1 (EL)	1 (EL)	
	Yes we exclude contribution received	2 (DE, NO)		1 (DK)	1 (DE)
	Other				
Volume discount	No	4 (BE, EE, HU, IT)	3 (HU, IT)	4 (BE, HU, IT, LI)	3 (HU, IT,LI)
	Are there SMP wholesale volume discount offers?	BE (FLLU only valid for the Joint Venture), LT (Based on volume km of OAo that are required), HR (part of the reference offer that is approved), FR (The co-financing recurring price decreases with the co-financing rate. Without co-financing, price is fixe and they are not discount offers), IT (only for FSLU services and in relation to previous joint venture/co-investment with Fastweb since2019 approved by NCA and Agcom)			
	Does NRAs approve this offer?	Yes (AT,HR,IT, IE, LT, RS)			

Source: BEREC RA Database 2025

From the previous replies we understand that NRAs take care of the stability issue and the provision of the Recommendations are well addressed with the scope to warrant final price stability.

NRAs that apply the Recommendation address the issue of the target coverage and take-up in defining a national coverage model with a forward-looking perspective. The costs are estimated mainly at a national level. For copper-based services the costs are estimated more frequently using an (efficient) FTTH network instead of a copper-based one. The modelling approach is consistent independently from the product in question such as copper, NGA VHCN and civil infrastructure.

Concerning traffic volumes on third party infrastructure: most NRAs do not include the part of demand on third party networks in combination with a national coverage in the costing methodology.

NRAs generally do not take into account state aid received by the incumbent operator, although some NRAs exclude these target areas from the calculation (EL, HR¹³⁰) or exclude the contribution received (DE, DK); this usually happens in countries where state aid plans are very limited, the opposite happens in other cases such as (IT).

The second main issue addressed by the Commission Recommendation, which is also relevant in the Gigabit Recommendation, is how reusable civil infrastructure is taken into account in the model. In the following table replies provided by NRAs are reported. Almost all NRAs that apply the Commission Recommendation take into account reusable civil infrastructure for cost calculation when relevant. No differences are detected in the approach between different product markets, meaning that already depreciated assets are treated in the same way for estimating costs, where relevant, for copper, NGA and VHCN services. PIA, both underground and poles, can be considered reusable; in some countries only underground civil infrastructure (ducts and manholes) is considered reusable (BE, IT, RS). Some respondents (4) consider only legacy copper infrastructures to be reusable (BE, CZ, HU, IT), when others consider both legacy copper infrastructures and new VHCN infrastructures to be a reusable asset (EE, EL, FR, HR, IE, LI¹³¹, LU, NO). Few NRAs also consider copper cables to be a reusable asset. In that case the economic lifetime of the infrastructure is considered to be longer than the general book value.

A question on duct access, namely pricing differences between old and new infrastructure in line with Rec. 59 of the Gigabit Recommendation reveals that only one NRA applies different prices for old and newly build duct access infrastructure.

Figure 41 - NRA information on civil infrastructure

Question	Options	Replies
Do you take into account reusable civil infrastructure?	Yes	19 (BE,CY,CZ,DE,DK,EL,ES,FR,HR,HU,IE,IT, LI,LU, NO,PL,RS,SI,SK)
	Only legacy copper infrastructures	4 (BE, CZ, HU, IT)
	Both legacy copper infrastructures and new VHCN infrastructures	7 (EL, FR, HR, IE, LI, LU, NO)
Which infrastructure do you consider to be reusable?	Comment received on which elements are taken into account when considering reusable civil infrastructure?	(IT) AGCOM considers that the asset-valuation method reflects the fact that reusable legacy civil-engineering infrastructure assets cannot be replicated in the competitive process. In that sense, only duct legacy trench has been effectively considered reusable and RAB has been excluded as already depreciated. For pole, even if not explicitly considered reusable due to the fact that activities and investments should host more than one OAO, the asset life has been considered equal to 40 years instead of the lower value generally accepted (20 years) for such kind of asset, with the objective to contributing to the intention of reusability purpose in the final price;

¹³⁰ HR declared that “since the modeled fibre network is similar to the SMP's fibre network the NRA excluded expected subsidies from the calculation of capex costs. For state aided areas HR considered a higher take- up rate since in these areas are not expected to have more than one VHCN network”.

¹³¹ This is valid only for VHCN services. In other cases, only the legacy infrastructure is considered to be relevant for copper LLU.

	(FR, HR, HU, LI, NO) All ducts, manhole, poles are considered reusable; (IE) For ducts the infrastructure is considered reusable depending on the rates of incidence remediation activities per kilometre (e. g. number of blockage clearances per kilometre); We have looked at data from the SMP operator regarding their actual deployment and investment in its FTTH network. The NRA considers all routes where the SMP operator has deployed FTTH to be classified as reusable, where the NRA takes the top-down valuation recorded in the SMP operators accounts. BE, RS only ducts have been considered to be reusable.
Which method do you use to consider already-depreciated infrastructures?	The depreciated assets are no longer included in the RAB and estimated at book value using accounting data from the SMP operator (CZ,DE,ES,FR,HR,IE,NO,SK); Indexation method (EL, HU, SI); The amount of already depreciated asset is obtained as the product between the parts of civil infrastructure that can be considered reusable with respect to the BU-LRAIC estimation, with the percentage of asset life already depreciated, in line with point 54 of the Gigabit Recommendation reusable legacy civil-engineering assets and their corresponding RAB have been evaluated on the basis of current costs adjusted for depreciation over the lifetime of the assets, that means that already depreciated assed have been excluded from the RAB. (IT).
What percentage of underground civil infrastructure do you consider to be reusable with respect to all underground civil infrastructures included in the RAB model?	<10 % (BE); <20 % (IT); <50 % (HR); <80 % (LU); CZ<90 %, >90 % (DK, FR, HU, LI, RS)
Average asset life already depreciated of the underground civil infrastructure that you consider reusable	<20 (CZ); <=30 (ES); <=40 (IT, LU); HU (>40)
Asset life of all other underground civil infrastructure	<=40 (CZ, EL, IT, LU, SK); >40 (FR, HU)
Do you consider copper cable reusable?	Yes 4 (CZ, NO, SI, SK)
Asset life of copper cable (number of years)	20 (SI); 36 (CZ); 50 (NO buried cable economic life time 50 year - 12-25 regulatory lifetime)
Do you differentiate prices for new and old infrastructure (reply for Duct access product)?	1 (DE)

Source: BEREC RA Database 2025

3.5 Cost model technical implementation

In line with past editions and confirmed by the present survey of the regulatory accounting report information on technical cost model implementation by NRAs is reported in the following table. The

replies are reported without differentiating between single product markets, as is the case for reusable civil infrastructure. No differences are observed where replies by NRAs are provided for more than one product/market.

Figure 41 summarises the main approaches by NRAs to implement cost models. The replies reported are independent of the specific price control and costing methodology adopted by each NRA and refer to the implementation of the models that support the price control and costing methodologies.

As a general question NRAs were required to provide information on the asset base of the model used; most replies consider a bottom-up basis as a main instrument; a scorched node or modified scorched node¹³² approach is applied by most NRAs; the local central office /ODF area covered is also the main approach to start the design project of the network. For FTTH a GPON solution is the most frequent architecture to calculate the cost of services.

In the survey some other elements have also been addressed *inter alia* one question on the treatment of the inflation rate in the model implementation. Point 61 of the Commission Notice on WACC: “Investors maximise their inflation-adjusted or real returns. There are typically two ways in which NRAs take inflation into account: a) inflation is compensated for through the annual indexation of the company's assets and only a real WACC return is allowed; or b) inflation expectations are included in the return on capital, by using a nominal WACC, without any adjustment to the company's asset base.” The replies received are not extensive and both options (a and b) included in the Commission Notice on WACC are considered by NRAs without a specific majority approach.

Figure 42 – General network modelling approach

Questions	Options	Replies
Asset Base	BU (Bottom up)	14 (BE,CY,CZ,DE,DK,EL,ES,FR,HR,HU,IT,LU,NO, RS)
	TD (Top down)	3 (LI, PL, SI)
	Hybrid	1 (IE)
Model main assumption ¹³³	Scorched node	6 (BE,CY,HR,HU,IT,SI)
	Scorched earth	1 (PL)
	Modified Scorched node	7 (DE,DK,EL,FR,IE,LU,NO)
Model geographical unit	MDF/ODF area	10 (BE,CY,EL,FR,HU,IE,IT,LU,NO,RS)
	Municipality	
	Municipality/MDF-ODF area	2 (DE, PL)
	Other	1 (HR)
Architecture FTTH	GPON/P2P	4 (BE ¹³⁴ ,CZ,FR,LU)
	GPON	6 (CY,EL,HR,HU,IT,RS)
	P2P	1 (DE)

¹³² The scorched node approach assumes that the historical number of locations of the actual network node are fixed and that the operator can choose the best technology to configure the network in between these nodes. The scorched earth approach determines the efficient cost of a network that provides the same services as actual networks without placing any constraints on network configuration. A modified scorched node is in-between the two previous approaches.

¹³³ The information reported is independent from the main price control method (such as Cost orientation/Price cap/ERT) declared by NRAs in each market/product.

¹³⁴ BE for FLLU P2P and GPON for VULA-H

	Other	0
How do you include the asset price development?	Already in the nominal WACC (point 61-b Commission WACC notice)	3 (IT, LI, SI)
	Explicitly in the asset base in combination of real WACC (point 61 -a Commission WACC notice)	2 (FR, HU)
	Allowing direct adjustment of inflation on the final price (ex. Price*(1+Allowed IR))	1(LU)
	Other	3 (CZ, BE ¹³⁵ , DK)
Number of Local central office/point of interconnection considered	600 (BE); 7542 (CZ), 8187 (FR); 348 (HR) ¹³⁶ 4000 (IT); 35 (LI); 100 (LU); 6400 MDF/200 ODF (RS);	
Cost per meter (digging) new civil infrastructure (average value)	985 CZK/m - 42 Euro/m (CZ); 45 (ES); 40-50 Euro/m (FR); 67,85 Euro/m (HR); 37 (VHCN)- 42(copper) Euro/m (IT); 10 Euro/m (RS); 595 SEK/m- 54,3 Euro/m (SE)	
Cost per meter (pole) new civil infrastructure (average value)	11-13 Euro/m (FR); 1,05 Euro/m (HR); 6.3 Euro/m (IT);	
What percentage (%) is the poles length trace included in your model with respect to the whole trace length: (length of pole trace)/(total trace length)?	<10% (CZ); <40% (FR); <40%-45% (HR); <50%(IT); <10%(SE)	
Do the SMP plans of copper network switch-off have an impact on the model?	3 Yes (BE, DK, LU) BE (Demand is impacted by migration from copper); LU (price increase)	

Price Benchmark

In the following table the price for recurrent fees (monthly fee) are reported for all the NRAs that provided information for the main products: i) ULL; ii) SLU; iii) FLLU; iv) VULA-C; v) VULA-H; vi) DA; vii) poles. The corresponding main price control is also reported in combination. All prices are in Euro currency. For civil infrastructure access the price is reported as specified by the NRAs, converted also in standard value as Euro/m/cm²/month in fact many different pricing approaches are available for different countries: in some cases it may refer to meter for specific space, in other cases for mini duct, the prices are differentiated also with respect to kind of the fee (monthly, yearly, multi-years).

¹³⁵ BE: Asset price evolution is taken into account through price trends. HR: The rate of price change associated to the asset has been applied throughout the useful asset life.

¹³⁶ HR There are 10 sites (in 5 cities) where regional/national bitstream access is provided (regardless of access network technology). A national bitstream access seeker can reach all users in Croatia via sites in one city. BE 5x2 interconnection points for bitstream legacy NGA and FTTH, and 1+1 for cable.

	ULL Euro/month		SLU (Euro/month)		FLU (Euro/month)		VULA (FTTC) (Euro/month)		VULA (FTTH) (Euro/month)		Duct access			Poles
	Price (recurrent fee)	Price control main category	Price (recurrent fee)	Price control main category	Price (recurrent fee)	Price control main category	Price (recurrent fee)	Price control main category	Price (recurrent fee)	Price control main category	prices as available in the offer	Price converted in Euro/m/cm ² /month the space when not indicated (12mm of diameter have been considered for the conversion for cm ² and 1100 m if the price refer for sp of xx meters)	Price control main category	prices as available in the offer
BE	8.73	Cost_Orient ation				Others/Co mbination	15.4	Cost_Orientati on	19.49 (depending on the speed profile)	Others/Com bination			Others/Co mbination	
CY	8.7	Cost_Orient ation	5.45	Cost_Orie ntation			8.24	Cost_Orientati on	8.24	Cost_Orient ation				
CZ	7.03	Others/Co mbination	6.91	Others/Co mbination	62.81	Others/Co mbination	8.19	Others/Combi nation	8.19	Others/Com bination				
DE	10.65	Cost_Orient ation	7.2	Cost_Orie ntation				Cost_Orientati on		No price control/Price Flexibility			Cost_Orient ation	
EE		0			60 (up to 3 Km)	Cost_Orient ation		Cost_Orientati on		Cost_Orient ation	0.045 Euro/meter/month for 30 mm of diameter	0.064	Cost_Orient ation	5,75 € per pole/month
EL	8.17	Cost_Orient ation	4.08	Cost_Orie ntation			7.96-8.90 (depending on speed profile)	Cost_Orientati on	11.08-19.34	Cost_Orient ation			Cost_Orient ation	
ES													Cost_Orient ation	Wood: 0.40 per pole/month Polyester: 0.78 per pole/month Concrete: 1.39 per pole/month
FI		Cost_Orient ation		Cost_Orie ntation	FTTH: 13.50- 27.50 (dependin g on SMP area) FTTB: 62- 92.50 (dependin g on SMP area)	Cost_Orient ation		Cost_Orientati on		Cost_Orient ation				
FR	9.2	Cost_Orient ation	9.2	Cost_Orie ntation							Non-mutualised deployments: 0,057€/cm ² *m/month , Mutualised deployments: 1,054/premise to pass/month	0.057	Cost_Orient ation	Non- mutualised deployments: 0,057€/cm ² *m/ month , Mutualised deployments: 1,054/premise to pass/month
HR	5.63	Cost_Orient ation				Cost_Orient ation		Cost_Orientati on		Cost_Orient ation	63-110 mm EUR/m/year 1,377; 50 mm EUR/m/year 1,1733; 20-40 mm EUR/m/year 0,3942; 3-16 mm (micro ducts) EUR/m/year 0,2243	0.026-0.002	Cost_Orient ation	
HU	4.1	Cost_Orient ation	2.49	Cost_Orie ntation	3.51	Cost_Orient ation	5.18-8.77 (30Mbit/s- depending on SMP area)	Cost_Orientati on	5.86-9.67	Cost_Orient ation	53.57 Euro/km/month	0.047	Cost_Orient ation	0.21 Euro/pole/mo nth
IE		No price control/Price Flexibility		No price control/Price Flexibility			20	Cost_Orientati on	23.50 (500Mbit/s) higher price for higher speed	Others/Com bination	0.55 Euro/m/Annual standard; 0.43 Euro/m/Annual (commercial areas); 0.35 Euro/m (State aid area) 25mm of cross section	0.0093-0.006	Cost_Orient ation	22.51Euro/pole /annual fee
IT	10.03	Cost_Orient ation	6.09	Cost_Orie ntation	10.60 (competit ive areas)- 11.89 Euro/mo nth	No price control/Price Flexibility	13.18 all speed	Cost_Orientati on	14.23 All speed until 2.5Gigabit/s	Cost_Orient ation	6.94 Euro/m/15 Years (until 2 miniduct 12mm of cross section) 4.09 Euro/m/15 years (until 5 miniduct) 12mm of cross section	0.058 - 0.034	Cost_Orient ation	4.13 Euro/m/15 Years (1 miniduct 12mm of cross section)
LI					21.95	Cost_Orient ation					0.12 Euro/m/month access segment 0.14 Euro/m/month backhaul	0.11-0.12	Cost_Orient ation	
LT	2.8	Cost_Orient ation	2	Cost_Orie ntation	4.5	Cost_Orient ation			7.9-30 depending on the speed		27 Euro/km/month	0.024	Cost_Orient ation	
LV						Others/Co mbination			5.5	Others/Com bination	36,44 EUR per initial 100 m; 4,28 EUR per every next 100 m. Per month	0.064	Cost_Orient ation	18,45 EUR per initial 6 poles; 1,00 EUR per every next pole.
LU	9.06	Cost_Orient ation	5.66	Cost_Orie ntation		Retail_min us				Retail_minu s				
NO	8.69	Cost_Orient ation	7.16	Cost_Orie ntation	32.38	No price control/Price Flexibility				Others/Com bination				
PT	8.99				10.28	No price control/Price Flexibility			14		Ducts (occupation for main ducts): 6.37€/km/cm ² /month - Lisboa and Porto municipalities 4.86€/km/cm ² /month - other municipalities	0.0064-0.0049	Cost_Orient ation	Poles (pole occupation, per cable fixation per month): 1.00 €
RS	5.35	Cost_Orient ation									1) The monthly charge for the lease of the space in cable ducts for laying cables in pipes with the diameter up to 20mm is 0,061 eur/m. 2) The monthly charge for the lease of the space in cable ducts for laying cables in pipes with the diameter up to 40mm is 0.09 eur/m.	0.026-0.0071	Cost_Orient ation	
SI	5.46	Others/Co mbination		Others/Co mbination		Retail_min us		Retail_minu s	6.8	Retail_minu s	72,09 EUR/km/month	0.064	Others/Co mbination	
SK	4.2	Others/Co mbination				Others/Co mbination	8.2	Others/Combi nation	8.2	Others/Com bination			Cost_Orient ation	Dec 2020

