

# **BEREC Report**

## **Regulatory Accounting in Practice 2020**

10 December 2020

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## List of Abbreviations

### A

AD *Access Directive*

### B

BB *Broadband*

### C

capex *capital expenditure*

CAP-M *Capital Asset Pricing Model*

CCA *Current Cost Accounting*

### D

DA *Duct Access*

DEA *Digital Economic Agenda*

DF *Dark Fibre*

DSL *Digital Subscriber Line*

### E

EECC *European Electronic Communications Code*

EoI *Equivalence of Input*

EoO *Equivalence of Output*

ERT *Economic Replicability Test*

EWG *Expert Working Group*

### F

FDC *Fully Distributed Costs*

FTTC *Fibre to the Cabinet*

FTTH *Fibre to the Home*

### H

HCA *Historic Cost Accounting*

### L

LLU *Local Loop Unbundling*

LR(A)IC *Long Run (Average) Incremental Cost*

LRIC *Long Run Incremental Cost*

### M

MDF *Main Distribution Frame*

MST *Margin Squeeze Test*

### N

NDCM *Non-discrimination Obligations and Costing Methodologies*

NRA *National Regulation Authorities*

### O

OAo *Other Alternative Operator*

OCM *Operative Capital Maintenance*

ODF *Optical Distribution Frame*

opex *operating expenditure*

### R

RA *Regulatory Accounting*

Rec. *Recommendation*

### S

SA *Shared Access*

SLU *Sub Loop Unbundling*

SMP *Substantial Market Power (regulated operator)*

### T

TD *Top Down*

### V

VDSL *Very High Bit Digital Subscriber Line*

VHCN *Very High Capacity Network*

VULA *Virtual Unbundled Local Access*

### W

WACC *Weighted Average Cost of Capital*

# 1. Executive summary

This is the sixteenth RA annual report which summarises the findings of a detailed survey of regulatory accounting systems across Europe. Information has been gathered from National Regulatory Authorities (NRAs) and covers the implementation of regulatory cost accounting methodologies. 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 provides also (i) elements about structural parameters of each country, (ii) WACC methodologies applied by NRAs and WACC values currently in force.

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 (Market 3a/2014), Wholesale Central Access (Market 3b/2014) and Wholesale high quality access (Market 4/2014).

Furthermore, as in last years' report, 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.

The report also looks at annualisation methodologies provided by respondent NRAs. As in last year's report, accounting information for specific products in Market 3a, such as copper access (including LLU, SA, SLU), fibre access (LLU, VULA), dark fibre access and duct access have been further analysed.

The report includes an updated section on the actual implementation of the Termination Rates Recommendation 2009/396/EC of 7 May 2009.

An evaluation of the implementation of the Recommendation 2013/466/EU on consistent non-discrimination obligations and costing methodologies is also presented (par. 3.5).

In Chapter 5 the report delivers an extended survey on WACC parameters, mainly focusing on market 3a and on the mobile market. The WACC chapter summarises the main methodologies currently used by NRAs and sets out the reasons behind the estimation of single parameters needed to evaluate the cost of capital under the CAP-M model.

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.

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 2020 provides an analysis more oriented on single products (increasing the scope of monitoring) with respect to the previous editions. The 2020 report collects in fact information for 21 main products (13 in 2015).

As a stable result during the past few years, cost orientation remains the most commonly used price control method and it is applied mainly for legacy products, while the Retail minus category refers mainly to VULA and market 3b products (Figure 15).

ERT 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 used as a substitute with respect to cost orientation, in line with the Commission NDCM Recommendation (2013/466/EU).

With regard to the cost base CCA is by far the most commonly used methodology for all markets.

The most frequent cost allocation approach is LRIC/LR(A)IC, for almost all products/markets. LRIC is the preferred approach specifically in termination markets. In the access market (market 3a) 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 the preferred approach for duct access products in Market 4 and WLR. In Market 3b for legacy products both methods are used.

For copper LLU most NRAs apply a cost orientation alone/LRIC-LR(A)IC/CCA approach – more than in last year's survey. The specific combination cost orientation and BU-LR(A)IC+ model in market 3a is the main methodology applied in more competitive markets (Fig. 26).

Considering NGA services, when competition conditions and demand side conditions are more favorable (low SMP market share in combination with higher NGA services penetration) NRAs start to replace strict cost orientation and apply ERT as price control (if any). The application of EOI is also more frequent in those cases.

In particular, when FTTC is a relevant access product, NGA price flexibility becomes less frequent in general, and FTTC, through VULA solutions, becomes the main focus of the regulation (as a sort of “anchor product” for the transition towards VHCN/ FTTH). In those cases the VULA–FTTC product is generally treated as the ULL services, with the same price control and costing methodology approach, i.e. cost-orientation and a BU-LR(A)IC+ model. All this confirms that NRAs are following the 2013 Recommendation on non-discrimination obligations and costing methodologies thereby converging further.

Accounting separation is often imposed together with the cost accounting obligation. Some NRAs consider that it is necessary to impose both obligations in order to ensure that robust regulatory accounting information is available for each product. In particular, in a quite mature and stable environment, such as LLU services in market 3a, 22 NRAs reported to apply accounting separation (as last year). A particular case is represented by the termination markets where NRAs that have established prices through pure BU-LRIC models have, in some cases, removed the Accounting Separation obligation at the same time; only 15 NRAs still maintain the obligation for the mobile termination market whereas 31 NRAs apply a price control obligation.

In termination markets, in line with the Commission Recommendation 2009/396/EC, a bottom-up approach is more frequent, irrespective of the kind of price control in use.

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

Compared to the BEREC WACC parameters Report 2020 (BoR (20) 116), 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 (CAP-M)<sup>1</sup> and hence similar parameters for determining the WACC. However, the value of these parameters naturally differs reflecting different national financial market conditions. 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 specific” such as the RFR, ERP and Tax rate, with a less relevant role for parameters such as beta, gearing and debt premium. An analysis was made with regard to the different years NRAs took the WACC decision to show the impact of the time variable when taking a WACC decision. This year report also summarizes separately WACC information taking into account only EU countries that are subject to the Article 7 procedure.

Overall the 2020 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 is more pronounced for the termination markets whereas we see a more differentiated picture for the wholesale access markets reflecting the different national market situations and structural factors influencing the regulatory strategy.

For the third time the report 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 test, Vectoring regulation, the cable regulation and the issue of wholesale only operators. A brief analysis of symmetric remedies is included. Outcomes of the survey are simply reported in a descriptive form.

## **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 convergence in the application of the 2013 Recommendation on consistent non-discrimination obligations and costing methodologies. In 2021 the report will continue to look at the application of regulatory accounting with respect to key access products (e.g. fibre) and will maintain the detail and 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 may be adapted in the light of the EECC provisions given that the EECC will have to be transposed by Member States by 21<sup>st</sup> December 2020. This implies looking in which way NRAs will apply the updated provisions to deal adequately with the developments in markets and technology.

Regarding the WACC calculation, the report data will continue to be collected 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.

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<sup>1</sup> Cf. BoR (13) 110.



## 2. Introduction

### 2.1 Background

The BEREC Regulatory Accounting EWG has been gathering and reporting data from NRAs to provide a high level picture on remedies in charge with more specific attention to the obligation of cost accounting, accounting separation and price control in European countries. The report also provides information on the regulatory context in which the obligation is imposed. The scope of the report is twofold: i) to provide a benchmark on regulatory accounting at a single access product level; and ii) to provide a view on the rationale/motivation of the decision on price control and costing methodology as adopted by NRAs.

This is the sixteenth annual report summarising the results of the 2020 survey.

The report has been updated since 2005 in order to monitor trends in the degree of harmonisation of regulatory accounting systems across Europe.<sup>2</sup> By the end of the first quarter 2006 several countries had completed the first round of the market reviews for the 18 markets listed in the 2003 Recommendation; therefore it was possible to evaluate how various NRAs implemented the obligations provided for by articles 9-13 of the Access Directive (for wholesale markets), and the principles contained in the European Commission Recommendation on Cost Accounting and Accounting Separation of September 2005.<sup>3</sup> In several places this report also refers already to the relevant articles of the EECC. In particular, it also contains a short analysis of symmetric remedies anticipating art. 61.3 EECC.

As the Commission issued the 2007 Recommendation that reduced the number of markets susceptible to ex ante regulation, the report focused gradually on a lower number of markets and, more recently, also on how NRAs implement the principles of the Commission Recommendation on consistent non-discrimination obligations and costing methodologies (NDCM).<sup>4</sup> In 2020 the Commission run 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).

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<sup>2</sup> - 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.

<sup>3</sup> Recommendation 2005/698/EC replacing Recommendation 98/322/EC on Accounting Separation and Cost Accounting of 8 April 1998. In September 2005 the ERG published a Common Position containing "Guidelines on implementing the EC Recommendation 2005/698/EC", cf. document ERG (05) 29.

<sup>4</sup> "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 26<sup>th</sup> 2013, cf. Document BoR (13) 41.

In 2014 the Commission issued a Recommendation that further reduced the number of relevant markets focussing the report on specific products in each market. Currently the Commission is working on a new Recommendation, BEREC submitted its Opinion on the draft recommendation on 16<sup>th</sup> October 2020 (BoR (20) 174). According to the EECC the new Recommendation has to be issued until 21<sup>st</sup> Dec. 2020.

Generally speaking, previous years' reports showed a clear trend towards an increasingly consistent approach to regulatory accounting among NRAs which this year's report confirms.

## **2.2 Current report**

This report provides an update on the status of regulatory accounting systems across Europe. It monitors how regulatory accounting methods have been developed as a consequence of the adoption by NRAs of decisions regarding market analyses.<sup>5</sup>

This year's report confirms the trend towards the consistent implementation of accounting methods and models already observed during the last few years.

The report benefits from information collected from 35 NRAs (listed in Appendix I) with most NRAs responding to the majority of the questions, thus providing a solid base for further analysis and comparison along the years.<sup>6</sup>

The information provided in this report refers to those markets for which remedies are in force (last update 1<sup>st</sup> April 2020).

## **2.3 The data collection process**

Under the regulatory framework of electronic communications, NRAs can, in principle, use a variety of appropriate regulatory accounting methodologies<sup>7</sup>.

In order to obtain a general view of cost accounting systems across Europe, the Regulatory Accounting EWG has collected a broad range of data from NRAs.<sup>8</sup>

Over time the number of markets considered susceptible to ex ante regulation has been reduced from 18 markets (Rec. 2003/311/EC) in 2003, to 7 in 2007 (Rec. 2007/879/EC) and 5 in 2014 (Rec. 2014/710/EC). Accordingly, the analysis of the regulatory accounting monitoring process has been adjusted.

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<sup>5</sup> The monitoring approach is based on a "survey" submitted by NRAs mainly based on predefined categories and sub-categories of replies. In that sense the approach described for each country is standardised for statistical reasons. The categories and sub categories chosen and agreed give just an indication of the main approach in use that is articulated in each NRA's decision reflecting own country specificity.

<sup>6</sup> IS, LI, MK data refer to previous year's reports as no change has been reported since last year. The same applies for the UK which left the EU on 31<sup>st</sup> Jan. 2020 and is therefore no longer a BEREC member.

<sup>7</sup> For an explanation of how to implement a regulatory accounting system see the ERG (05) 29 "Common position on EC Recommendation on Cost accounting systems and accounting separation under the regulatory framework for electronic communications" (2005/698/EC). Cf. also BEREC response to the Commission's questionnaire on costing methodologies for key wholesale access products in electronic communications, BoR (11) 65.

<sup>8</sup> Confidential information is not published.

Although there are fewer markets now subject to ex ante regulation, the number of products in markets 3a, 3b and 4 (according to Rec. 2014/710/EC) has increased and has become more differentiated especially with the evolution of NGA and VHCN networks. This change is reflected in the RA annual report which provides an analysis that year after year becomes more focused on single products (increasing the scope of monitoring). The 2020 report collects information on 21 main products as reported in Figure 1 (13 main products in 2015).<sup>9</sup>

Figure 1 – Market and products monitoring perimeter

| Markets/products |   | Definition   |
|------------------|---|--|
| M1 2007          |   | Access to the public telephone network at a fixed location for residential and non residential customers |
|                  |   |  |
| M2 2007          |   | Call origination on the public telephone network provided at a fixed location                            |
|                  |   |  |
| M1               |   | Wholesale call termination on individual public telephone networks provided at a fixed location          |
|                  |   |  |
| M2               |   | Wholesale voice call termination on individual mobile networks   |
|                  |   |  |
| Market 3a        | M3a_2014_M4_2007_ULL  | Local loop unbundling service on copper network  |
|                  | M3a_2014_M4_2007_SLU  | Sub loop unbundling on copper network  |
|                  | M3a_2014_M4_2007_SA   | Shared access service on copper network  |
|                  | symmetric access to wiring and cables and associated facilities inside buildings or up to the first concentration or distribution point |  |
|                  | M3a_2014_M4_2007_Terminating segment ( in line with definition of art. 61 (3))  | symmetric access to wiring and cable and associated facilities beyond the first concentration point      |
|                  | M3a_2014_M4_2007_Terminating segment (point beyond the first concentration point art. 61 (3))   |  |
|                  | M3a_2014_M4_2007_fiberLLU   | Fibre local loop unbundling  |
|                  | M3a_2014_M4_2007_VULA (FTTC)  | VULA on Fiber to the Cabinet Network   |
|                  | M3a_2014_M4_2007_VULA (FTTH)  | VULA on Fiber to the Home Network  |
|                  | M3a_2014_M4_2007_DF   | Dark fibre in access network   |
|                  | M3a_2014_M4_2007_DA   | Duct access on access network  |
| Market 3b        | M3b_2014_legacy   | Bitstream service at central access on legacy infrastructure (copper from the central office)            |
|                  | M3b_2014_NGA (included FTTC/FWA)  | Bitstream service at central access on FTTC and FWA infrastructure                                       |
|                  |   | Bitstream service at central access on FTTH infrastructure   |
| Market 4         | M3b_2014_(FTTH)   |  |
|                  | M4_2014_Active_Legacy   | Terminating segment on legacy copper network   |
|                  | M4_2014_Active_NGA  | Terminating segment on FTTx network  |
|                  | M4_2014_Passive   | Access to passive infrastructure (dark fiber)  |
| WLR              |   | Wholesale Line Rental  |

Source: BEREC RA Database 2020

Before reporting the main results on regulatory accounting practices currently in force in the EU, in line with the last three past versions of the report, this year's report provides more information on the regulatory and competitive framework in each member state (chapter 2.4). Therefore, the regulatory outcome for the accounting obligation - which is still the main focus of the report - will be described including information on the individual market situation in which remedies have been applied. In this context the report has given information for framing trends and decisions about the remedies approach adopted on price control and costing methodologies at single product level.

For this reason, for each product/market, the report begins with a picture of the application of regulatory accounting obligation with reference to the following elements of the regulatory context: i)

<sup>9</sup> This year's report also includes information on the application of regulation of the terminating segment (in line with the definition of art. 61 (3) and the point beyond the first concentration point). Market 3b also includes specific information on the type of technology, i.e. legacy, NGA (FTTC/FWA) and VHCN (FTTH) separately.

Geographical regulation; ii) Equivalence model applied; iii) Application of retail margin squeeze test; iv) Vectoring regulation; v) cable regulation/wholesale only operator and; vi) main regulatory priorities.

In the motivation section some elements about combination of regulatory accounting obligation and structural parameters are given.

## 2.4 The remedy framework in practice

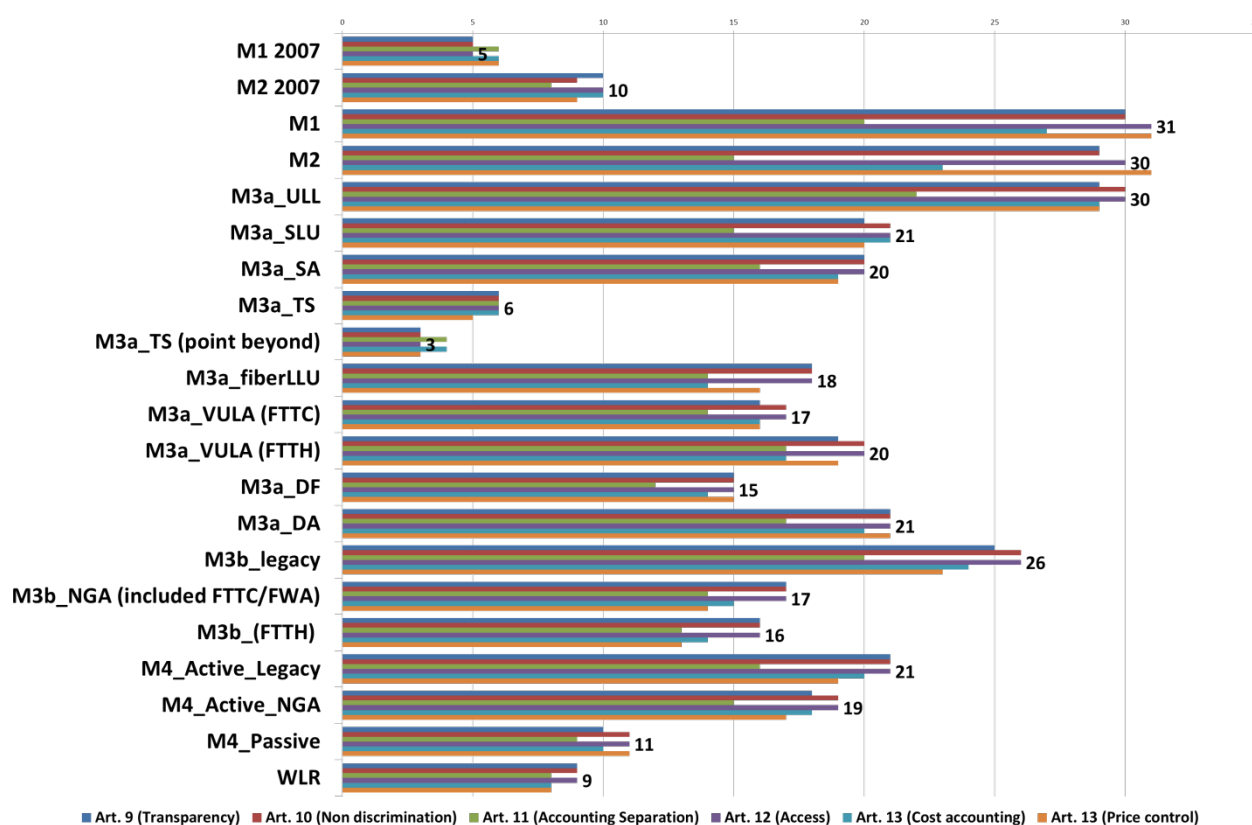
In this section an overview on the application of the set of remedies imposed for each product (Art. 9-13 of the AD) is given. The specific cross reference to the Access Directive has been made in continuity with the previous reports and takes into account the fact that the European Electronic Communications Code (EECC) is still in the transposition phase in most EU Member States. In any case, the remedy set “Transparency”; “Non-discrimination”; “Accounting separation”; “Access”; “Cost accounting” and “Price control” are still the set of remedies available in the EECC.<sup>10</sup>

Figure 2 – Access Directive 2009/19 Art. 9-13

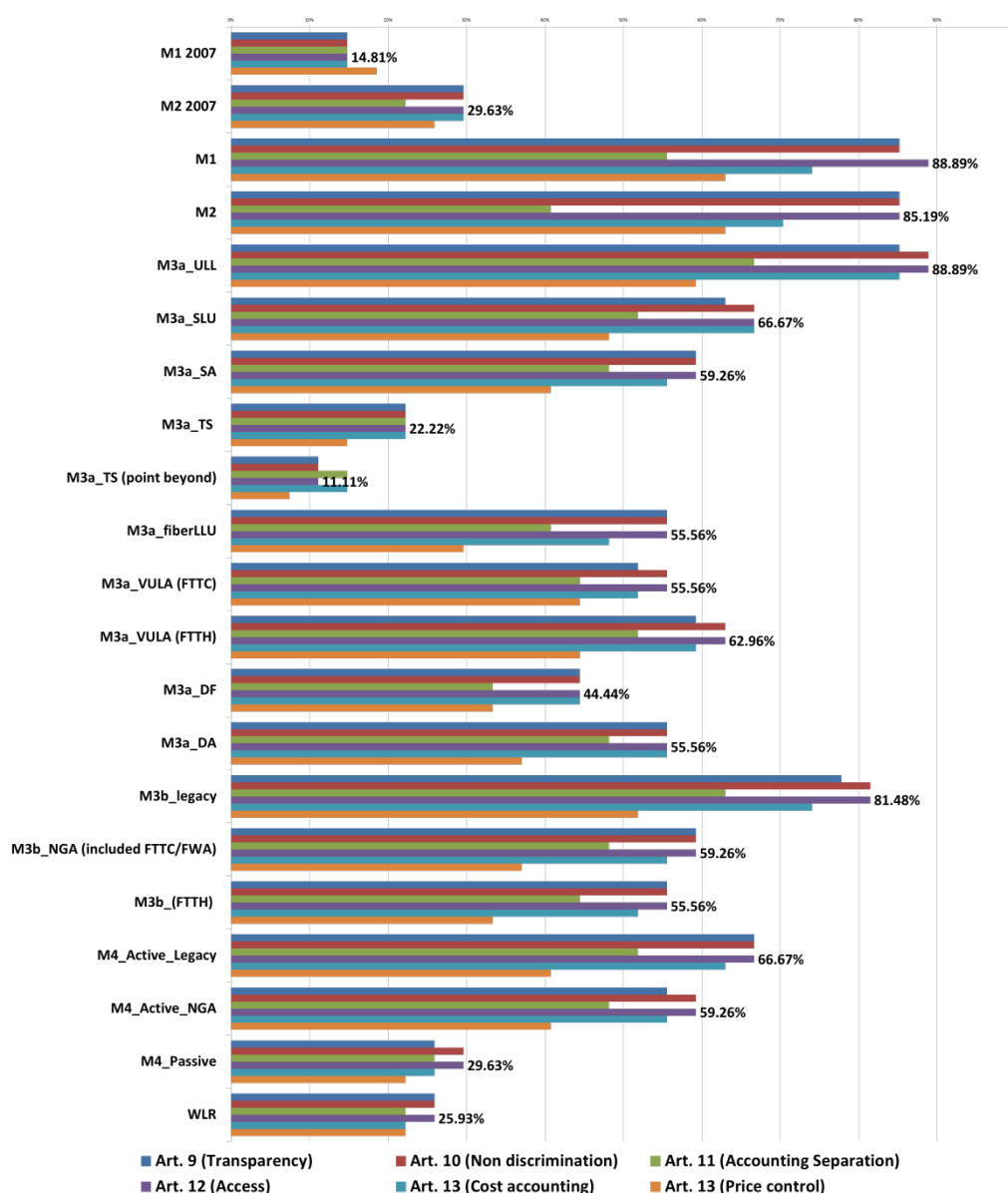
| Article | Obligation                                       |
|---------|--|
| Art. 9  | Transparency                                     |
| Art. 10 | Non-discrimination                               |
| Art. 11 | Accounting Separation                            |
| Art. 12 | Access to and use of specific network facilities |
| Art. 13 | Cost accounting                                  |
| Art. 13 | Price control                                    |

Results from the application of the remedies which have been set out from art. 9 to 13 of the AD 2009/19/EC – see Figure 2 - are reported in Figure 3 for each product included in the survey and shown for each NRA. Specifically, the absolute number of NRAs that apply each obligation including both EU and non EU member states is reported as well as the percentage of EU member NRAs in comparison to all 27 NRAs.