In the following Figure legacy ULL services and adopted costing methodologies are shown. The reported price bands¹³⁷ have been evaluated considering a compound inflation rate from 2014 until 2024 (HIPC) for each country.¹³⁸ The other tables show replies provided by NRAs for all other products/markets.

¹³⁷ The price band refers to the one reported in rec. 41 of the NDCM Recommendation in Euro currency.

¹³⁸ <https://ec.europa.eu/eurostat/databrowser/view/tec00118/default/table?lang=en>. The compound inflation rate is considering the time window 2014 -2024. Where not available, the EU (27) compound inflation rate has been used. The low and high value of the price band have been evaluated as $8-10 \cdot (1 + \text{inflation rate}_{2014}) \cdot (1 + \text{inflation rate}_{2015}) \dots (1 + \text{inflation rate}_{2024})$.

Figure 43 – LLU monthly fee and costing methodology/price band

	Regulated product	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test	price declared	Price band low	Price band High	Inflation (2014-2024)
BE	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ex-post MS test	8.73	10.68	13.35	1.33
CY	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Straight-line (linear depreciation)	EOO	ERT (Economic Replicability Test)	8.7	9.33	11.66	1.17
CZ	Yes	Others/Combination	N/A	N/A	N/A	N/A	EOI	ex - ante MS test	€ 7,03 / 175 CZK	12.31	15.39	1.54
DE	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Annuity	N/A	ex - ante MS test	10.65	10.51	13.13	1.31
EL	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ERT (Economic Replicability Test)	8.17	9.53	11.92	1.19
FI	Yes	Cost_Orientation	FDC	N/A	CCA	Straight-line (linear depreciation)	N/A	N/A	N/A	9.67	12.08	1.21
FR	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	9,20€/access/month (excluding network taxes)	9.98	12.47	1.25
HR	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ex - ante MS test	5.63	10.65	13.31	1.33
HU	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A	1610 HUF/month	13.47	16.83	1.68
IT	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Annuity	EOI	N/A	10.03 Euro/mese	9.87	12.34	1.23
LT	Yes	Cost_Orientation	FDC	N/A	HCA	RAV (Regulatory Asset Value)	N/A	ex-post MS test	2.8	12.11	15.13	1.51
LU	Yes	Cost_Orientation	LRIC	N/A	CCA	Tilted annuity	EOI	N/A	9.06	10.09	12.61	1.26
NO	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	HCA	Economic depreciation	EOO	N/A	102 NOK	11.17	13.96	1.4
PL	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	N/A	11.94	14.92	1.49
RS	Yes	Cost_Orientation	FDC	N/A	CCA	Straight-line (linear depreciation)	EOO	N/A	5,35 eur	12.4	15.5	1.55
SI	Yes	Others/Combination	LRIC	BU-LRIC	CCA	Tilted annuity	EOI	N/A	5.46	10.24	12.8	1.28
SK	Yes	Others/Combination	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	4.2	11.53	14.42	1.44

Figure 44 – SLU monthly fee and costing methodology

	SLU	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test	price declared
CY	Yes	Cost_Orientatio n	LR_A_IC	BU-LR(A)IC+	CCA	Straight-line (linear depreciation)	EOO	ERT (Economic Replicability Test)	5.45
CZ	Yes	Others/Combina tion	N/A	N/A	N/A	N/A	EOI	ex - ante MS test	€ 6,91 / 172 CZK
DE	Yes	Cost_Orientatio n	LR_A_IC	TD-LR(A)IC+	CCA	Annuity	N/A	ex - ante MS test	7.2
EL	Yes	Cost_Orientatio n	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ERT (Economic Replicability Test)	4.08
FI	Yes	Cost_Orientatio n	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FR	Yes	Cost_Orientatio n	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	9,20€/access/ month (excluding network taxes)
HU	Yes	Cost_Orientatio n	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A	979 HUF/month
IT	Yes	Cost_Orientatio n	LR_A_IC	BU-LR(A)IC+	CCA	Annuity	EOI	N/A	6.09 Euro/mese
LT	Yes	Cost_Orientatio n	FDC	N/A	HCA	RAV (Regulatory Asset Value)	N/A	ex-post MS test	2
LU	Yes	Cost_Orientatio n	LRIC	N/A	CCA	Tilted annuity	EOI	N/A	5.66
NO	Yes	Cost_Orientatio n	LR_A_IC	BU-LR(A)IC+	HCA	Economic depreciation	EOO	N/A	84 NOK
PL	Yes	Cost_Orientatio n	LR_A_IC	TD-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	N/A

Figure 45 – FLLU monthly fee and costing methodology

	FLLU	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test	price declared
BE	Yes	Others/Combination	LR_A_IC	BU-LR(A)IC+	CCA	Economic depreciation	EOO	ex-post MS test	No price decision as of today
CZ	Yes	Others/Combination	N/A	N/A	N/A	N/A	EOI	ex - ante MS test	€ 62,81 / 1 564 CZK
DK	Yes	No price control/Price Flexibility	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EE	Yes	Cost_Orientation	FDC	N/A	HCA	Straight-line (linear depreciation)	EOO	ERT (Economic Replicability Test)	60 per fiber (up to 3 km)
FI	Yes	Cost_Orientation	FDC	N/A	CCA	Straight-line (linear depreciation)	N/A	N/A	Prices for FTTH: DNA 13,50 eur/mo Elisa 16,00 eur/mo Telia 27,50 eur/mo Prices for FTTB: DNA 92,50 eur/mo Elisa 82,00 eur/mo Telia 84,50 eur/mo
HR	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ex - ante MS test	N/A
HU	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A	1379 HUF/month from the ODF;
IT	Yes	No price control/Price Flexibility	LR_A_IC	BU-LR(A)IC+	CCA	N/A	EOI	N/A	10.60 Euro/m (competitive areas)-11.89 Euro/month (non competitive areas)
LI	Yes	Cost_Orientation	FDC	N/A	HCA	Straight-line (linear depreciation)	Other	N/A	fibre LLU: CHF 21.95 per month
LT	Yes	Cost_Orientation	FDC	N/A	HCA	RAV (Regulatory Asset Value)	N/A	ex-post MS test	4.5
LU	Yes	Retail_minus	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A
LV	Yes	Others/Combination	FDC	N/A	CCA	Straight-line (linear depreciation)	N/A	N/A	2.99 EUR par 100 metres
NO	Yes	No price control/Price Flexibility	N/A	N/A	N/A	N/A	EOO	N/A	380 NOK
PL	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	N/A
PT	Yes	No price control/Price Flexibility	N/A	N/A	N/A	N/A	EOI	N/A	10.286
SE	Yes	N/A	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A
SI	Yes	Retail_minus	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A
SK	Yes	Others/Combination	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A

Figure 46 – VULA-C monthly fee and costing methodology

	VULA C	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test	price declared
BE	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	N/A	EOO	ex-post MS test	N/A
CY	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Straight-line (linear depreciation)	EOI	ERT (Economic Replicability Test)	8.24
CZ	Yes	Others/Combination	N/A	N/A	N/A	N/A	EOI	ex - ante MS test	€ 8,19 / 204 CZK
DE	Yes	Cost_Orientation	N/A	N/A	CCA	Annuity	N/A	ex - ante MS test	N/A
EE	Yes	Cost_Orientation	FDC	N/A	HCA	Straight-line (linear depreciation)	EOO	ERT (Economic Replicability Test)	VULA is not yet implemented, it will be Nov 2025
EL	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ERT (Economic Replicability Test)	see cells 240-244
FI	Yes	Cost_Orientation	N/A	N/A	CCA	Straight-line (linear depreciation)	N/A	N/A	N/A
HR	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ex - ante MS test	N/A
HU	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A	DIGI L2WAP: FTTC VDSL 30 MBit/s 2035 HUF/month w/o TV; 2556HUF/month w 3 TV channel Magyar Telekom L2WAP: FTTC VDSL 30 MBit/s 2202 HUF/month w/o TV; 3441 HUF/month w 3 HD TV channel (and 0 SD channel)
IE	Yes	Cost_Orientation	LR_A_IC	N/A	CCA	Economic depreciation	N/A	N/A	€20 since 1 July 2025
IT	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Annuity	EOI	N/A	13.18 Euro/mese (non competitive areas)
SI	Yes	Retail_minus	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A
SK	Yes	Others/Combination	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	8.2

Figure 47 – VULA-H monthly fee and costing methodology

	VULA H	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test	price declared
BE	Yes	Others/Combination	LR_A_IC	BU-LR(A)IC+	CCA	Economic depreciation	EOO	ex-post MS test	From 19 € to 49 € according to line profile
CY	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Straight-line (linear depreciation)	EOI	ERT (Economic Replicability Test)	8.24
CZ	Yes	Others/Combination	N/A	N/A	N/A	N/A	EOI	ex - ante MS test	€ 8,19 / 204 CZK
DE	Yes	No price control/Price Flexibility	N/A	N/A	CCA	Annuity	N/A	ex - ante MS test	N/A
EE	Yes	Cost_Orientation	FDC	N/A	HCA	Straight-line (linear depreciation)	EOO	ERT (Economic Replicability Test)	VULA is not yet implemented, it will be Nov 2025
EL	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ERT (Economic Replicability Test)	see cells 247-263
FI	Yes	Cost_Orientation	N/A	N/A	CCA	Straight-line (linear depreciation)	N/A	N/A	N/A
HR	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ex - ante MS test	N/A
HU	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A	DIGI L2WAP: FTTH 500 MBit/s 2299 HUF/month w/o TV; 3300 HUF/month w 3 TV channel Magyar Telekom L2WAP: FTTH 150 MBit/s 2555 HUF/month w/o TV; 3794 HUF/month w 3 HD TV channel (and 0 SD channel)
IE	Yes	Others/Combination	N/A	N/A	N/A	N/A	N/A	ex - ante MS test	€23.50 is the lowest monthly rental charge for the incumbent's FTTP VUA 500MBPS service. Faster speed services are available at higher prices.
IT	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Annuity	EOI	N/A	14.23 Euro/month (non competitive areas) all profiles until 2.5 Gbit/s (down)-1Gbit/s (up)
LU	Yes	Retail_minus	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A
LV	Yes	Others/Combination	FDC	N/A	CCA	Straight-line (linear depreciation)	N/A	N/A	5.50 EUR
MT	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NO	Yes	Others/Combination	N/A	N/A	N/A	Straight-line (linear depreciation)	EOO	ERT (Economic Replicability Test)	N/A
SI	Yes	Retail_minus	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A
SK	Yes	Others/Combination	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	8.2

Figure 48 – Duct-access monthly fee and costing methodology

	DA	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test	price declared
BE	Yes	Others/Combination	LR_A_IC	BU-LR(A)IC+	CCA	N/A	EOO	N/A	N/A
BG	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Annuity	N/A	N/A	Dependent on number of users
EE	Yes	Cost_Orientation	FDC	N/A	HCA	Straight-line (linear depreciation)	N/A	N/A	0.045/m for 30mm diameter cable slot
EL	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	N/A
ES	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Economic depreciation	EOO	N/A	N/A
FR	Yes	Cost_Orientation	FDC	N/A	CCA	Tilted annuity	EOI	N/A	Non-mutualised deployments: 0,0576/cm2*/m/month Mutualised deployments: 1,054/premise to pass/month
HR	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	63-110 mm EUR/m/year 1,377; 50 mm EUR/m/year 1,1733; 20-40 mm EUR/m/year 0,3942; 3-16 mm (micro ducts) EUR/m/year 0,2243
HU	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A	21028 HUF/km/month
IE	Yes	Cost_Orientation	N/A	N/A	N/A	Straight-line (linear depreciation)	N/A	N/A	See Schedules 103 and Schedule 104-106 in the price list linked below: https://www.openeir.ie/industry-information/reference-offers#PIARO and click on the following document: PIARO Price List V2.0 Final_UnMarked_01092025.pdf
IT	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Annuity	EOI	N/A	N/A
LI	Yes	Cost_Orientation	FDC	N/A	HCA	Straight-line (linear depreciation)	Other	N/A	0.107 CHF per month per metre in access segment; 0.128 CHF per month per metre in backhaul segment
LT	Yes	Cost_Orientation	FDC	N/A	HCA	RAV (Regulatory Asset Value)	N/A	ex-post MS test	27 Eur / 1 km
LV	Yes	Cost_Orientation	FDC	N/A	CCA	Straight-line (linear depreciation)	N/A	N/A	36,44 EUR per initial 100 m; 4,28 EUR per every next 100 m.
NO	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PL	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	N/A
PT	Yes	Cost_Orientation	N/A	N/A	N/A	N/A	EOI	N/A	Ducts (occupation for main ducts): 6.37€/km/cm2 - Lisboa and Porto municipalities 4.88€/km/cm2 - other municipalities
RS	Yes	Cost_Orientation	FDC	N/A	CCA	Straight-line (linear depreciation)	EOO	N/A	1) The monthly charge for the lease of the space in cable ducts for laying cables in pipes with the diameter up to 20mm is 0,061 eur/m. 2) The monthly charge for the lease of the space in cable ducts for laying cables in pipes with the diameter up to 40mm is 0,09 eur/m.
SI	Yes	Others/Combination	LRIC	BU-LRIC	CCA	Tilted annuity	EOI	N/A	72,09 EUR/km
SK	Yes	Cost_Orientation	LRIC	BU-LRIC	N/A	N/A	Other	N/A	N/A