<sup>10</sup> Specifically in the EECC we refer to: Art. 69 (Obligation of transparency), Art. 70 (Obligation of non-discrimination); Art. 71 (Accounting separation); Art. 73 (Obligation of access to and use of specific network elements and associated facilities); Art. 74 (Price control and cost accounting obligations).

Figure 3 a-b – Application obligations ex Art. 9 -13 AD<sup>11</sup>

<sup>11</sup> Labels report the indication of relevant markets according to the 2014 Rec. (only M1 and M2 of Rec. 2007 are added) and of specific access products belonging to each market.



Source: BEREC RA Database 2020

Figure 3 shows that different sets of remedies are applied to each product. Focusing on RA in general, accounting separation is often imposed together with the cost accounting obligation. Some NRAs consider that it is 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 could be useful for vertically integrated undertakings when using cost models for price control, to prevent unfair cross-subsidy (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 (i.e. reducing regulatory burden such as cost orientation).

In particular, in a quite mature and stable environment, such as LLU services in market 3a, 22 NRAs reported to apply accounting separation. A particular case are the termination markets where NRAs that have established prices through pure BU-LRIC models have, in some cases, removed the Accounting Separation obligation at the same time; only 15 NRAs still maintain the obligation for the mobile termination market whereas 31 NRAs apply a price control obligation.

In comparison to last year's report one NRA has removed the ex ante regulation in market 3a and 3b completely for all products (BG) due to the fact that markets have been found to be sufficiently competitive; in one other country (NL) regulatory framework, and corresponding regulatory obligations, have been changing due to court decisions; One NRA (SE) has removed duct access that is no longer regulated on an SMP basis.

A focus on products related to market 3b which are differentiated by technology (legacy, "NGA" and "VHCN-FTTH") has been included with respect to last year's report. In this case it can be observed that the SMP regulation in market 3b (NGA and/or VHCN) is applied in combination with the availability of VULA or Fibre LLU, coherently with the ladder of investment principle. Specifically 20 NRAs (BE, CY, CZ, DE, DK, EE, EL, ES, FI, HR, HU, IE, IT, IS, LT, LU, LV, NO, PL, SK) apply access obligations to NGA (FTTC) and/or VHCN (FTTH); 12 NRAs apply access obligation in market 3b to both NGA and VHCN (BE, CZ, FI, HR, HU, IE, IT, LT, LU, LV, PL, SK); generally access obligation in market 3b over VHCN architecture is less frequent, in fact only three NRAs (DK, ES, NO) have applied it in market 3b only to VHCN, while 4 NRAs (CY, DE, EL, IS) have imposed access obligation in market 3b only to NGA services architectures and not to VHCN.

Considering "VHCN" products in market 3a VULA over FTTH and/or FLLU, 26 NRAs apply access obligation (AT, BE, CY, CZ, DE, DK, EE, EL, ES, FI, HR, HU, IS, IE, IT, IS, LT, LU, LV, MT, NO, PL, SE, SI, SK), where 12 NRAs apply both regulatory obligations (CZ, FI, HR, HU, IS, LT, LU, LV, MT, NO, SI, SK), 6 NRAs apply only FLLU (DE, DK, EE, LI, PL, SE) and 8 NRAs apply access regulatory obligation only to VULA FTTH (AT, BE, CY, EL, ES, IE, IT, MK).<sup>12</sup>

Three NRAs (PT, RS, UK), that have still determined SMP in market 3a and/or 3b, do not regulate any products over FTTH in market 3a (neither VULA nor Fibre LLU) or in market 3b. In such last cases access to the civil infrastructure is the only SMP obligation for addressing competition via a VHCN solution.

It should be considered that the relevance of the regulatory access obligation in each country is dependent on the level of coverage with a specific technology and the level of diffusion of the NGA products in the retail market in terms of take-up as well as level of competition. The imposed obligation is also a result of the technological choice of the SMP operator.

The picture in Figure 4 represents a sort of scale which is based on the amount of access obligation in markets 3a and 3b; it gives a rough classification of the amount of regulatory measures considered. The following access remedies have been considered for market 3a: LLU, VULA FTTC, VULA FTTH, Fibre LLU, DA; For market 3b: legacy, NGA (FTTC/FWA) and FTTH are considered. The picture shows the amount of SMP access obligation in charge on legacy, NGA and "VHCN" networks.

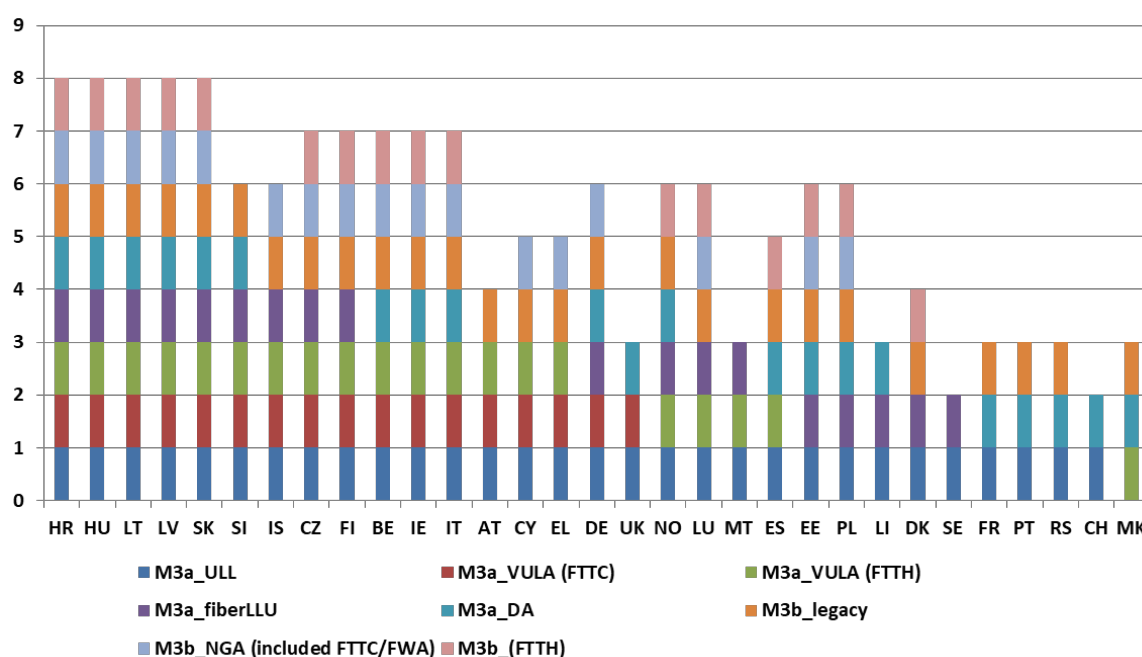
One group of countries applies all access obligations for all products in market 3a and 3b (HR, HU, LT, LV, SK). In a second group of countries four of five main regulatory obligations are in charge in market 3a (CZ, FI). In this case no duct access as SMP obligation is in charge, but Fibre LLU is included, and (BE, IE, IT) where Fibre LLU is excluded, but DA is in charge. In those cases also obligations in market 3b are in charge for all products. In such a case the Fibre LLU is excluded due to irrelevance.

<sup>12</sup> BE: in principle Fibre wavelength unbundling should be always provided.



In another group of countries (NO, LU, MT, ES) FTTH is the main deployed architecture. In this case VULA FTTH is present in combination with Fibre LLU and/or DA in market 3a. A further group of countries (EE, PL, LI, DK, SE) include only Fibre LLU as the main instrument in market 3a, generally in combination with duct access. Other countries (FR, PT, RS, CH) include only duct access as instruments for regulatory purposes to NGA networks, even when FR and PT<sup>13</sup> have applied symmetric obligations respectively to the terminating segment and civil infrastructures also when the main deployed architecture is FTTH.

Figure 4 – Regulatory obligation ex Art. 9 -13 AD



Source: BEREC RA Database 2020

Following, some elements related to remedy details – which are considered to have a relevant impact on pricing and regulatory accounting – are summarized.

After a general overview of the regulatory strategy adopted by NRAs on the remedies at single product level, main elements that can be relevant for the decision on the appropriateness of a specific price control and corresponding costing methodology are taken into account. In that context we still refer mainly to the instruments which are provided by the NDCM Recommendation<sup>14</sup> such as: the availability of an economic replicability test (ERT); the imposition of a non-discrimination obligations; the adoption of a differentiated geographical regulation that is an indication of the presence of alternative network and can provide a demonstrable retail price constraint in the market; the symmetric regulation obligation in line with new art. 61 (3) of the EECC. Those options are addressed below:

#### The legal basis for the application of the replicability test

<sup>13</sup> PT applies symmetric obligation to civil infrastructure independently with respect to the BCRD provision.

<sup>14</sup> From 16 July 2020 until 7 October 2020 the Commission launched a public consultation for the revision on the NGA Recommendation (NGA) and the Non Discrimination and Costing Methodologies Recommendation (NGCM), to which BEREC replied (BoR (20) 169).



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 - it must be based on the specific competitive concerns identified in the market analysis.

However, also a contrary case exists: art. 13 AD is imposed in some cases even if “No price control” is declared as a price control method. In this case art. 13 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 methodology; in that case the general imposition of art. 13 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.

Up to now, the statement of the NDCM Recommendation on the ERT for NGA products as the alternative for ex ante price control is not fully applied. Summing up, margin squeeze tests are used mainly as a complementary measure for a price control method, within the article 13 AD legal framework. 2020 data confirms that a retail margin squeeze test (ex-ante or ex-post) is less frequently imposed on legacy products, access to infrastructure and dark fibre - in this case consistently with the 2013 NDCM Recommendation.

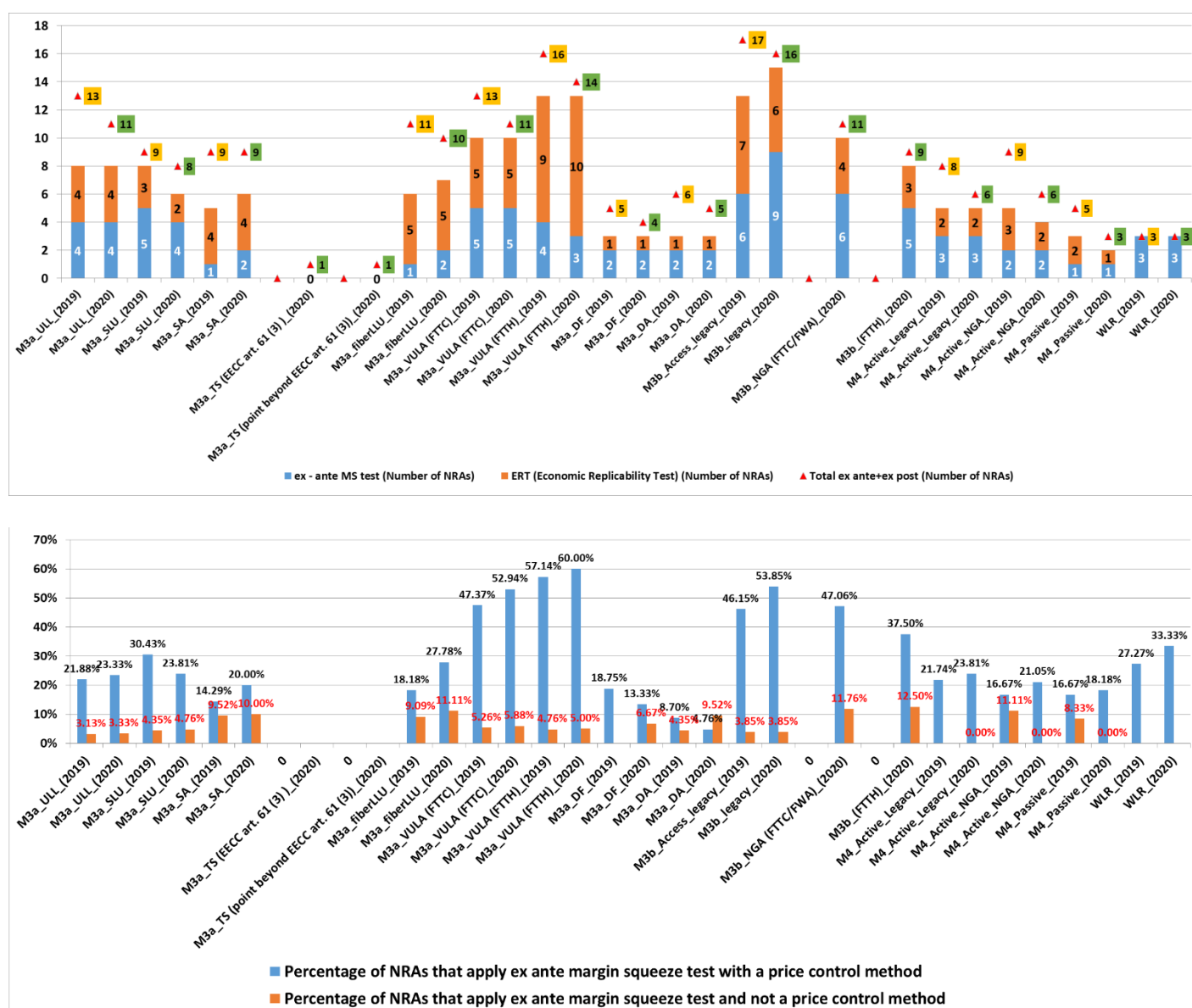
In Figure 5 the results of the survey are provided and compared with previous year's data for markets 3a, 3b, 4 and WLR products.<sup>15</sup> The given options were the following: i) ex-ante margin squeeze test; ii) ERT (Economic Replicability Test); iii) ex-post retail margin squeeze test. The three options have been derived from BoR (14) 190.<sup>16</sup>

A combination of price control and a retail margin squeeze test/ERT test is applied only for specific access products (e. g. the flagship wholesale products on which the retail margin squeeze test is applied). For example, about 30 % of NRAs that apply a price control to LLU services also apply a form of an ex ante replicability test. For VULA FTTH this reaches 60 % (Figure 5), indicating that the application of the margin squeeze test becomes more relevant for NGA products.<sup>17</sup> The amount of NRAs that apply an ex-ante or ex-post control is decreasing in absolute terms, due to the increase of NRAs that have removed the wholesale regulation.

<sup>15</sup> A comparison with last year report is carried out when homogeneous data are available.

<sup>16</sup> When a specific wholesale product is included in the applied economic replicability test, it means that this wholesale product is included in the corresponding assessment

<sup>17</sup> The percentage is evaluated considering as denominator all NRAs that have declared to impose an access obligation.

Figure 5 a-b – Application of retail margin squeeze test<sup>18</sup>

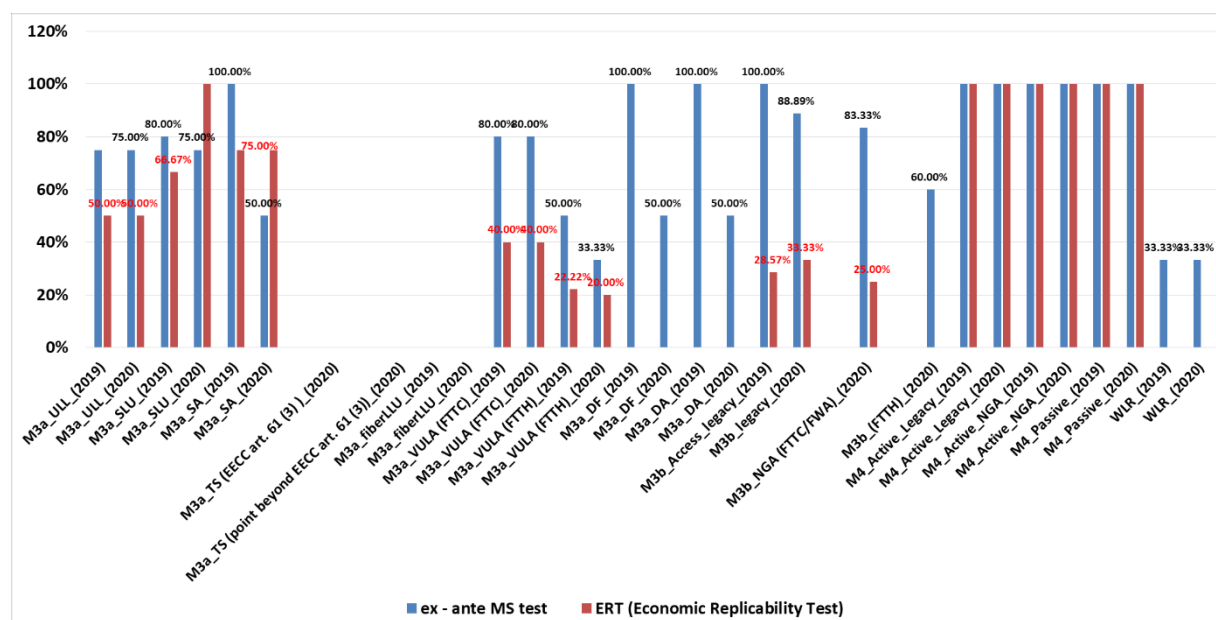
Source: BEREC RA Database 2020

In Figure 6 the percentage of NRAs that apply ex-ante tests (ex-ante margin squeeze test or ERT) is reported in combination with cost oriented prices as the main category. Some NRAs have used ex ante margin squeeze tests as a stand-alone price flexibility tool. This is more evident with respect to VULA – FTTH in market 3a where only 20 % of NRAs out of the 10 NRAs that apply ERT in 2020 have chosen it complementary to the cost orientation obligation. This percentage is decreasing in comparison to the previous year in combination with an increase of NRAs that apply the test. This suggests that ERT is increasing at least for VHCN wholesale product as a price control method and is used as a substitute with respect to cost orientation - in line with the principle suggested in the NDCM recommendation.

<sup>18</sup> The yellow label refers to the number of NRAs that apply an ex ante or ex post test, the green label the corresponding number for the 2020 survey.

The traditional margin squeeze test is often used complementary to cost oriented price regulation rather than as a substitute. When NRAs declare to use an ex-post margin squeeze test independently of the product, they declare a cost oriented price. For market 4, i. e. leased lines, the test, when applied, is always complementary to cost orientation.

Figure 6 – Application of retail margin squeeze test and cost orientation



Source: BEREC RA Database 2020

### Geographical regulation

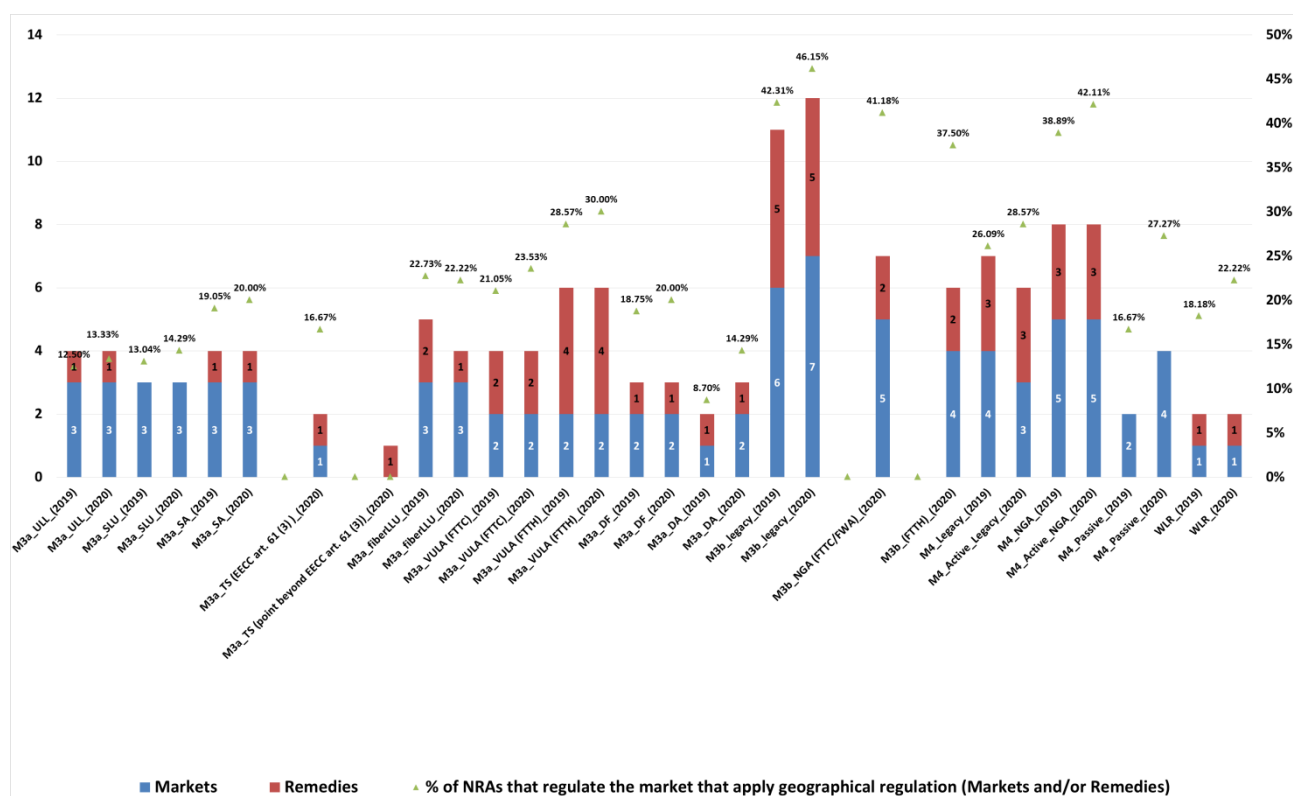
A geographical approach to regulation is another variable that can influence the imposition of price control obligation.<sup>19</sup>

Figure 7 reports an updated overview of the application of geographical regulation. Some NRAs apply a geographical approach to regulation in terms of market segmentation (affecting SMP assessment), others in terms of remedies.

Forms of geographical regulation relate primarily to markets 3b and 4. Comparing 2019 to 2020 data, it appears that the geographical approach to the ex-ante regulation is getting more relevant in all markets with a specific role taken by legacy products in market 3b. Looking at the percentage of NRAs that differentiate geographical markets and/or remedies in comparison to NRAs that regulate the same markets, the incidence of geographical regulation is slightly on the increase in all markets. In market 3b legacy product and market 4 above 40 %.

<sup>19</sup> Concerning the consolidated replies about categories and subcategories the main non-competitive areas have been considered as the main reply and shown in the graphs. Thus when deregulation is applied via a geographical approach this effect is not shown in the consolidated picture of categories and sub categories.

Figure 7 - Geographical remedies/market regulation



Source: BEREC RA Database 2020

### Symmetric framework

This year's report also collects information on the application of symmetric regulation anticipating art. 61 paragraph 3 EECC. Specifically, separate information on sub-paragraph 1 (terminating segment)<sup>20</sup> and sub paragraph 2 access point beyond the first concentration point<sup>21</sup> has been collected.