Figure 49 – Pole fee and costing methodology

	Pole	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test	price declared
BG	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Annuity	N/A	N/A	N/A
EE	Yes	Cost_Orientation	FDC	N/A	HCA	Straight-line (linear depreciation)	N/A	N/A	5,75 € per pole
EL	Yes	N/A	N/A	N/A	N/A	Tilted annuity	N/A	N/A	N/A
ES	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Economic depreciation	EOO	N/A	Wood: 0.40 Polyester: 0.78 Concrete: 1.39
FR	Yes	Cost_Orientation	FDC	N/A	CCA	Tilted annuity	EOI	N/A	Non-mutualised deployments: 0,057€/cm2*m/month Mutualised deployments: 1,054/premise to pass/month
HU	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A	82 HUF/piece/month
IE	Yes	Cost_Orientation	N/A	N/A	N/A	Straight-line (linear depreciation)	N/A	N/A	See Schedule 102 in the price list linked below: https://www.openair.ie/industry-information/reference-offers#PIARO and click on the following document: PIARO Price List V2.0 Final_UnMarked_01092025.pdf
IT	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Annuity	EOI	N/A	N/A
LV	Yes	Cost_Orientation	FDC	N/A	CCA	Straight-line (linear depreciation)	N/A	N/A	18,45 EUR per initial 6 poles; 1,00 EUR per every next pole.
NO	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PL	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	N/A
PT	Yes	Cost_Orientation	N/A	N/A	N/A	N/A	EOI	N/A	Poles (pole occupation, per cable fixation): 1.00 €

Figure 50 – DF and costing methodology

	DF	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test
AT	Yes	Cost_Orientati on	FDC	N/A	CCA	Straight-line (linear depreciation)	N/A	N/A
CZ	Yes	Cost_Orientati on	LRIC	BU-LRIC	CCA	Tilted annuity	EOI	N/A
DE	Yes	Cost_Orientati on	LR_A_IC	TD-LR(A)IC+	CCA	Annuity	N/A	N/A
EL	Yes	Cost_Orientati on	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	N/A
FR	Yes	Others/Combina tion	N/A	N/A	N/A	N/A	EOO	N/A
HU	Yes	Cost_Orientati on	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A
IE	Yes	Cost_Orientati on	N/A	N/A	N/A	Tilted annuity	N/A	N/A
IT	Yes	Cost_Orientati on	LR_A_IC	BU-LR(A)IC+	CCA	Annuity	EOI	N/A
LI	Yes	Cost_Orientati on	FDC	N/A	HCA	Straight-line (linear depreciation)	Other	N/A
LT	Yes	Cost_Orientati on	FDC	N/A	HCA	RAV (Regulatory Asset Value)	N/A	ex-post MS test
PL	Yes	Cost_Orientati on	LR_A_IC	TD-LR(A)IC+	CCA	Tilted annuity	EOO	N/A
PT	Yes	Cost_Orientati on	N/A	N/A	N/A	N/A	EOO	N/A
RS	Yes	Cost_Orientati on	FDC	N/A	CCA	Straight-line (linear depreciation)	EOO	N/A
SI	Yes	Others/Combina tion	LRIC	BU-LRIC	CCA	Tilted annuity	EOI	N/A

Figure 51 – BTS legacy fee and costing methodology

	Regulated product	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test	price declared
BE	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ex-post MS test	13.66
DE	Yes	Cost_Orientation	N/A	N/A	N/A	N/A	N/A	ex - ante MS test	N/A
EL	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ERT (Economic Replicability Test)	N/A
FI	Yes	No price control/Price Flexibility	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FR	Yes	Cost_Orientation	N/A	N/A	CCA	Tilted annuity	EOO	N/A	Price is mainly composed of access component and collect component . 1 / Acces component: from 13,09€/month to 13,83€/month (excluding network taxes) 2/ Backhaul component: price depends on the backhaul technology and the class of service. For Ethernet, component is 2.700 / month + [0.60€ - 2.15€]/Mbits
HR	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	N/A	N/A	N/A	N/A	N/A
HU	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A	Shared Lines on copper network: 1195 HUF/month (30 Mbit/s downstream net speed); Naked Lines on copper network : 2566 HUF/month (30 Mbit/s downstream net speed)
LT	Yes	Cost_Orientation	FDC	N/A	HCA	RAV (Regulatory Asset Value)	N/A	ex - ante MS test	Prices vary from 7.90 Eur/month to 30 Eur/month depends on speed, quality, other parameters. More details - https://www.telia.lt/verslui/reguliuoja-mos-paslaugos/isankstiniai-pasiulymai/didmenine-placiajuosciorysio-prieiga
LU	Yes	Retail_minus	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A
NO	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PL	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	N/A
RS	Yes	Cost_Orientation	FDC	N/A	CCA	Straight-line (linear depreciation)	EOO	N/A	367 RSD (3,13 eur) for the xDSL access and 450 RSD (3,84eur) per Mb/s for traffic delivery
SI	Yes	N/A	LRIC	BU-LRIC	CCA	Tilted annuity	EOI	N/A	N/A

Figure 52 – BTS_FTTTC fee and costing methodology

	BTS FTTTC	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test	price declared
BE	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ex-post MS test	15.4
DE	Yes	Cost_Orientation	N/A	N/A	N/A	N/A	N/A	ex - ante MS test	N/A
EE	Yes	Cost_Orientation	FDC	N/A	HCA	Straight-line (linear depreciation)	EOO	ERT (Economic Replicability Test)	N/A
EL	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ERT (Economic Replicability Test)	N/A
FI	Yes	No price control/Price Flexibility	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HR	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	N/A	N/A	N/A	N/A	N/A
HU	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A	Shared Lines on FTTC/XDSL: 1848 HUF/month (50 Mbit/s downstream net speed); Naked Lines on FTTC/XDSL : 2687 HUF/month (50 Mbit/s downstream net speed)
LU	Yes	Retail_minus	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A
PL	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	N/A
RS	Yes	Cost_Orientation	FDC	N/A	CCA	Straight-line (linear depreciation)	EOO	N/A	N/A
SI	Yes	Retail_minus	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A
SK	Yes	Others/Combination	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A

Figure 53 – BTS_FTTH fee and costing methodology

	BTS FTTH	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test	price declared
BE	Yes	Others/Combination	LR_A_IC	BU-LR(A)IC+	CCA	Economic depreciation	EOO	ex-post MS test	From 19 € to 49 € according to line profile
DE	Yes	No price control/Price Flexibility	N/A	N/A	N/A	N/A	N/A	ex - ante MS test	N/A
DK	Yes	No price control/Price Flexibility	N/A	N/A	N/A	N/A	N/A	A price squeeze test is an element in the commitments. The test is carried out by the operator	N/A
EE	Yes	Cost_Orientation	FDC	N/A	HCA	Straight-line (linear depreciation)	EOO	ERT (Economic Replicability Test)	N/A
EL	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	ERT (Economic Replicability Test)	N/A
FI	Yes	No price control/Price Flexibility	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HR	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	N/A	N/A	N/A	N/A	N/A
HU	Yes	Cost_Orientation	LRIC	BU-LRIC	CCA	Tilted annuity	EOO	N/A	3171 HUF/month (100 Mbit/s downstream net speed)
LT	Yes	Cost_Orientation	FDC	N/A	HCA	RAV (Regulatory Asset Value)	N/A	ex - ante MS test	Prices vary from 7.90 Eur/month to 30 Eur/month depends on speed, quality, other parameters. More details - https://www.telia.lt/verslu-i/reguliuojamos-paslaugos/is-ankstiniai-pasiulymai/didmenine-placiajuoscio-rycio-prieiga
LU	Yes	Retail_minus	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A
LV	Yes	Others/Combination	FDC	N/A	CCA	Straight-line (linear depreciation)	N/A	N/A	5.50 EUR plus monthly fee for respective service class.
PL	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Tilted annuity	EOO	N/A	N/A
PT	Yes	No price control/Price Flexibility	N/A	N/A	N/A	N/A	EOO	N/A	Aggregate Access Prices (Monthly): Internal aggregate access: 1 Gbps - € 500 10 Gbps - € 1900 External aggregate access: 1 Gbps - € 700 10 Gbps - € 3000 Price per local access (Monthly): € 14
RS	Yes	Cost_Orientation	FDC	N/A	CCA	Straight-line (linear depreciation)	EOO	N/A	N/A
SI	Yes	Retail_minus	N/A	N/A	N/A	N/A	N/A	ERT (Economic Replicability Test)	N/A
SK	Yes	Others/Combination	N/A	N/A	N/A	N/A	EOI	ERT (Economic Replicability Test)	N/A

Figure 54 – LL_legacy and costing methodology

	LL Legacy	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test
BE	Yes	Others/Combination	LR_A_IC	BU-LR(A)IC+	CCA	N/A	EOO	ex-post MS test
CY	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Straight-line (linear depreciation)	EOO	N/A
DE	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Annuity	N/A	ex - ante MS test
EL	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	N/A
ES	Yes	Cost_Orientation	N/A	N/A	CCA	Economic depreciation	EOI	N/A
FR	Yes	Cost_Orientation	FDC	N/A	CCA	Tilted annuity	EOO	N/A
IE	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LT	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SI	Yes	N/A	LRIC	N/A	CCA	Tilted annuity	EOI	N/A

Figure 55 – LL_NGA and costing methodology

	LL NGA	Price control main category	Allocation method main category	Allocation method sub category	cost base	Annualization method	Equivalence model	Margin squeeze test
AT	Yes	Cost_Orientation	FDC	N/A	CCA	Straight-line (linear depreciation)	N/A	ex - ante MS test
BE	Yes	Others/Combination	LR_A_IC	BU-LR(A)IC+	CCA	N/A	EOO	ex-post MS test
CY	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Straight-line (linear depreciation)	EOO	N/A
DE	Yes	Cost_Orientation	LR_A_IC	TD-LR(A)IC+	CCA	Annuity	N/A	ex - ante MS test
EL	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Tilted annuity	EOO	N/A
ES	Yes	N/A	N/A	N/A	N/A	N/A	EOI	ex-post MS test
FR	Yes	Others/Combination	N/A	N/A	N/A	N/A	Other	ex - ante MS test
HR	Yes	Cost_Orientation	LR_A_IC	N/A	CCA	Tilted annuity	EOO	N/A
HU	Yes	Cost_Orientation	FDC	HCA-FDC	HCA	Straight-line (linear depreciation)	EOO	N/A
IE	Yes	Cost_Orientation	FDC	N/A	CCA	Tilted annuity	N/A	N/A
IT	Yes	Cost_Orientation	LR_A_IC	BU-LR(A)IC+	CCA	Annuity	Other	N/A
LT	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LU	Yes	Cost_Orientation	LRIC	N/A	CCA	Tilted annuity	Other	N/A
PT	Yes	Cost_Orientation	N/A	N/A	N/A	N/A	EOO	N/A
SI	Yes	N/A	LRIC	N/A	CCA	Tilted annuity	EOI	N/A

4. Additional Information: structural data

This section serves to identify main structural differences within European countries, for example the competitive and market situation in each country, population and population density indicators as well as existing telecommunications infrastructure as well as the state of NGA rollout.

These structural differences may have an influence on NRAs regulatory strategy and therefore the approach towards price regulation. However, it should be pointed out that there are a number of other important factors that may influence NRA regulation, i. e. national broadband strategy, national competitive challenges and country specific consumer behaviour.

A total of 30 NRAs¹³⁹ have provided data for this section. If data is confidential and can therefore not be shown in the analysis or if there are country specificities, this will be shown in the footnotes. Only data for countries who have responded to the survey will be shown.

The following structural data have been collected (data as at 1st April 2025 unless otherwise indicated in the footnotes):

¹³⁹ Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), Czechia (CZ), Germany (DE), Denmark (DK), Estonia (EE), Greece (EL), Spain (ES), Finland (FI), France (FR), Croatia (HR), Hungary (HU), Ireland (IE), Italy (IT), Liechtenstein (LI), Luxemburg (LU), Lithuania (LT), Latvia (LV), Malta (MT), Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Republic of Serbia (RS), Sweden (SE), Slovenia (SI), Slovakia (SK). No data has been provided in 2025 by: Albania (AL), Iceland (IS), Montenegro (ME), North Macedonia (MK), Kosovo (XK)* and Turkey (TR). Bosnia and Herzegovina (BA) and Ukraine (UA) may be included in future reports, as soon as data becomes available. *All references to Kosovo in this document should be understood to be in the context of the United Nations Security Council Resolution 1244 (1999).