In case of the sub paragraph 1 (terminating segment) access obligations are applied by 7 NRAs (ES, FR, HR, HU, IT, LT, LV). Generally, the full set of remedies (transparency, non-discrimination, access, cost accounting and price control) are applicable within the frame of symmetric regulation as shown in the previous paragraphs. Access obligation beyond the first concentration point, anticipating art. 61 paragraph 3 sub-paragraph 2, has been declared by 4 NRAs (FR, HR, LT, LV). 3 NRAs combine both SMP and symmetric obligations: specifically (HR,LT,LV) include in the regulatory framework all the remedies for SMP regulation in market 3a and 3b as reported in figure 4c. In one case (FR) the application of symmetric access obligations using the provision of art. 61 (3) sub-paragraph 1 and 2 (terminating segment and access point beyond the first concentration point with a symmetric approach) has been considered sufficient enough to generally not impose SMP remedies on fibre in the market 3a for the mass market. Specific SMP remedies were imposed for wholesale products dedicated to business retail markets. In all other cases where the symmetric obligation is applied, Fibre LLU and/or VULA FTTH is imposed on an SMP basis in combination. It should be

<sup>20</sup> 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"

<sup>21</sup> Art. 61 (3) sub paragraph 2 EECC states that: "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."

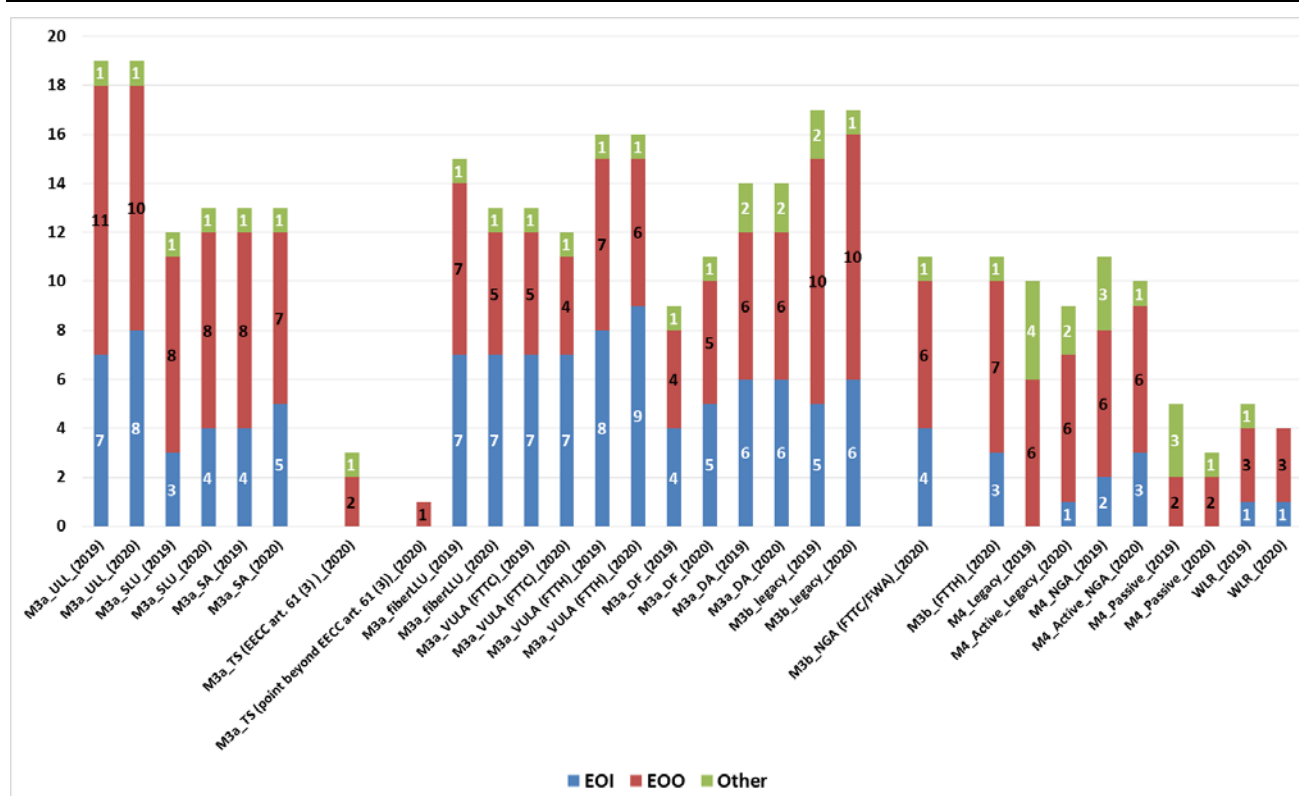
said that the application of art. 61 would be only assessed in the following years considering the national transposition of the Code and the adoption of the BEREC Guidelines on the application of article 61.3.

### Equivalence model

The survey asked for information on the Equivalence model currently in force for different products. The options provided were: EoI<sup>22</sup>, EoO<sup>23</sup> and “Other”<sup>24</sup>. Figure 8 shows the outcome of the survey.

In absolute terms there is a small increase in the number of NRAs that impose EoI/EoO models; this is more evident for products like VULA FTTH and in relation to market 3b.

Figure 8 - Equivalence model



Source: BEREC RA Database 2020

In Figure 9 the percentage of NRAs that apply EoI / EoO in relation to the total number of NRAs that apply a non-discrimination obligation for the corresponding product is provided. The cumulative percentage of EoO and/or EoI is more frequent in relative terms in case of NGA product VULA (FTTC/FTTH) as well as for market 3b and DF. Generally there has been an increasing preference to apply an EoI model where regulation is in charge.

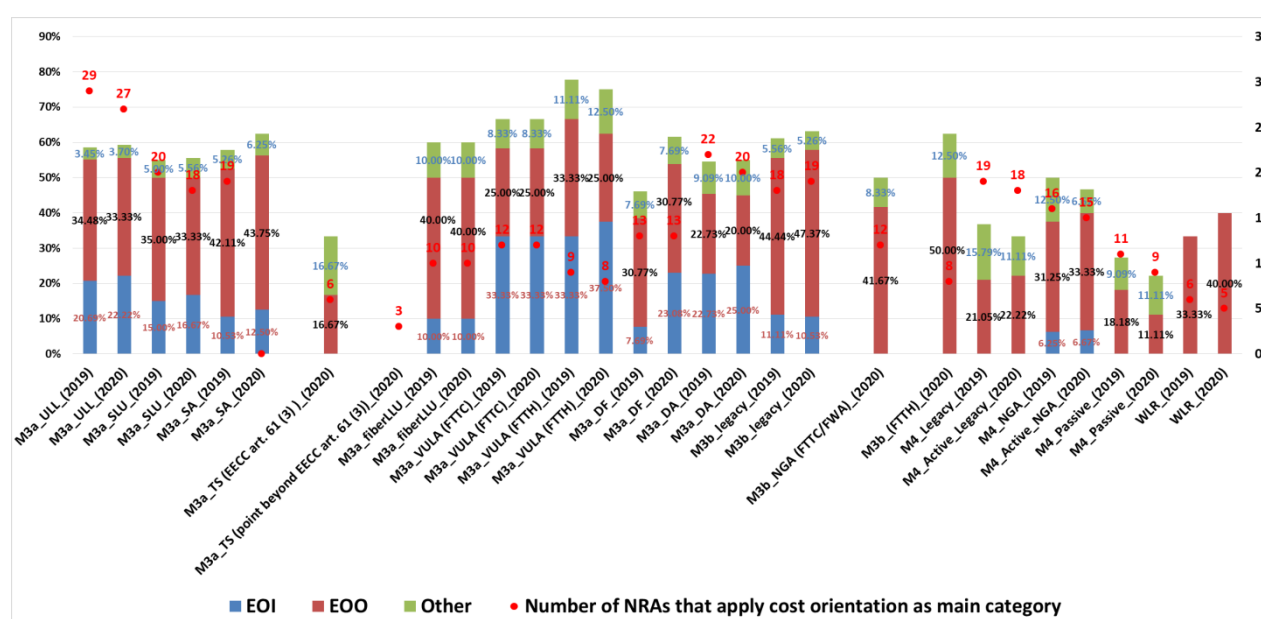
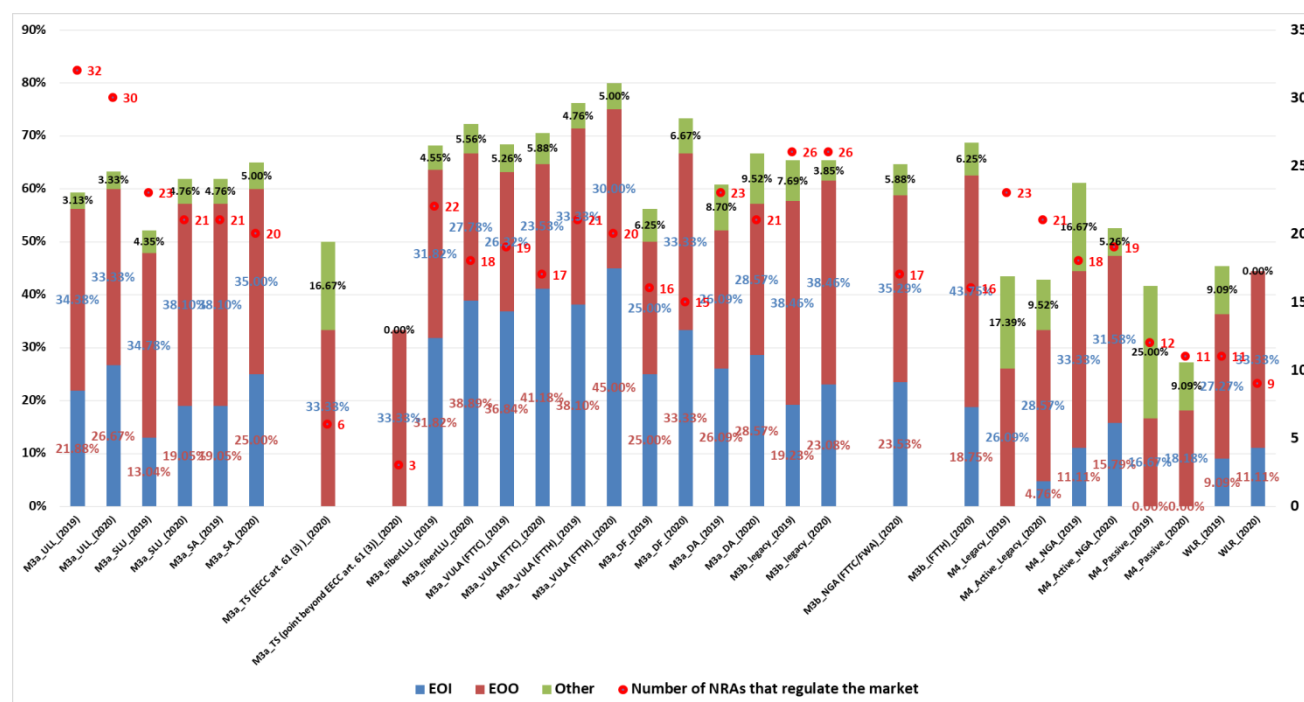
<sup>22</sup> 'Equivalence of Input (EoI)' means the provision of services and information to internal and third-party access seekers on the same terms and conditions, including price and quality of service levels, within the same time scales using the same systems and processes, and with the same degree 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.

<sup>23</sup> '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 albeit using potentially different systems and processes.

<sup>24</sup> 'Other' is a residual option for enhanced non-discrimination obligation not properly filed under EoI/EoO.

In the same picture the percentage of NRAs that apply EoI and/or EoO in relation to NRAs that apply it together with cost orientation is given. In this case, concerning market 3a products, the EoI or EoO application is a complementary cost orientation measure not a substitution. More than 60 % of NRAs that apply cost orientation also apply a non-discrimination obligation, applying EoO or EoI to the access product. Increasingly, when EOI is in charge, cost orientation is relaxed, particularly in case of NGA and VHCN products. For market 3b all NRAs that apply EoI do not apply any cost orientation when regulating the corresponding product.

Figure 9 - Equivalence model

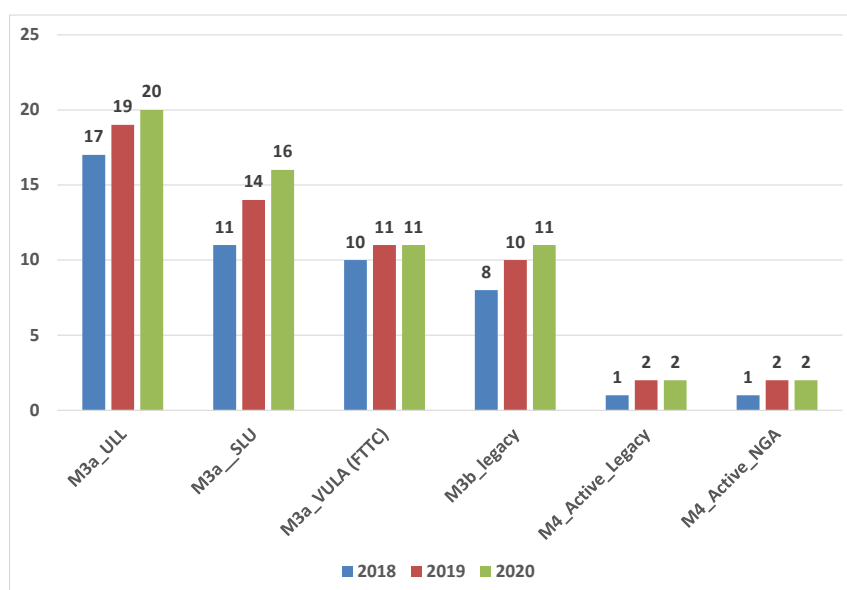


Source: BEREC RA Database 2020

### Vectoring deployment

Information on vectoring regulation in case a VDSL2 xDSL standard is deployed by the incumbent operator has been collected since it may have an impact on the access obligation (efficiency vs. competition), on access pricing and, more general, on the application of the ladder of investment principle. Figure 10 reports the number of NRAs that allow vectoring regulation in access markets 3a, 3b and 4. The permission of vectoring deployment is increasing. Generally the availability of vectoring deployment by SMP operators is allowed depending on the availability of a VULA product (DE, SE). In one case the possibility to use vectoring in coordinated form, from the cabinet by the SMP and/or OAO, is conditioned to the availability of a Multi Operator Vectoring solution (IT).<sup>25</sup>

Figure 10 – Vectoring regulation



Source: BEREC RA Database 2020

The most significant number is recorded for VULA FTTC: 11 out of 17 NRAs that have imposed an access obligation have also regulated the use of a vectoring solution by the SMP operator.

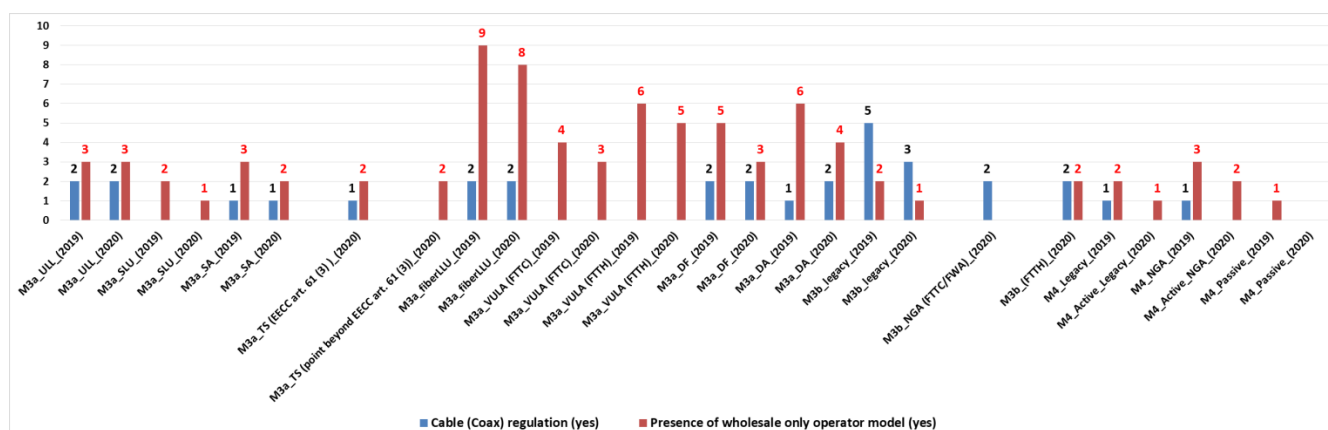
### Cable regulation/wholesale only operator

NRAs were asked to provide information for each product/market on (i) the regulation of cable operators and (ii) the presence of operators following a wholesale-only operator business model (Figure 11).

<sup>25</sup> In CH Vectoring is allowed, but no specific regulation is adopted.



Figure 11 – Cable regulation/Presence of wholesale-only operator



Source: BEREC RA Database 2020

The situation remains largely unchanged from to the previous year. Replies indicate that only few NRAs regulate cable operators in access markets (3 NRAs).<sup>26</sup> Operators with a wholesale-only model offer mainly fibre LLU (8 NRAs) and VULA FTTH (5 NRAs). 8 countries have a wholesale-only fibre offer; in these cases 3 NRAs imposed also Fibre LLU access obligation – in combination with cost oriented price obligation - for the SMP integrated operator.

<sup>26</sup> BE regulates cable coax network operators only in market 3b for NGA services, not on legacy cable networks.



### 3. Outline of the Results

#### 3.1 Regulatory Accounting methodologies (definitions)

With reference to regulatory accounting methodologies, a set of predefined options has been used in order to improve data comparability while providing a more detailed picture over the years.

##### Price control

For the price control methodology the following categories and sub categories have been considered (Figure 12).

Figure 12 - Price control categories and sub-categories

| Price control<br>Main category | Subcategory 1<br>Cost orientation | Subcategory 2<br>Retail minus        | Subcategory 3<br>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 in compliance with Recommendation of Termination Rates Recommendation of 7 May 2009 |
| Benchmarking                   |                                   | ERT (Economic Replicability Test)    |  |
| Others/Combination             |                                   | Fair and reasonable pricing          |  |
| No price control               |                                   | Retail minus                         |  |

Source: BEREC RA Database 2020

The sub category “price cap” is included in the sub category “cost orientation” as it is generally 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 (with respect to MST) providing more price flexibility to the SMP operator (according to the relevant provisions of the NDCM to promote competition and enhance the broadband investment environment 2013/466/EU). 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 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 would 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 13).

Figure 13 - 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 2020

The LR(A)IC and LRIC categories refer in both cases to a modelling approach used for estimating the cost of the services; FDC refers to the fact that the cost of the services are determined taking into account the results of the regulatory accounting system of incumbent operators. LR(A)IC and LRIC categories are 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 are 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 level of (in)efficiency of the incumbent operator in providing the services<sup>27</sup>.

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 eventually using efficiency 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 cost base used, the traditional categories of HCA and CCA have been identified (Figure 14).

Figure 14 - Cost base categories and sub categories

| Cost base |
|-----------|
| HCA       |
| CCA       |

Source: BEREC RA Database 2020

<sup>27</sup> 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.

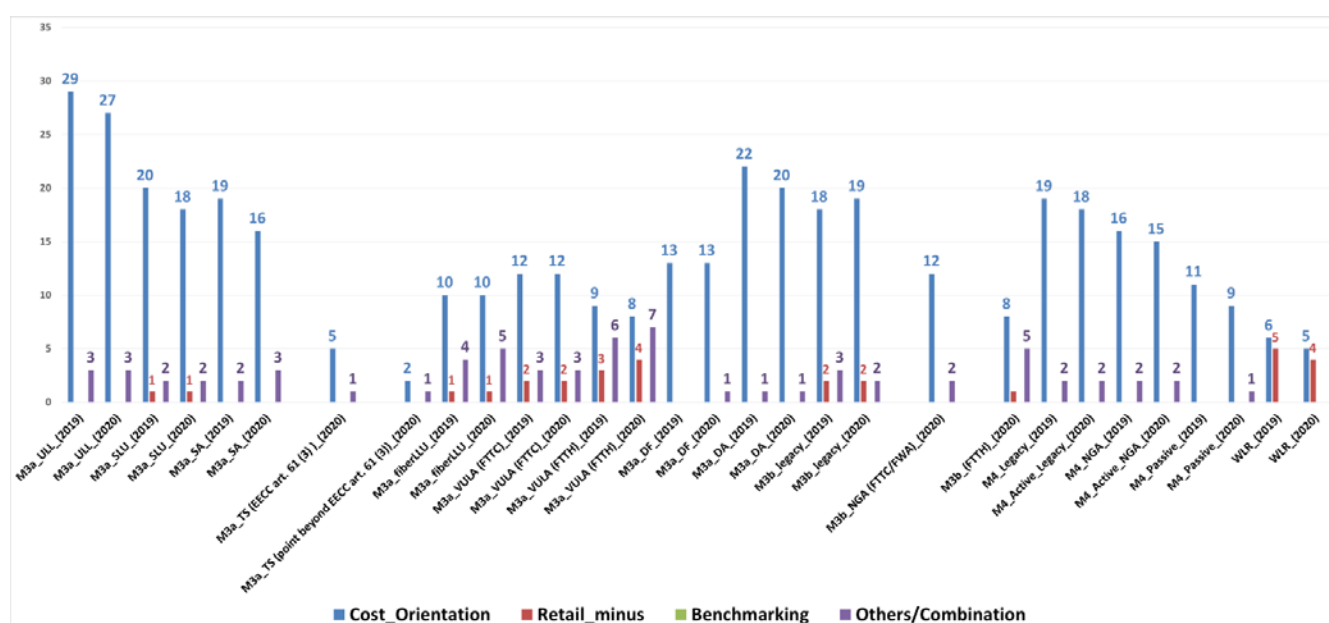
### 3.2 Price control methods

The following gives an overview of the price control methods used by NRAs to regulate markets and products according to the main categories and sub categories previously reported (2019 and 2020 records are reported). In the same picture the corresponding percentage of the main category of price control in use in relation to the number of NRAs that regulate the market is given.<sup>28</sup>

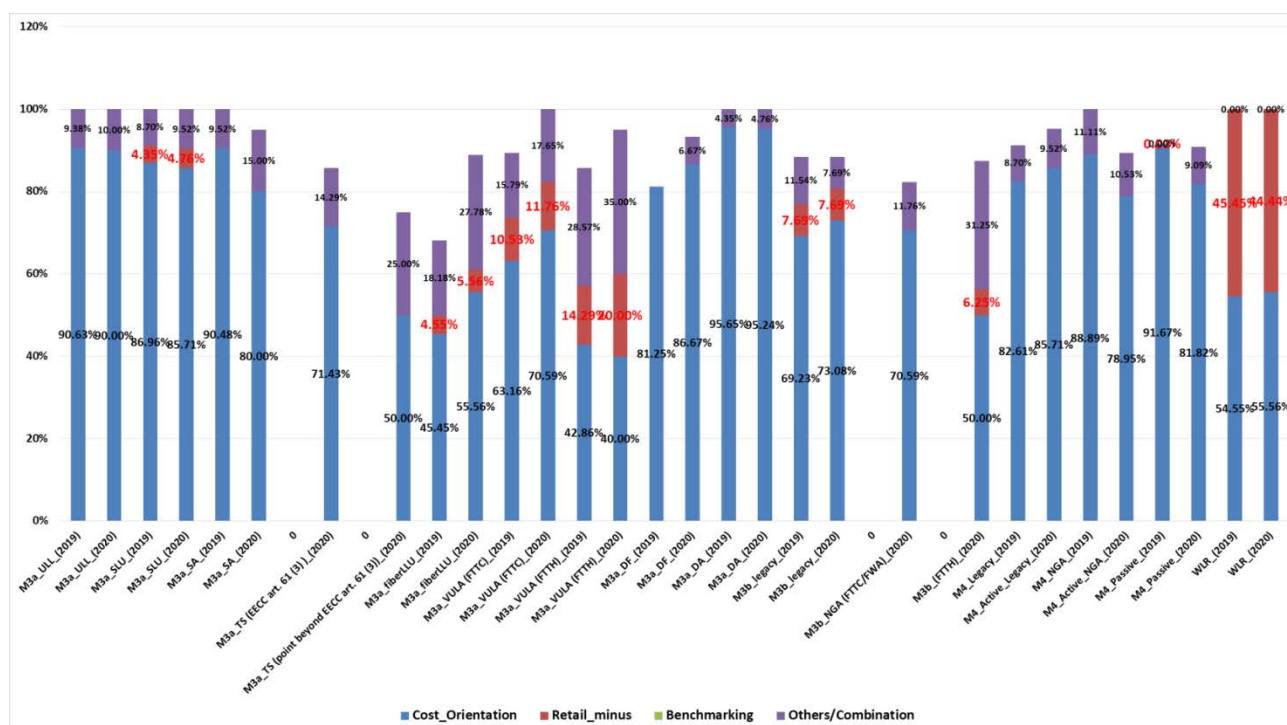
In terms of main categories of price control, cost orientation remains the most frequently used method and it is applied mainly to legacy products (Figure 15). Retail minus has been chosen mainly for VULA products or in market 3b.