Table 4 - Structural Data collected

1	Population and population density
1.1	Number of inhabitants
1.1a	Number of private households
1.1b	Average household size
1.2	Population density: number of inhabitants per sq km
1.2a	Metro population density
1.2b	Non-metro population density
2	Market situation
2.1	Mobile broadband penetration (subscriptions as % of the total population)
2.2	Fixed broadband penetration (subscriptions as a % of total households)
2.2.1	Technology share: % of DSL
2.2.2	Technology share: % of VDSL (NGA)
2.2.3	Technology share: % of cable (coax, HFC)
2.2.4	Technology share: % of FTTx
2.2.5	Technology share: % of other technologies (i.e. satellite, BWA etc.)
3	Market share SMP operator / competitors
3.1	Share of fixed broadband subscriptions
3.1.1	SMP operator
3.1.2	Competitors
3.1.3	Cable operators
3.2	Share of DSL broadband subscriptions legacy broadband
3.2.1	SMP operator
3.2.2	Competitors
3.3	Share of NGA (FTTB/C) broadband subscriptions
3.3.1	SMP operator
3.3.2	Competitors
3.3.3	Cable operators
3.4	Share of NGA (FTTH) broadband subscriptions
3.4.1	SMP operator
3.4.2	Competitors
3.4.3	Cable operators
3.5	FTTx/cable coverage on own infrastructure
3.5.1	SMP FTTB/C (via SLU) coverage (total coverage if more than one operator is present)
3.5.2	SMP FTTH BB coverage (total coverage if more than one operator is present)
3.5.3	SMP cable coverage (total coverage if more than one operator is present)
3.5.4	Other access operator(s) own infrastructure (including third party civil infrastructure) vertically integrated operator FTTB/C (via SLU) BB coverage (total coverage if more than one operator is present)
3.5.5	Other access operator(s) own infrastructure (including third party civil infrastructure) vertically integrated operator FTTH BB coverage (total coverage if more than one operator is present)
3.5.6	Other access operator(s) own infrastructure (including third party civil infrastructure) cable coverage (total coverage if more than one operator is present)
3.6	Other access operator(s) using third party infrastructure
3.6.1	Wholesale only other access operator(s) FTTH coverage (total coverage if more than one operator is present)

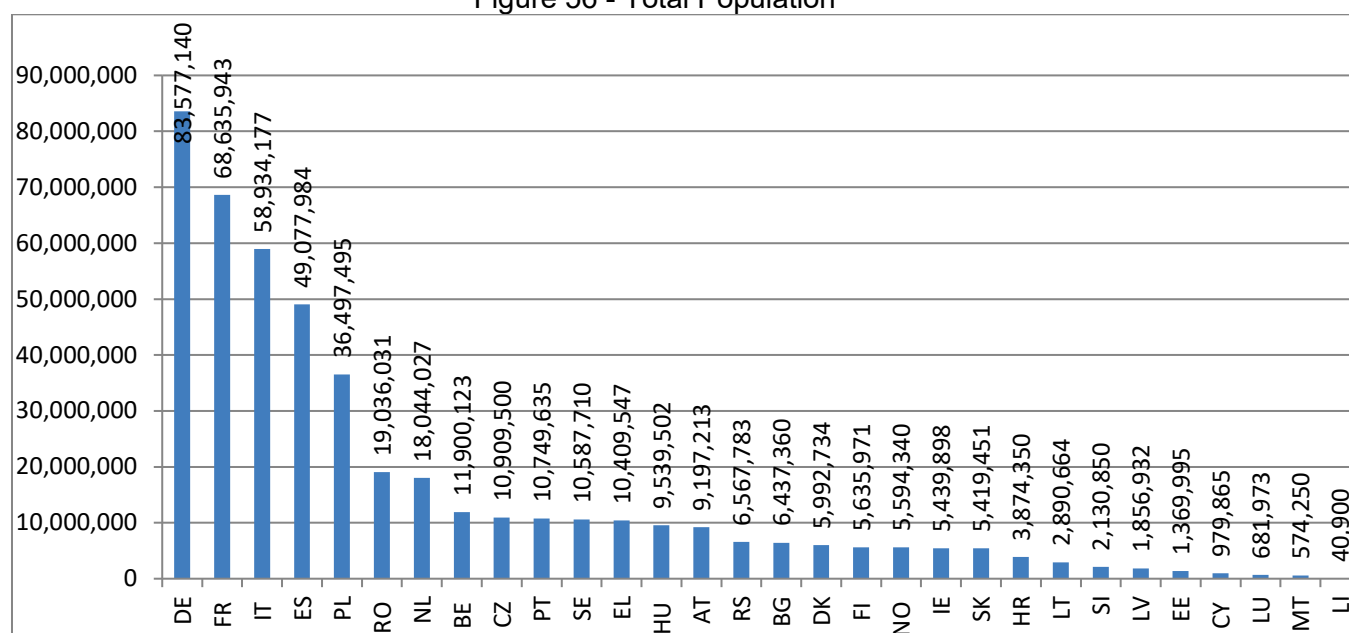
The data for population and population density is sourced from the Eurostat database unless otherwise indicated. The most recent available data is used, for example where “Eurostat 2025” is stated, this means that the data was extracted in 2025 but may be related to 2025, 2024, 2023 or earlier, depending on the last time the source data was collected/updated by Eurostat. The data for Market and Competitive Situation and Market Shares is sourced from participating NRAs.

4.1 Population and Population Density

The data, which is naturally static and remains largely unchanged in comparison to previous years, may have a considerable influence on the cost of telecommunications infrastructure. This results in different investment risks: e. g. a high population density may mean more economically viable connections while this fact might also attract more competition whereas less densely populated areas usually incur higher rollout costs coupled with less potential customers but there may be public subsidies.

When looking at the **total population**¹⁴⁰ (i.e. the total number of inhabitants per country) the top countries remain Germany, France, Italy, Spain and Poland.

Figure 56 - Total Population



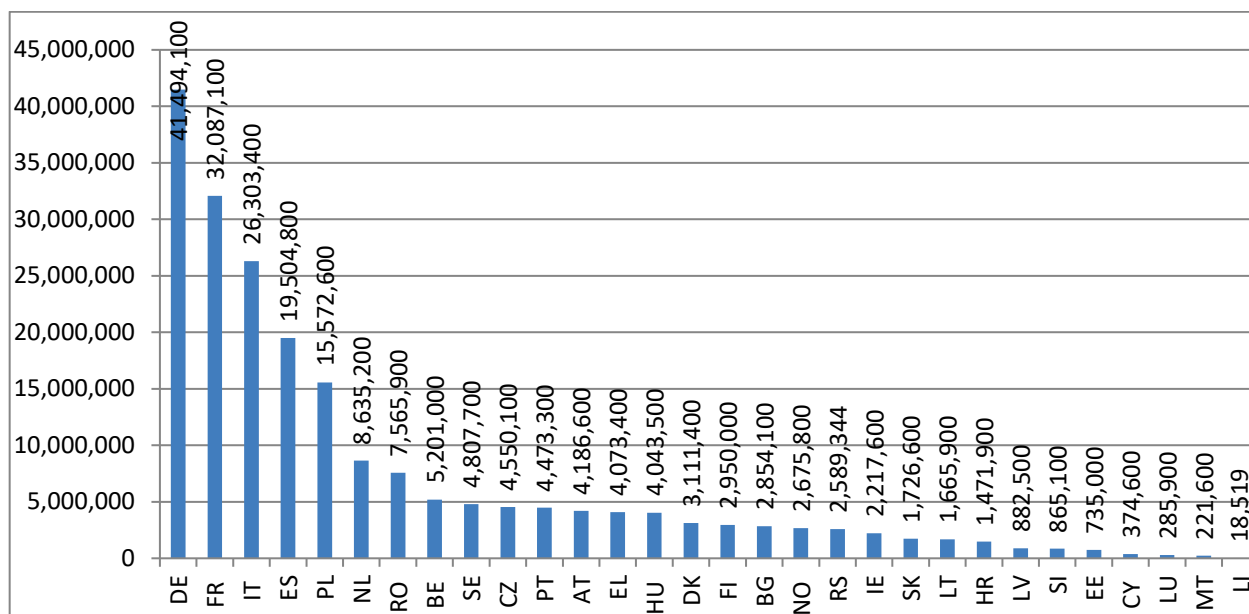
Source: Eurostat 2025

On average, there are 2,3 people per household, the most people per household with just over three in Slovakia¹⁴¹. The number of households is used in this report to calculate the fixed broadband penetration, shown per household.

¹⁴⁰ Eurostat "Population on 1st January 2025" online data code: TPS00001. Provisional data for BE, EL, ES, FR, IT, CY, LI. Estimate for EL, RO.

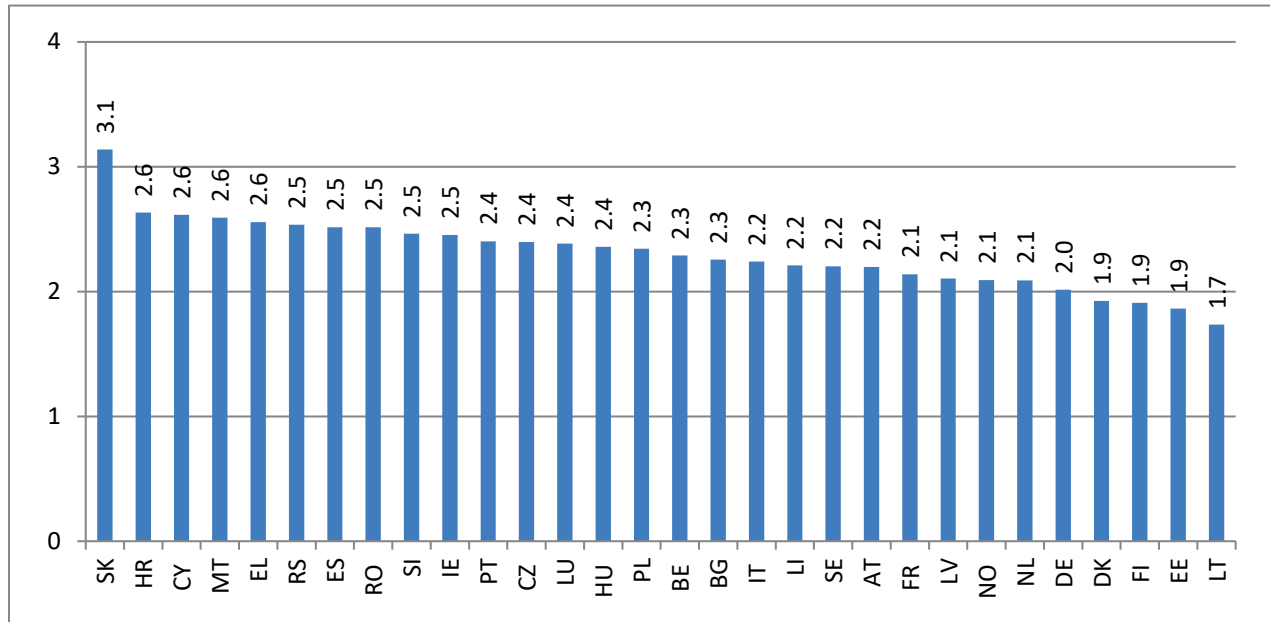
¹⁴¹ Eurostat 2023 "number of private households", online data code: LFST_HHNNHWHTC. Number of people per household calculated from number of households. Household definition differs (see Eurostat Metadata) in FR, ES. BG: Discrepancies to last year's data may be due to a break in time series. LI: current best estimate, RS: Census 2022 data (Statistical Office of the Republic of Serbia).

Figure 57 - Number of Private Households



Source: Eurostat 2025

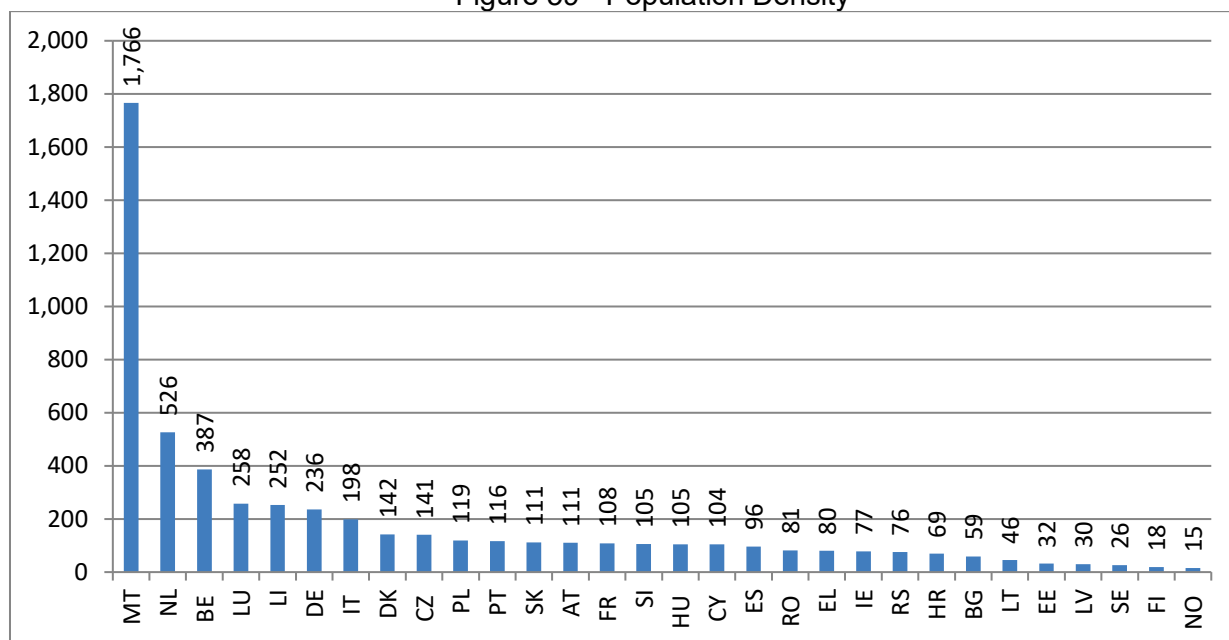
Figure 58 - Average Household Size



Source: Eurostat 2025

In terms of **population density**¹⁴² (i.e. the number of inhabitants per square kilometre) the top countries with around/above 200 people per square km are Malta, the Netherlands, Belgium, Luxembourg, Liechtenstein, Germany and Italy.

Figure 59 - Population Density

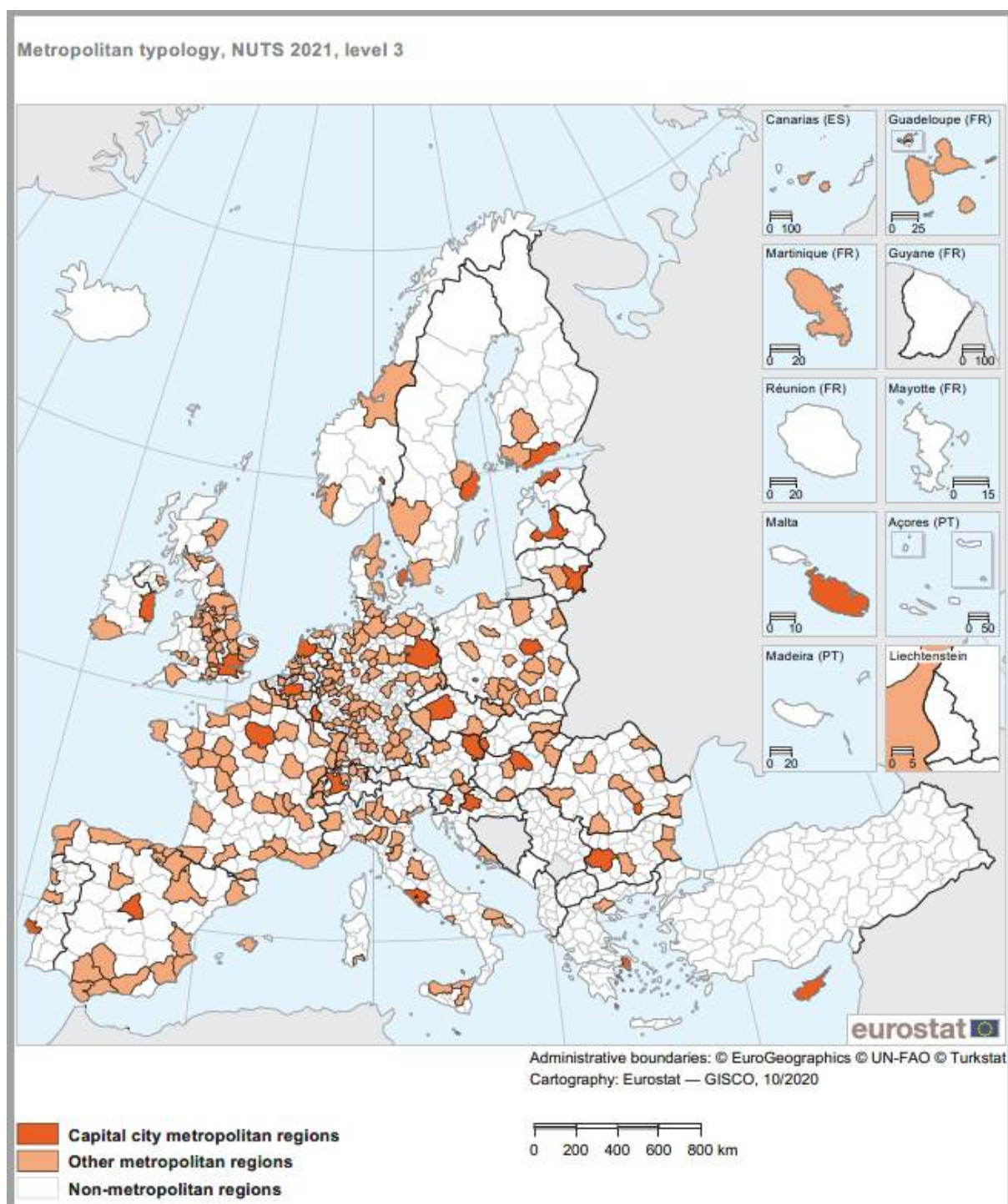


Source: Eurostat 2025

When looking at the **metro and non-metro population density**, an impression is given of the differences in country typology, i.e. a country with densely populated urban areas (in many smaller countries one single densely populated urban area) might well have very sparsely populated rural areas. This requires different effort and cost by operators to provide infrastructure access to the population in urban and rural areas and leaves regulators with the challenge of encouraging high capacity broadband roll-out also in less densely populated areas.