An increased percentage of NRAs impose cost orientation obligation for Fibre unbundling and VULA FTTC, while more flexibility in price regulation is seen in case of VULA FTTH. The use of cost orientation for DA is the mainly the case when the access obligation is imposed.

Figure 15 - Price control main categories



<sup>28</sup> When the percentage shown is lower than 100 % for the corresponding product, this is due to the fact that no regulation or no price control is applied.

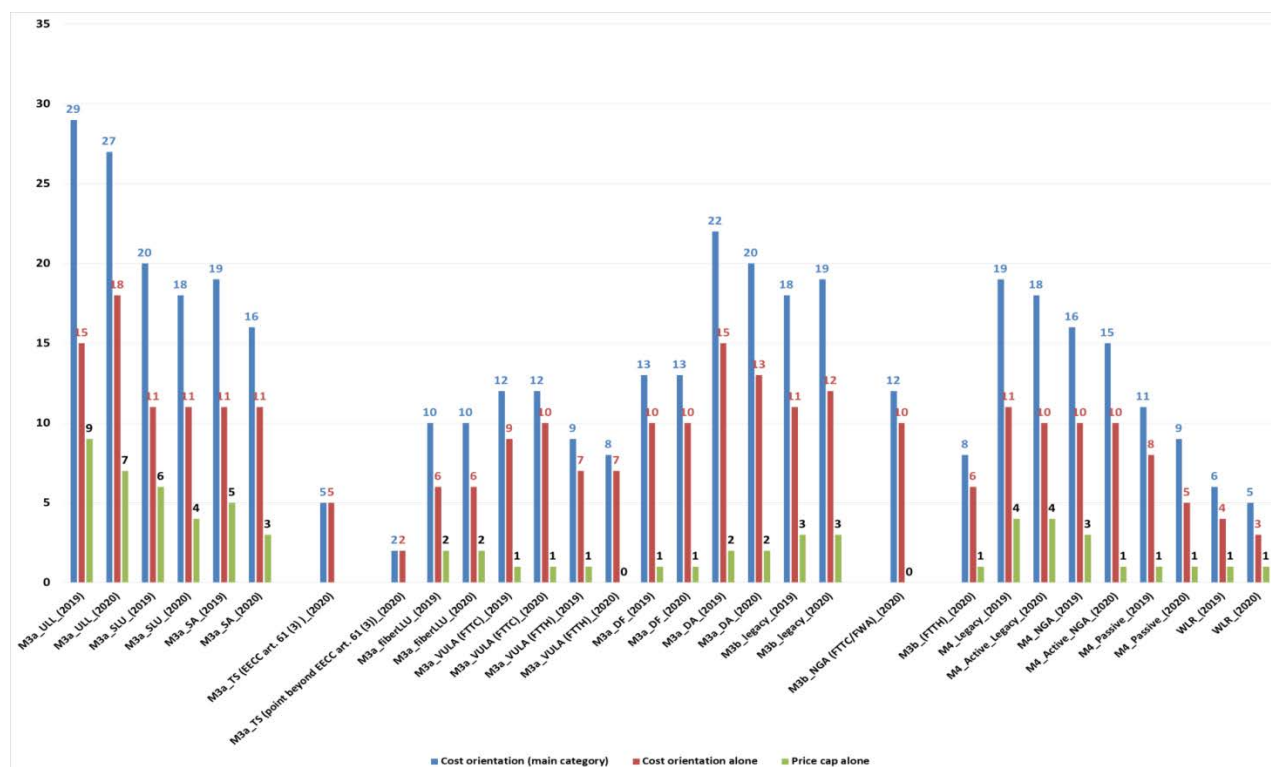


Source: BEREC RA Database 2020

The overall situation remains quite stable in comparison to last year, that is to say that regulatory focus on price control obligation is not noticeably changing. Cost orientation in market 3a is the main approach used for the LLU legacy product.

With respect to the sub-categories, Figure 16 highlights that cost orientation alone is still the most frequent price control method used by NRAs, especially in case of DA or DF, but also in market 3b.

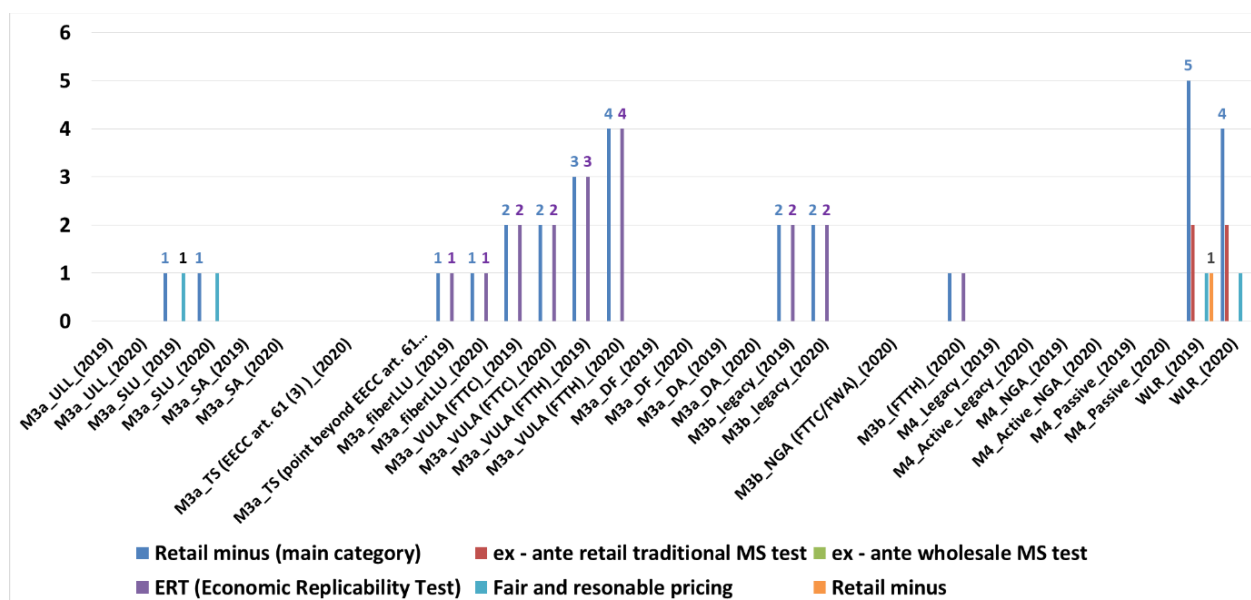
Figure 16 - Price control sub category Cost Orientation



Source: BEREC RA Database 2020

In Figure 17 the retail minus sub categories are represented.

Figure 17 - Price control sub category Retail minus



Source: BEREC RA Database 2020

The ERT price control methodology is mainly applied for VULA and NGA products in line with the Commission Recommendation on Costing Methodologies. This sub category has increased slightly

in absolute terms in comparison to last year. An ex ante MST is mainly applied as a price control method for legacy voice services. Retail minus is currently applied only in one member state for WLR. The sub category “fair and reasonable” prices has been reported only for WLR services or for SLU. Corresponding to last year’s survey, the Benchmarking approach has been chosen infrequently and only for termination markets.<sup>29</sup>

### ***3.3 Cost base, annualisation and cost allocation methodologies***

#### Cost base

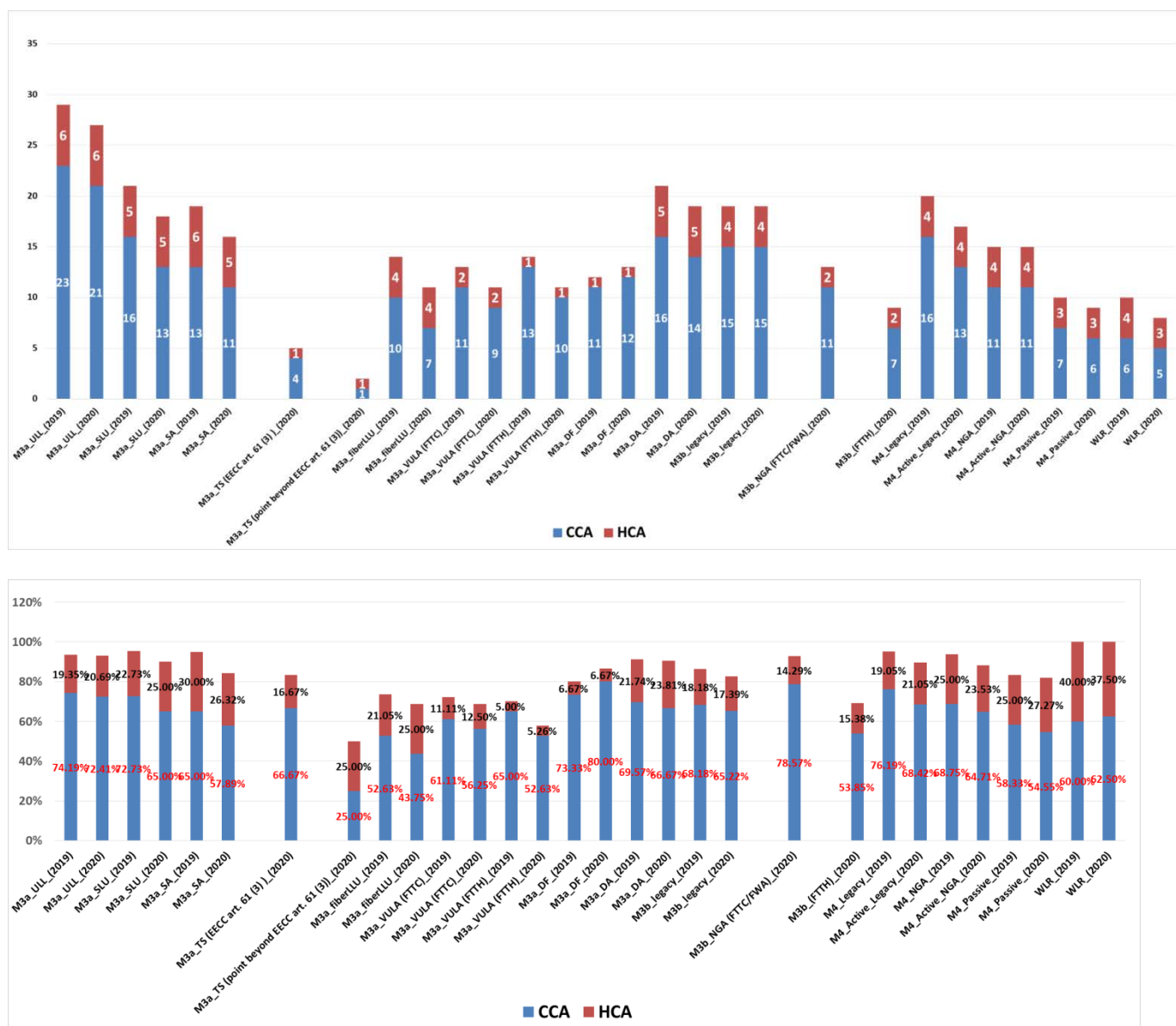
With reference to the cost base, Figure 18 shows that in 2020 CCA is by far the most commonly used methodology for all markets with the exception of WLR, where HCA is more frequently used. The situation remains stable in comparison to last year’s survey.