¹⁴² Eurostat 2022 "Population density" online data code: TPS00003. Provisional in FR, PL, estimate in PL. Discrepancies to last year's data may be due to a break in time series: DE, CY. RS data: Worldometer 2025.

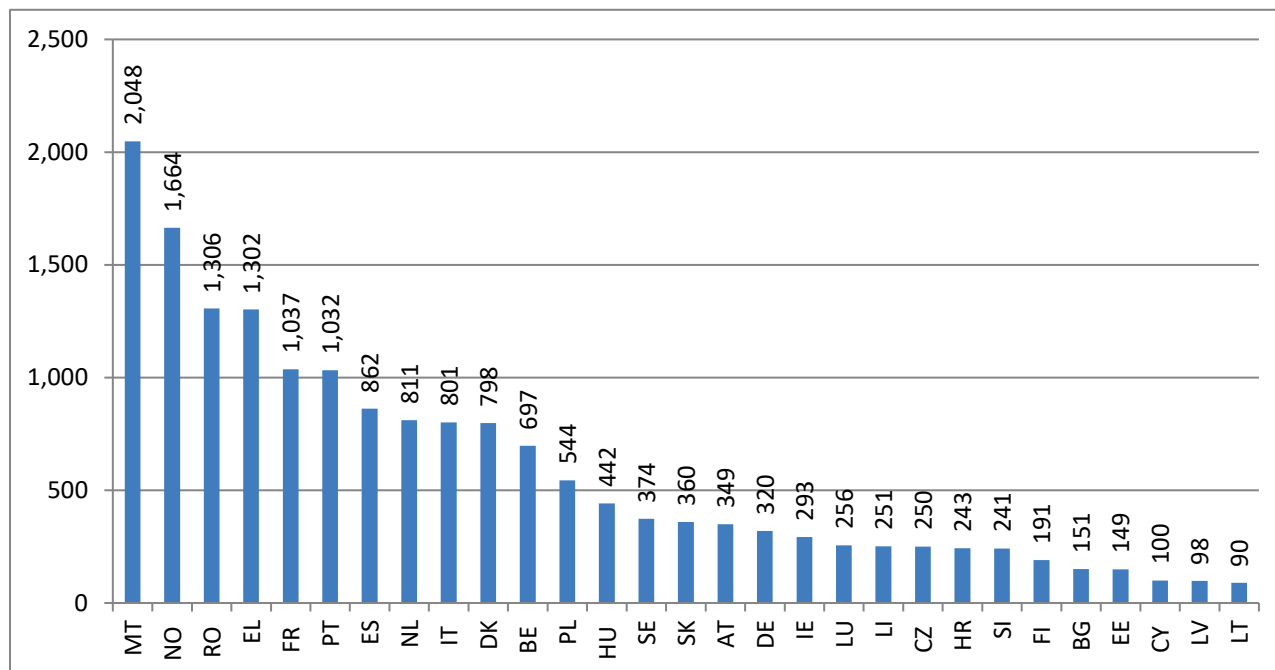
Figure 60 - Metro and Non-metro Regions in the EU/EFTA



Source: Eurostat, JRC and European Commission, Directorate-General Regional and Urban Policy. Based on population grid from 2011 and NUTS 2021.

The population density in the **capital city metro area**¹⁴³ (usually, but not always, the most densely populated area of the country) is highest in Valetta (MT), Oslo (NO), Bucharest (RO), Athens (EL), Paris (FR) and Lisbon (PT).

Figure 61 - Metro Population Density



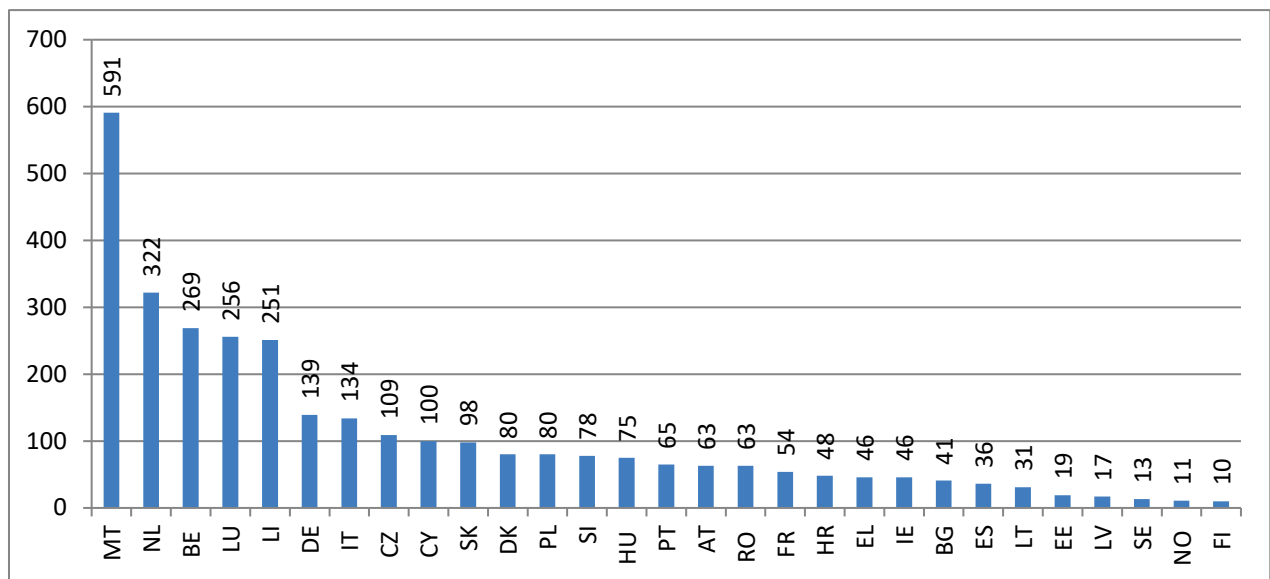
Source: Eurostat 2025

The non-metro population density¹⁴⁴ shows Scandinavian and Baltic countries (FI, NO, SE, LV, EE, LT) to have the least densely populated rural areas.

¹⁴³ Eurostat 2025 "Population density by metropolitan regions", online data code: met_d3dens. Eurostat metro-regions are based on agglomerations, which include the commuter belt around a city. AT: Vienna, BE: Brussels, BG: Sofia, CY: Nicosia, CZ: Prague, DE: Berlin, DK: Copenhagen, EE: Tallinn, EL: Athens, ES: Madrid, FI: Helsinki, FR: Paris, HR: Zagreb, HU: Budapest, IE: Dublin, IT: Rome, LI: Vaduz, LV: Riga, MT: Valetta, NL: Amsterdam, NO: Oslo, PL: Warsaw, PT: Lisbon, RO: Bucharest, RS: no data, SE: Stockholm, SI: Ljubljana, SK: Bratislava. Provisional in FR, estimate in RO. Discrepancies to last year's data may be due to a break in time series: BG, HU, PL. Not available for RS. No differentiation Metro/Non Metro area in CY, LI, LU.

¹⁴⁴ Provisional in FR, estimate in RO. Discrepancies to last year's data may be due to a break in time series in BG, HU, PL. Not available for RS. No differentiation Metro/Non Metro area in CY, LI, LU.

Figure 62 - Non-Metro Population Density



Source: Eurostat 2025

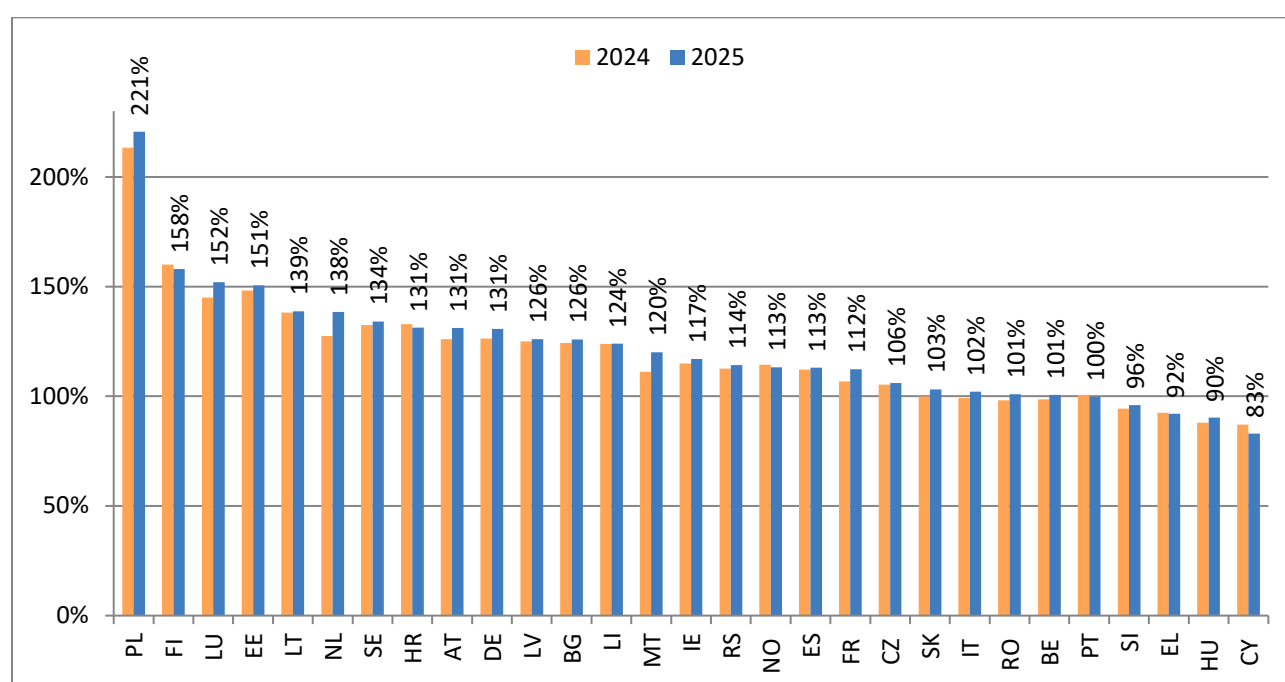
4.2 Market and Competitive Situation

The market and competitive situation within the different countries has a direct influence on the regulatory regime and shows considerable disparity. The data in this section has been provided by NRAs¹⁴⁵. Where data is confidential or not available, it will not be shown in the graphs (see explanations in foot notes).

As with previous BEREC RA Reports, this report focusses on broadband usage rather than subscriptions to classical fixed and mobile telephones.

The **mobile broadband penetration**, represents mobile broadband end users as a percentage of the total population,¹⁴⁶ (excluding M2M). In 2025 almost all of the respondents have a mobile broadband penetration rate of more than 90 %. Shown in comparison is the penetration rate in 2024.

Figure 63 - Mobile Broadband Penetration (per total population)



Source: BEREC RA database 2025

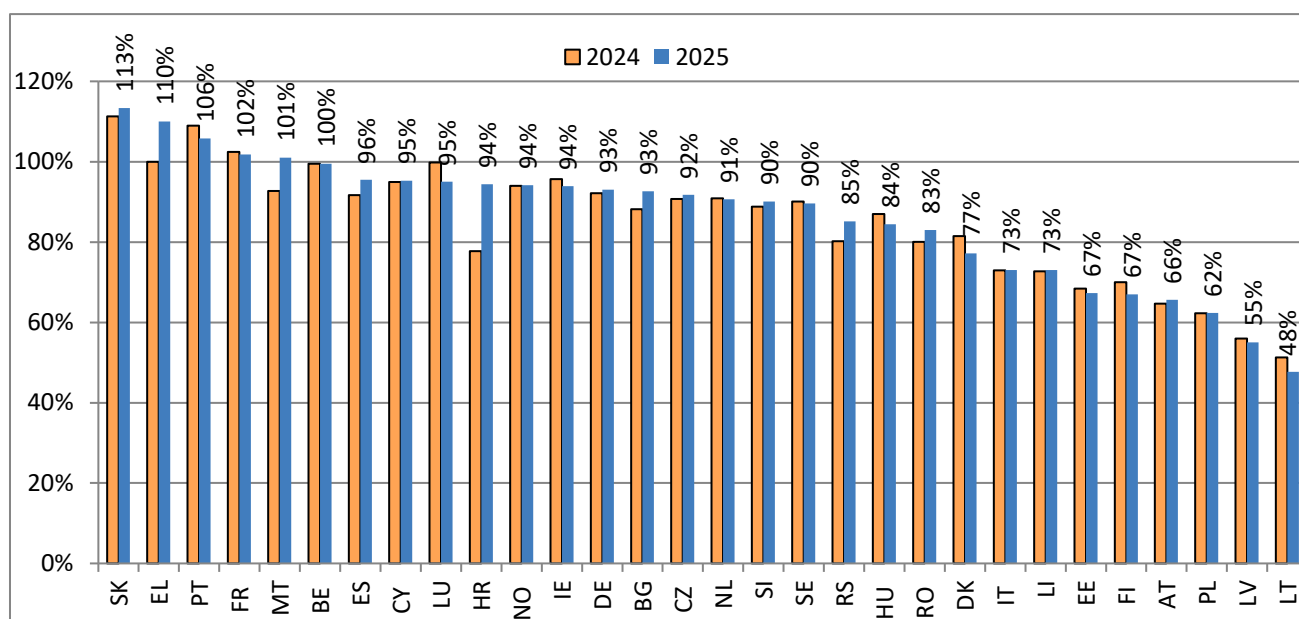
The **fixed broadband penetration**¹⁴⁷ represents fixed broadband subscriptions as a percentage of the total number of households. Percentages vary between 48 % in Lithuania and 113 % in Slovakia. Percentages are shown in comparison to the previous year.

¹⁴⁵ CZ: The separation of former incumbent – O2 Czech Republic a.s. (O2), former SMP operator, occurred on June 1, 2015. On the basis of the voluntary separation of O2, two companies were created – O2 and Česká telekomunikační infrastruktura a.s. (CETIN). CETIN (SMP in market 3a and 3b) became an infrastructure and wholesale service operator without any retail activities, and O2 became a retail service operator, i.e. O2 represents the incumbent at the retail level and infrastructure owner CETIN represents the incumbent at the wholesale level.

¹⁴⁶ DK: data not available (5G only router subscriptions). MT: figure is under review.

¹⁴⁷ CZ: including fixed LTE/5G access (access provided in fixed location). IE: including LTE subscriptions LT: lower figure in 2025 is due to the number of households increasing while BB penetration remains similar to previous years and mobile services increasing considerably.

Figure 64 - Fixed Broadband Penetration (per household)

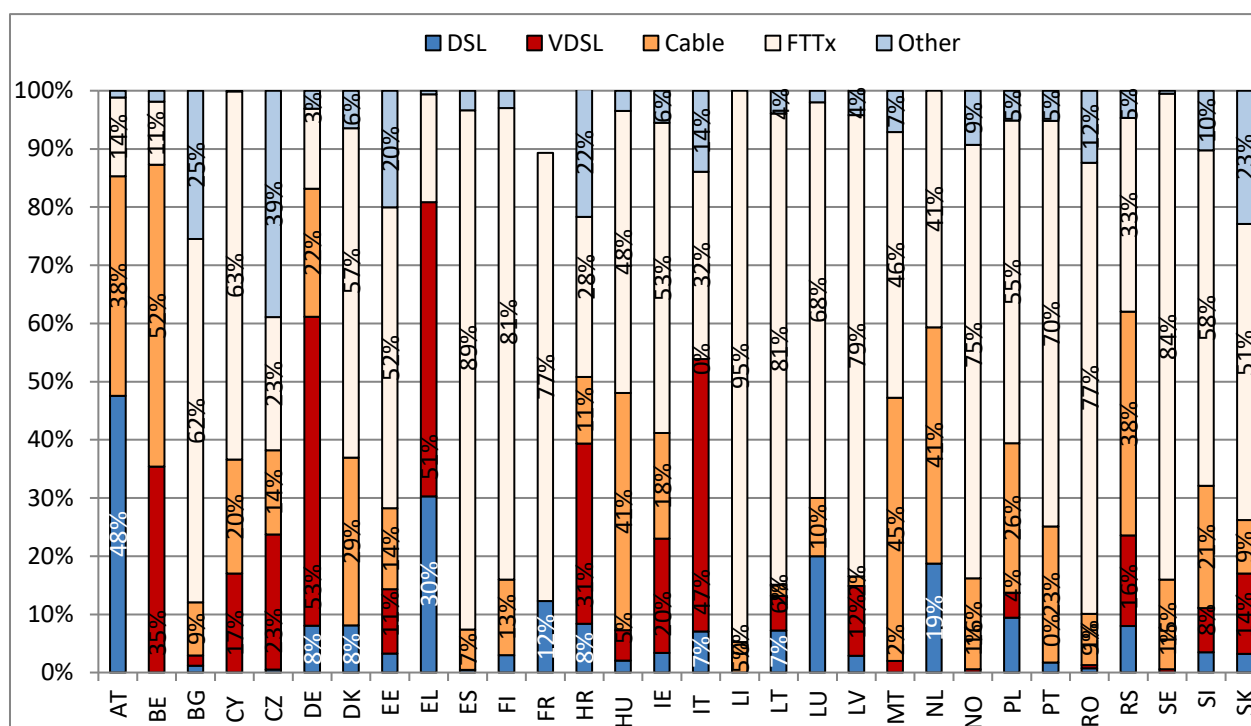


Source: BEREC RA database 2025

The following table shows the percentage share of fixed broadband technology. Legends for very small percentages are omitted in the table:

- DSL lines (including ADSL, naked DSL)
- VDSL lines (NGA)
- Cable (via coax, hybrid fibre coax cable HFC)
- FTTx (via FTTH, FTTB/C)
- Other technologies (broadband wireless access BWA, satellite, fixed LTE etc.)

Figure 65 - Technology Share of Fixed Broadband



Source: BEREC RA database 2025

DSL lines as a percentage of fixed broadband have the highest share in Austria (48 % incl. hybrid), followed by Greece (30 %) ¹⁴⁸.

VDSL lines as a percentage of fixed broadband have the highest shares in Greece (51 %) and Germany (53 %) ¹⁴⁹.

Cable as a percentage of fixed broadband has a share of more than 40 % in Belgium, Malta, Hungary and the Netherlands ¹⁵⁰.

FTTx technology share of more than 80 % is reported for Lithuania, Finland, Sweden, Spain and Liechtenstein ¹⁵¹.

Other technologies reported by some countries include satellite, fixed wireless access (FWA), fixed LTE, vULL etc. These seem to be similar to the previous year. Czechia has the highest share with almost 40 %, followed by Slovakia (23 %) and Bulgaria (26 %) ¹⁵².

4.3 Market Shares (Broadband)

This section looks at the market and competitive situation in the increasingly important broadband market, i. e. the market shares of the SMP operator(s) vs. the market shares of alternative operators

¹⁴⁸ AT: DSL incl. hybrid. NO: included in VDSL. No DSL (0%) in BE, CY, LI.

¹⁴⁹ Data not available in AT, FI, LU, NL. No VDSL (0%) in ES, LI, PT. SE: includes ADSL. DK: VDSL part of copper. FR: confidential

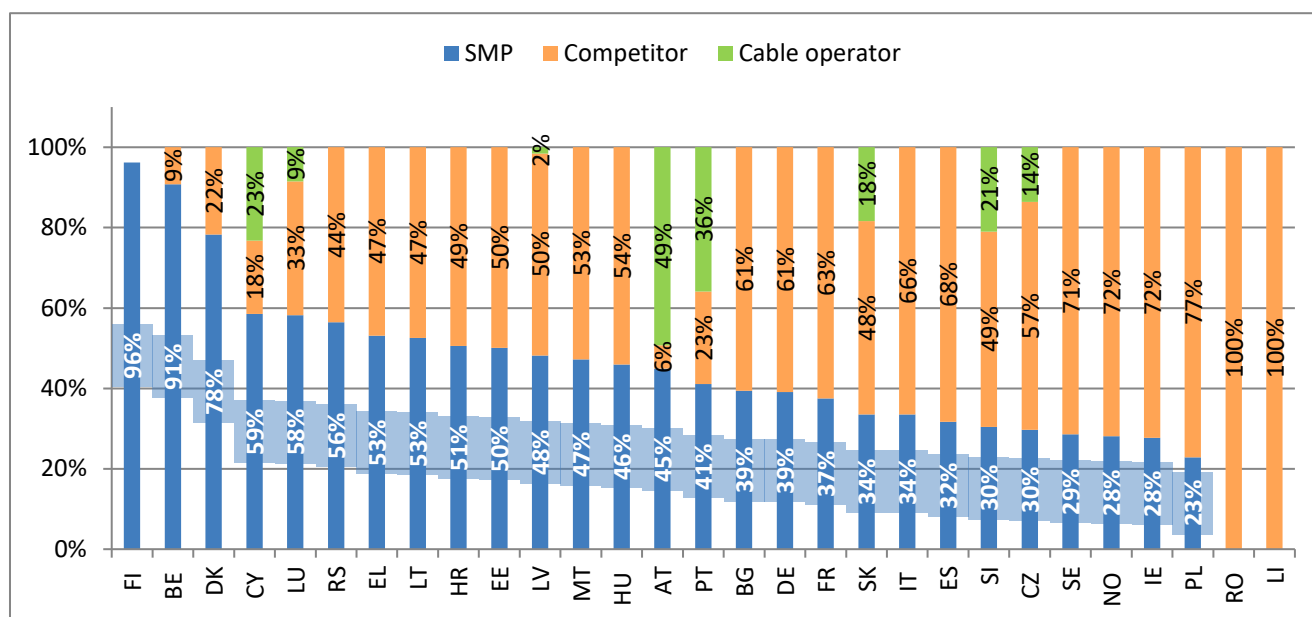
¹⁵⁰ No cable (0%) in EL, IT. FR: confidential

¹⁵¹ RO: excluding HFS and DSL+fibres.

¹⁵² AT: FWA Sat, Rest. DE: Sat. DE: wireless BB, satellite and radio link. NL: no data. 0% in CY, LI, SE. FR: confidential

(OAO other access operators/competitors) as well as cable operators. This includes DSL and NGA (FTTx) broadband users. The data in this section has been provided by NRAs¹⁵³. The data analysis shows a considerable disparity in market shares. It points to differences in the national competitive situation, thereby affecting regulatory strategy. Cable shares may be included in SMP and/or competitor market shares (see footnote). It should be pointed out that currently 15 countries (AT, BG, CY, CZ, LI, FI, FR, IE, IT, MT, NL, PT, ES, SE) do not have an SMP in the WCA market, while in RO the WCA market was never regulated¹⁵⁴.

Figure 66 - Fixed Broadband Market Share



Source: BEREC RA database 2025

The **fixed broadband** market share is split into:

- Share of the SMP(s)/Incumbent operator(s): in some countries, they also operate cable, thus total SMP shares may not be portrayed correctly for these countries. The share ranges from a 23 % in Poland to 96 % in Finland.
- Share of competitors: market shares range from 6 % in Austria to 100 % in Romania and Liechtenstein. In some countries, competitor data includes cable.

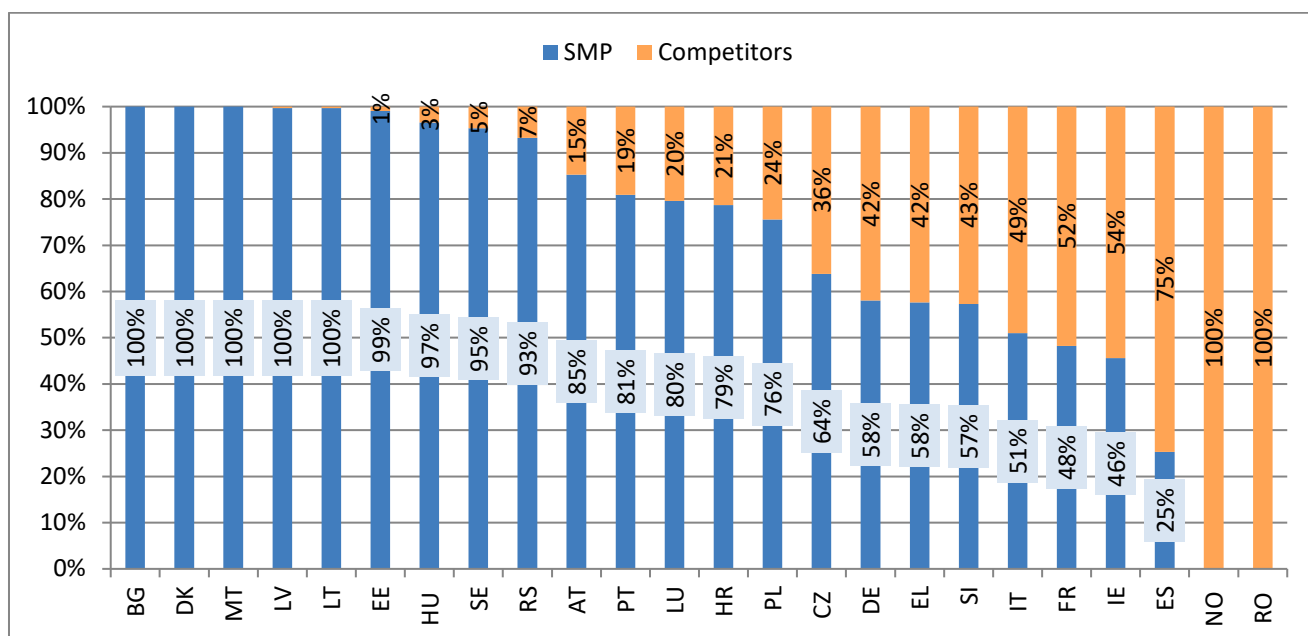
¹⁵³ Confidential in NL. CY: cable operator share includes 2.7% of FTTH subscriptions. IT: Only wholesale operator is SMP (since the division of wholesale and retail). CZ: O2 data (retail service provider). RO: The incumbent (not SMP) has been bought & integrated by a competitor in mid-2024. ES: No operator can be strictly considered a cable operator since all operators have also FTTH. EL/IT: no cable coverage. Cable share included in SMP shares in BE, DK (39%), MT (46%), NO. Cable share included in competitor share in BE, BG, DE, DK (39%), EE (14%), FR (19%) HR (41%), HU (7%), EI (19%), NO, PL (46%), RO, RS (30%). LI: There is no SMP operator in BB subscriptions (retail market).

¹⁵⁴ See BoR (25) 146 BEREC Input to the European Commission's consultation on the revision of the Recommendation on relevant markets susceptible to ex ante regulation, Chapter 2.3. For the countries that deregulated the market, 'SMP' refers to the former SMP operator.

- Share of cable operators: not all NRAs record data/record data separately from competitor data. Where it is available/recorded separately shares range from 2 % in Latvia to 49 % in Austria.

The **DSL broadband** share¹⁵⁵ is the traditional domain of SMP/incumbent operators. Their market share ranges from 0 % in NO and RO to over 90 % in RS, SE, HU, EE, LT, LV, BG, DK, MT. Shown in the same figure are competitor market shares.

Figure 67 - DSL Broadband Market Share



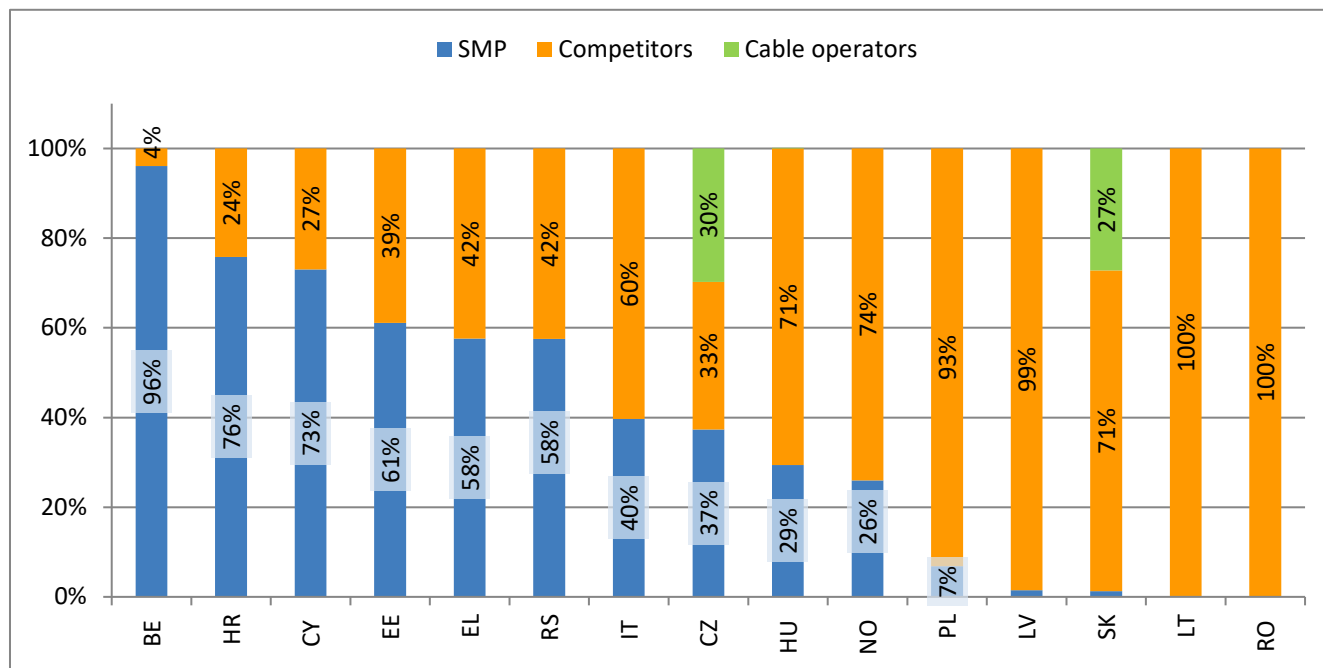
Source: BEREC RA database 2025

¹⁵⁵ Data is confidential in NL, SK. No data in FI. CZ: The share of the SMP/Incumbent is represented by O2 (retail operator). RO: The incumbent (not SMP) has been bought & integrated by a competitor in mid-2024. LI: there is no DSL broadband. For ES, please note that copper DSL was completely switched off in May 2025.

Due to the increasing relevance of NGA and corresponding with questions concerning “coverage on own network”, question on FTTx have been split into FTTC/B and FTTH.

Looking at **NGA (FTTB/C) broadband** share,¹⁵⁶ the SMP/Incumbent’s share is with 96 % highest in Belgium. Shown in the same figure are competitor’s and cable operator’s market shares. Cable operator shares may be included in SMP/competitor shares (see footnote).

Figure 68 – NGA (FTTB/C) Broadband Market Share

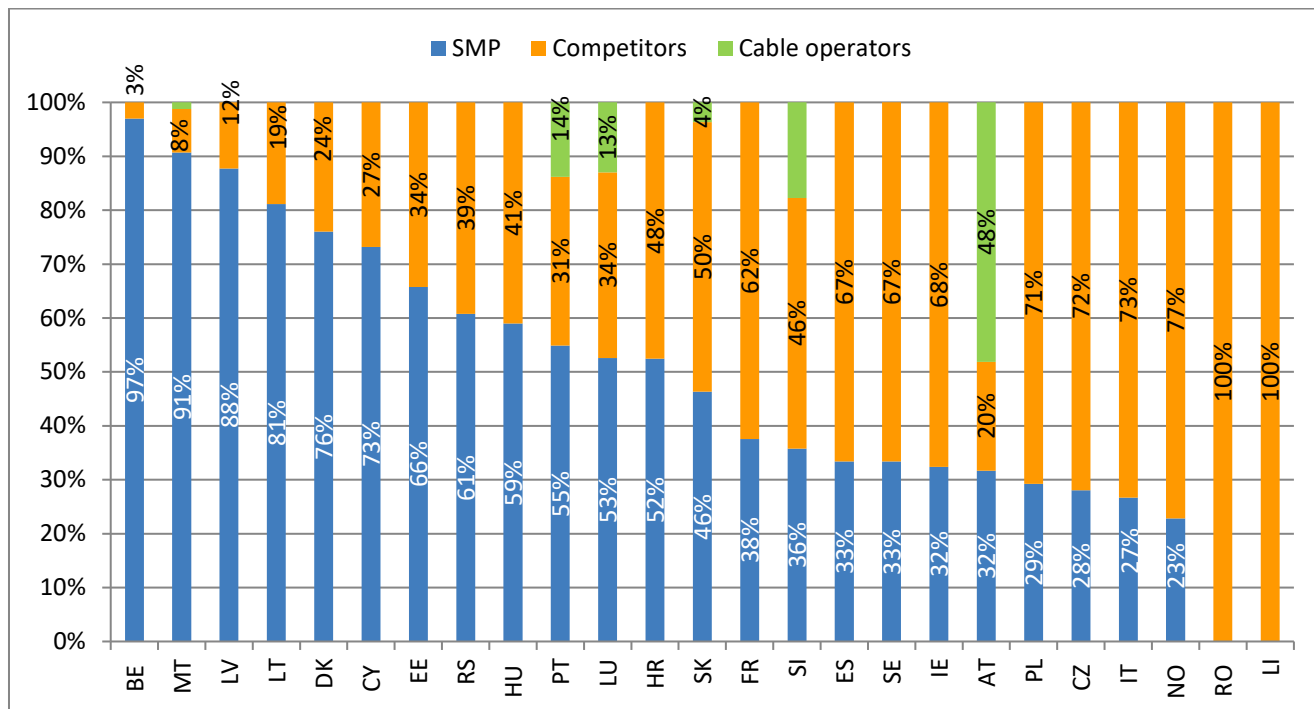


Source: BEREC RA database 2025

¹⁵⁶ Data is confidential in BG, NL. No data in AT (FTTB not available), DE (FTTB/C and FTTH not recorded separately), ES (no FTTB/C subscriptions), FI, FR (figures are included in other categories), IE (ComReg does not collect FTTC data), LU, MT, PT, SE, SI. CZ: The share of the SMP/Incumbent is represented by O2 (retail operator). ES: No operator can be strictly considered a cable operator since all operators have also FTTH. RO: The incumbent (not SMP) has been bought & integrated by a competitor in mid 2024. SE: data includes all fibre subscriptions, all FTTx. Cable share is included in competitor share in FR (18%), HR (11%), IE (6%), NO, PL (45.96%), RO, RS (41%). LI: There is no FTTB/C broadband. The fibre access is built in Point-to-Point FTTH architecture.

Regarding **NGA (FTTH) broadband** share¹⁵⁷, the SMP/Incumbent's share is over 90 % in Belgium and Malta. Shown in the same figure are competitor's and cable operator's market shares. Cable shares may be included in SMP/competitor shares (see footnote).

Figure 69 – NGA (FTTH) Broadband Market Share



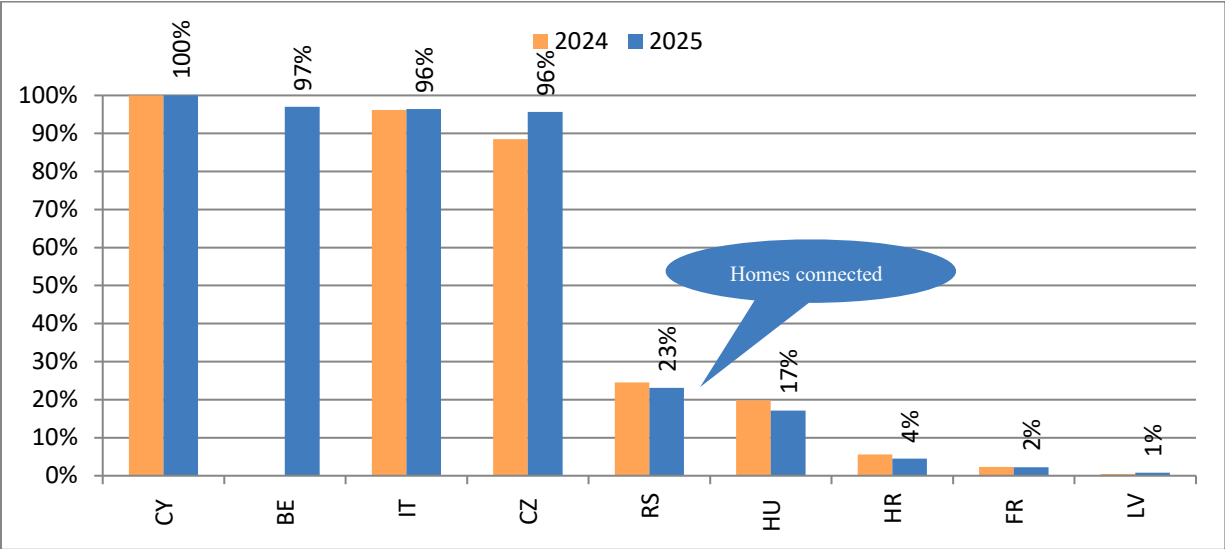
Source: BEREC RA database 2025

¹⁵⁷ Data is confidential in BG, NL Data is not available in DE (FTTB/C and FTTH not recorded separately), EL, FI. ES: No operator can be strictly considered a cable operator since all operators have also FTTH. RO: The incumbent (not SMP) has been bought & integrated by a competitor in mid-2024. SE: includes all fibre subscriptions, all FTTx. Cable is included in competitor share in CY, HR (30%), IE (6%), NO, PL (29,92%), RO, RS (13%). Cable is included in SMP share in NO.

The next section covers **FTTx and cable coverage on own infrastructure** split into **SMP** own infrastructure (total coverage if more than one operator is present) and **OAO** own infrastructure (total coverage if more than one operator is present and including third party civil infrastructure). As in the previous part, only percentages for 2023 are shown. Text bubbles indicates a different way of recording coverage, data are therefore not comparable.

SMP’s coverage of Fibre to the Building/Curb (FTTB/C) infrastructure as a percentage of total households.¹⁵⁸ Coverage remains largely unchanged in comparison to the previous year (where available)¹⁵⁹.

Figure 70 - SMP FTTB/C Coverage: % of households



Source: BEREC RA database 2025

SMP’s coverage of Fibre to the Home (FTTH) infrastructure as a percentage of total households:¹⁶⁰ Coverage has increased in comparison to the previous year (where available)¹⁶¹.

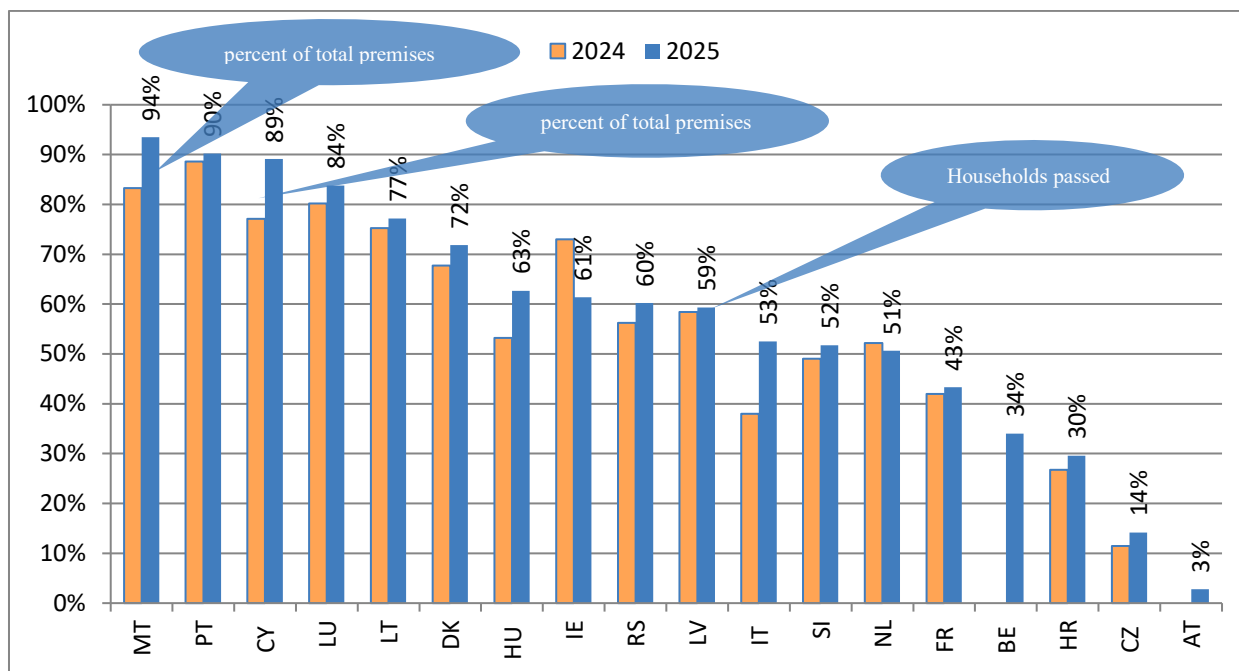
¹⁵⁸ SMP FTTB/C (via SLU) BB coverage: total coverage if more than one operator is present.

¹⁵⁹ Data is confidential in BG, NL, SK and not available in AT (FTTB not available), DE, DK, EE, EL, ES (no FTTB/C infrastructure), FI, IE (SMP does not sell FTTC), LI (no SMP operator, no BB provider with own FTTx infrastructure), LT, LU, MT, NO, PL, PT, RO, SE, SI. RS: data refers to homes connected. CZ: data for FTTB/C are represented by CETIN’s (infrastructure owner) NGA VDSL and FTTB lines (coverage).

¹⁶⁰ SMP FTTH BB coverage: total coverage if more than one operator is present.

¹⁶¹ Data is confidential in BG, SK and not available in DE, EE, EL, ES, FI, LI (no SMP operator. No BB provider with own FTTx infrastructure), NO, PL, SE. CZ: data of CETIN (infrastructure owner) IE: lines passed/number of households. Metric derived from ComReg data and using CSO population figure. NL: number of premises passed. PT: as a % of total premises (refers to cabled premises of Fastfiber - MEO sold its infrastructure to Fastfiber (2020= and Fibroglobal (2022).

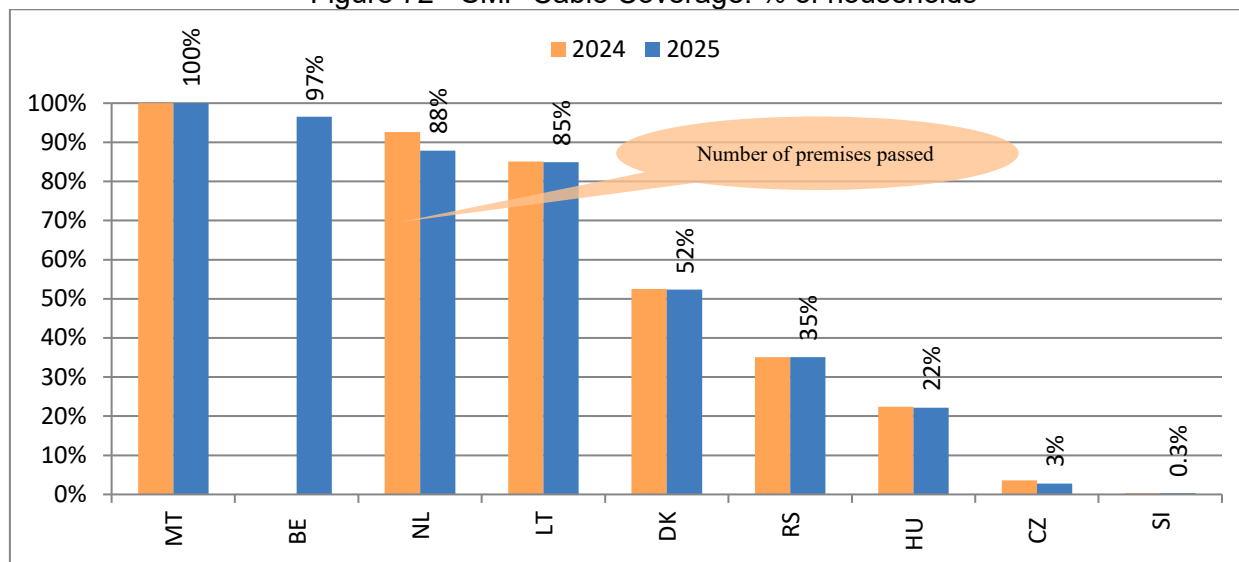
Figure 71 - SMP FTTH Coverage: % of households



Source: BEREC RA database 2025

SMP cable coverage as a percentage of total households:¹⁶² Data – where available – does not differ from the previous year¹⁶³.

Figure 72 - SMP Cable Coverage: % of households

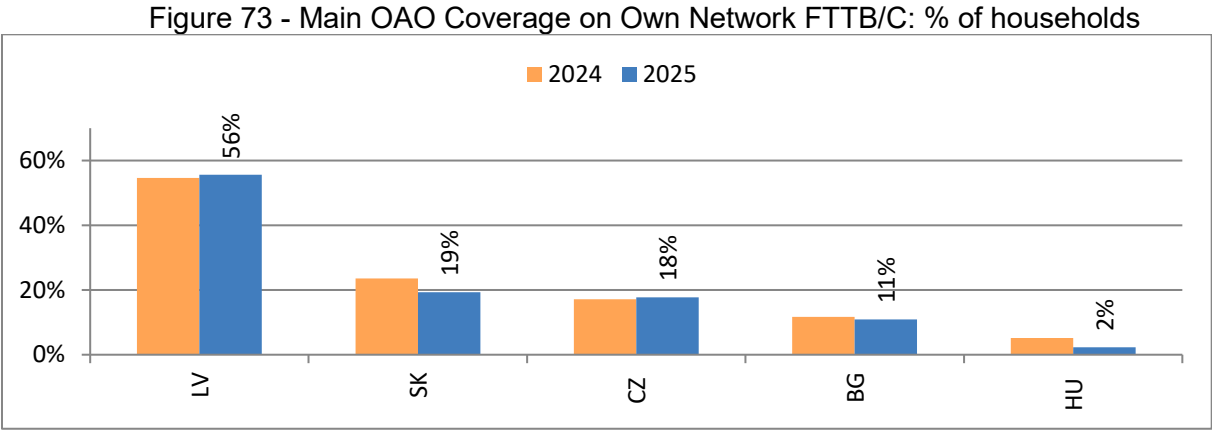


Source: BEREC RA database 2025

¹⁶² SMP cable coverage: total coverage if more than one operator is present.

¹⁶³ Confidential in BG. Not available in EE, EL, FI, IE, IT, LU, NO, PL, RO, SE. 0% in AT, CY, FR, HR, LV, PT, SK. No SMP cable operator/infrastructure in DE, ES, LI.

The total coverage of the **main OAO Fibre to the Building/Curb (FTTB/C) as a percentage of total households**.¹⁶⁴ Data does not differ substantially – where available - from the data provided in the previous year¹⁶⁵.



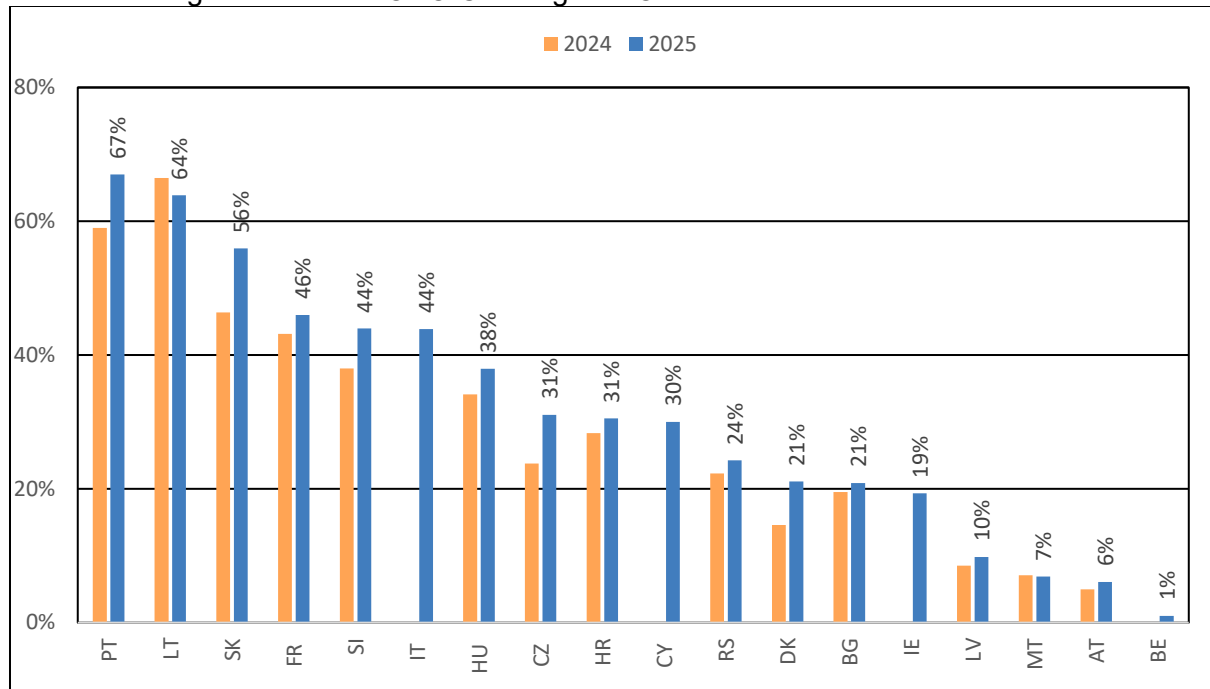
Source: BEREC RA database 2025

¹⁶⁴ OAO own infrastructure (including third party civil infrastructure) vertically integrated operator FTTB/C BB coverage: total coverage if more than one operator is present.

¹⁶⁵ Confidential in NL. Not available in BE, DE, DK, EE, EL, FI, IE (ComReg does not collect FTTC data), IT, LT, LU, MT, NO, PL, PT, RO, SE (have no spit on FTTC), SI. 0% in AT (FTTB not available) CY, ES (no FTTB/C infrastructure), FR, HR. LI: there is no OAO with own FTTx infrastructure.

Fibre to the Home (FTTH) coverage of the main OAO via their own infrastructure (as a percentage of total households). Where recorded, it has increased in comparison to the previous year¹⁶⁶.

Figure 74 - Main OAO Coverage on Own Network FTTH: % of households

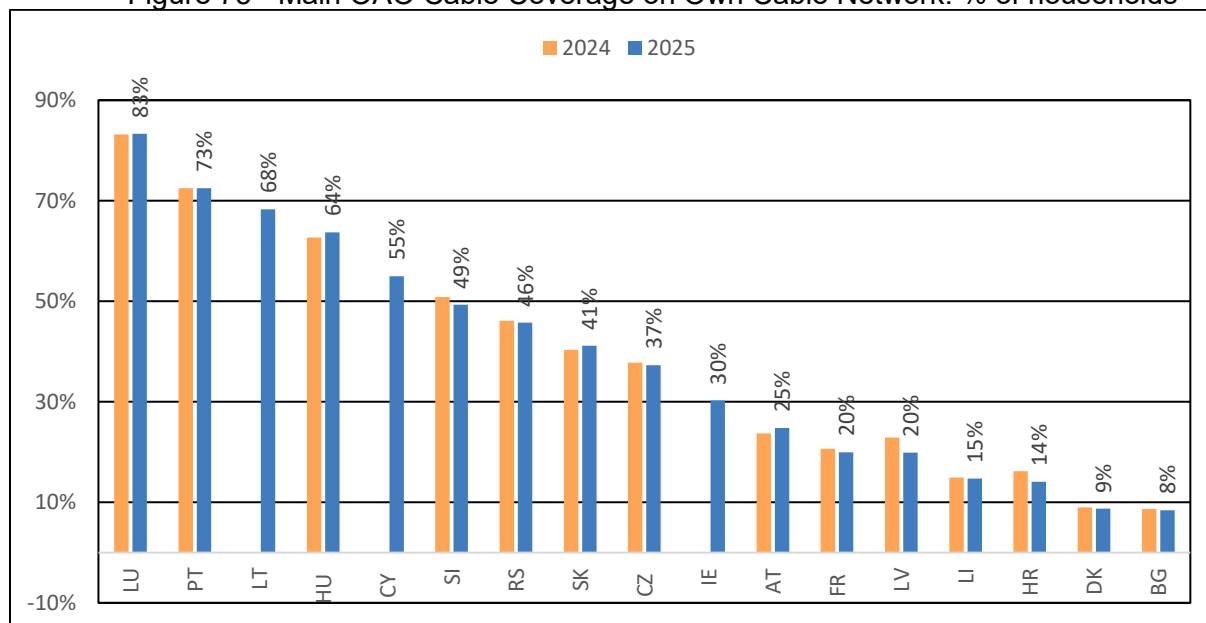


Source: BEREC RA database 2025

¹⁶⁶ Confidential in NL. Not available in DE, EE, EL, ES, FI, LU, NO, PL, RO, SE (ca. 180 municipal networks, mostly not vertically integrated). IE: lines passed / number of households. Vertical Integrated Operator with both retail and wholesale arm. IT: Coverage of OAO Wholesale only+OAO vertical integrated operators (data are recalculated from last year report and are consistent with DESI report on household denominator). LI: There is no OAO with own FTTx infrastructure.

The total **cable coverage of OAO on own cable network (as a percentage of total households)**.¹⁶⁷ Coverage has remained largely unchanged in comparison to the previous year (where available)¹⁶⁸.

Figure 75 - Main OAO Cable Coverage on Own Cable Network: % of households



Source: BEREC RA database 2025

Total **wholesale only OAO FTTH coverage (as a percentage of total households)**.¹⁶⁹ ¹⁷⁰

¹⁶⁷ OAO own infrastructure (including third party civil infrastructure) cable coverage: total coverage if more than one operator is present.

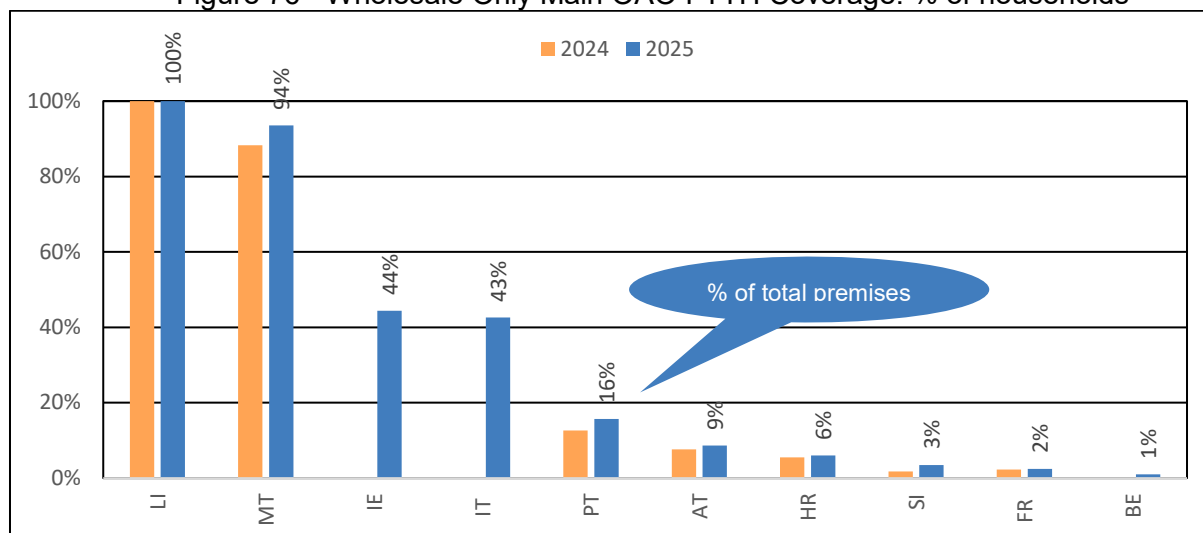
¹⁶⁸ Confidential in NL and not available in DE, EE, EL, ES, FI, IT, MT, NO, PL, RO, SE. IE: lines passed / number of households. Metric derived from ComReg data and using CSO population figure. LI: Coverage of national infrastructure owner LKW, SMP-regulated access for all providers of broadband including the incumbent.

¹⁶⁹ Wholesale only OAO FTTH coverage (total coverage if more than one operator is present). Not available in BE, BG, CZ, DE, DK, EE, EL, ES, FI, HR, LV, NL, NO, PL, RO, SE, SK. IE: NBI/Siro premises passed / no. of households. 2024 data not comparable. LI: Coverage of national infrastructure owner LKW; national coverage will be complete (100%) by the end of 2022. MT: OAO has own infrastructure and VULA agreement with the SMP. PT: As % of total premises, does not include Fastfiber. MT: The percentage provided - same as last year - reflects the OAO's potential to connect clients to fibre via VULA, the OAOs own infrastructure fibre network is 2.16%.

¹⁷⁰ Confidential in NL. Not available in BG, CZ, DE, DK, EE, EL, ES, FI, LT, LU, LV, NO, PL, RO, SE (ca. 180 municipal networks, mostly not vertically integrated). 0% in CY, HU, RS. IE: Metric derived from COMREG data and using CSO population figure of 2,138,700

lines passed/no. of households. AT: incl. vULL. IE: Lines passed/number of households. Metric derived from ComReg data and using CSO population figure. LI: All infrastructure is owned and offered by the regulated open access (SMP) operator LKW, which only operates layer 0 (civil engineering infrastructure) and layer 1 (cables), thus offering to providers access to ducts and fibres, with 100% national coverage in both the access and the backhaul segment. The architecture of the fibre access network is P2P-FTTH, whereby LKW builds P2P-FTTB and the building owners complement to P2P-FTTH. MT: OAO has own infrastructure and a VULA agreement with the SMP hence the SMP coverage is the potential OAO coverage. PT: % of total premises. Does not include Fastfiber and Fibroglobal.

Figure 76 - Wholesale Only Main OAO FTTH Coverage: % of households



Source: BEREC RA database 2025

Appendix I - List of Participating Countries/NRAs

The following countries / NRAs have provided data for the 2025 RA Report:

AT	Austria (RTR)
BE	Belgium (BIPT)
BG	Bulgaria (CRC)
CH	Switzerland (BAKOM, only WACC questionnaire)
CY	Cyprus (OCECPR)
CZ	Czechia (CTU)
DE	Germany (BNETZA)
DK	Denmark (DBA)
EE	Estonia (ETRA)
EL	Greece (EETT)
ES	Spain (CNMC)
FI	Finland (TRAFICOM)
FR	France (ARCEP)
HR	Croatia (HAKOM)
HU	Hungary (NMHH)
IE	Ireland (COMREG)
IT	Italy (AGCOM)
LI	Liechtenstein (AK LLV)
LT	Lithuania (RRT)
LU	Luxembourg (ILR)
LV	Latvia (SPRK)
MT	Malta (MCA)
NL	Netherlands (ACM)
NO	Norway (NKOM)
PL	Poland (UKE)
PT	Portugal (ANACOM)
RO	Romania (ANCOM)
RS	Republic of Serbia (RATEL)
SE	Sweden (PTS)
SI	Slovenia (AKOS)
SK	Slovakia (RU)