In the following picture the type of cost base in use when a price control is in charge is shown. HCA is a relevant cost base only when an FDC approach as accounting method is applied. For this reason CCA is slightly increasing - this is in line with an approach that applies a CCA-OCM paradigm for price calculation.

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<sup>29</sup> Not reported in the picture.

Figure 18 - Cost base used

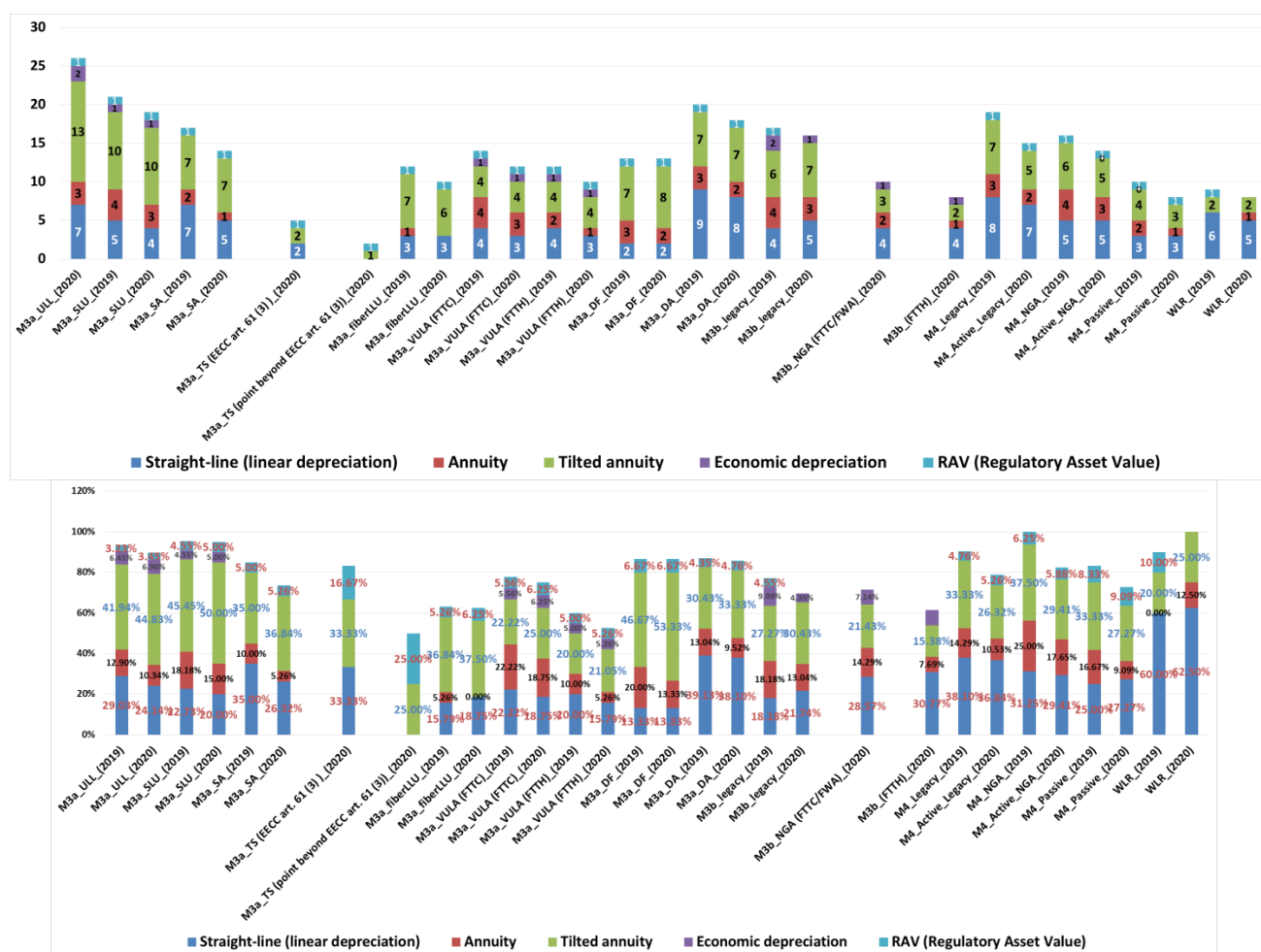


Source: BEREC RA Database 2020

### Annualisation

Annualisation methodologies within the CCA category are represented in Figure 19. The most frequently used approach is the tilted annuity. Standard annuity and straight line follow. Economic depreciation is used mainly in termination markets (not represented in the picture).

Figure 19 - Annualisation methods



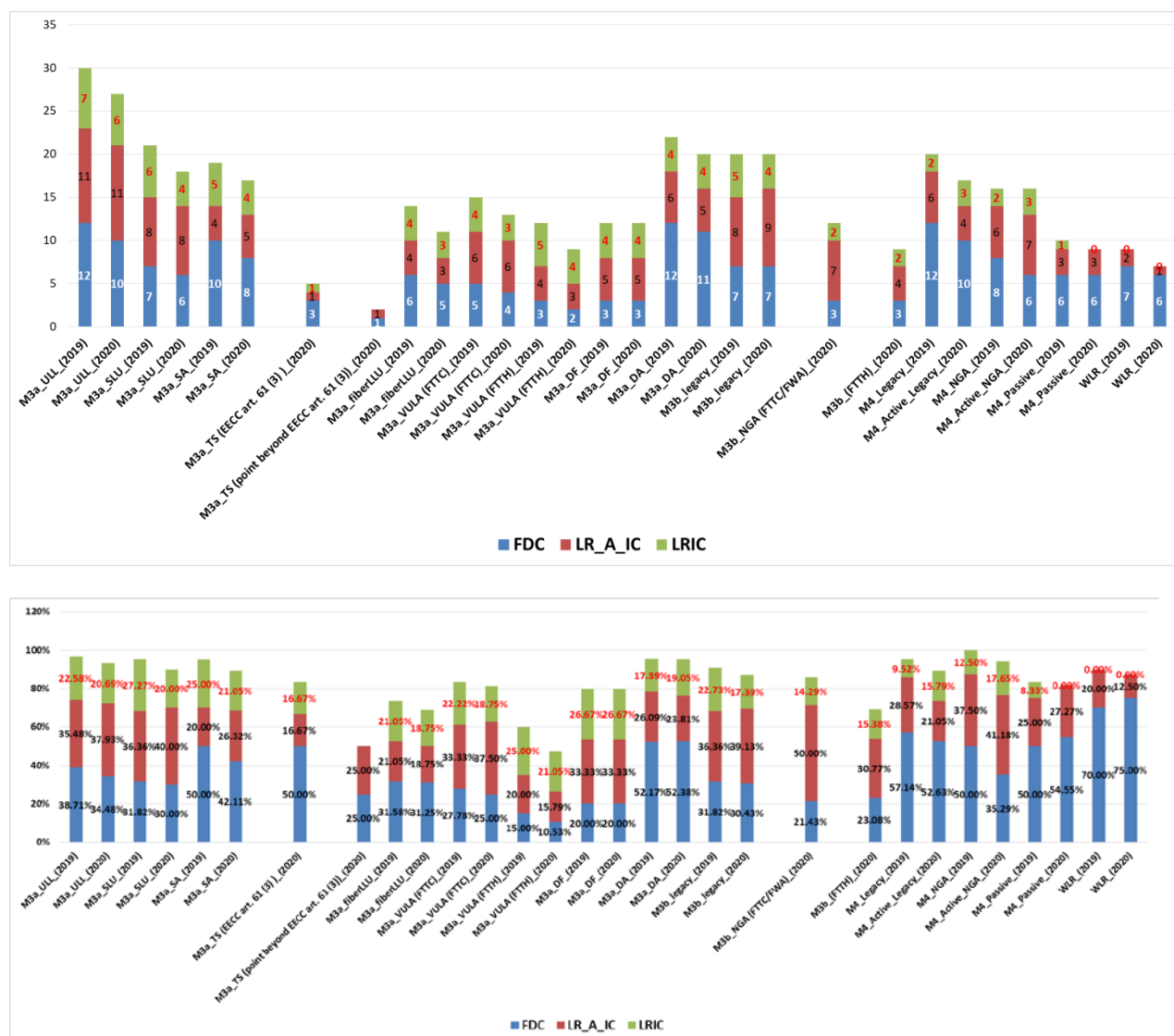
Source: BEREC RA Database 2020



### Cost Allocation

Figure 20 shows the main cost allocation methodologies used in each market. In case sub categories were not selected, it generally means that a hybrid approach is in use.

Figure 20 - Cost Allocation methods



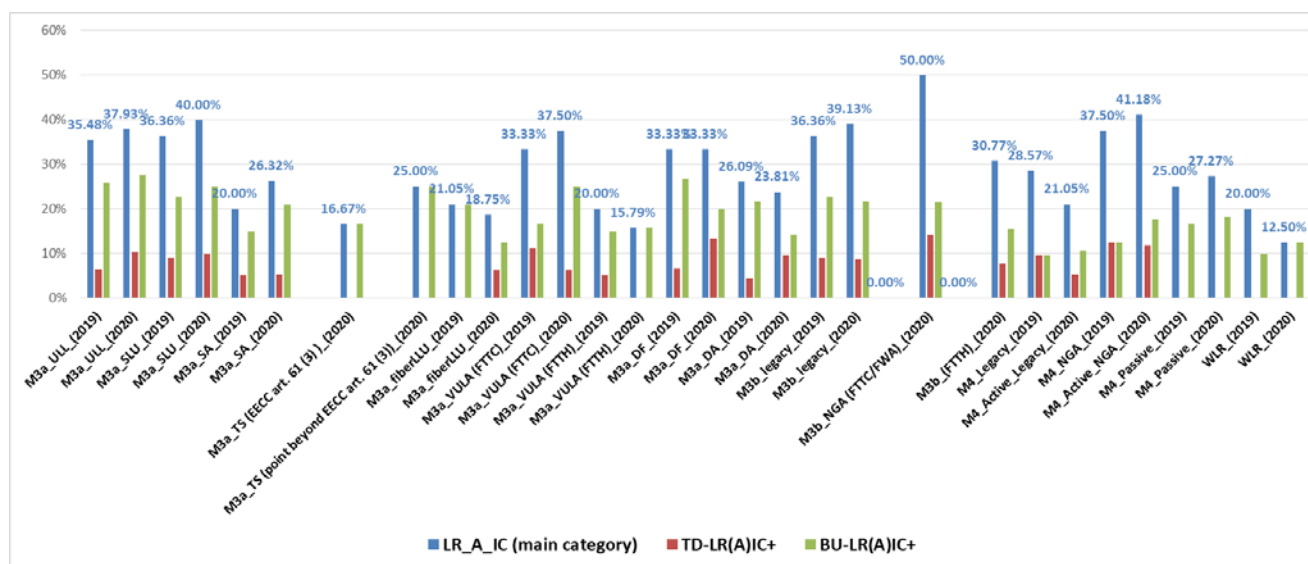
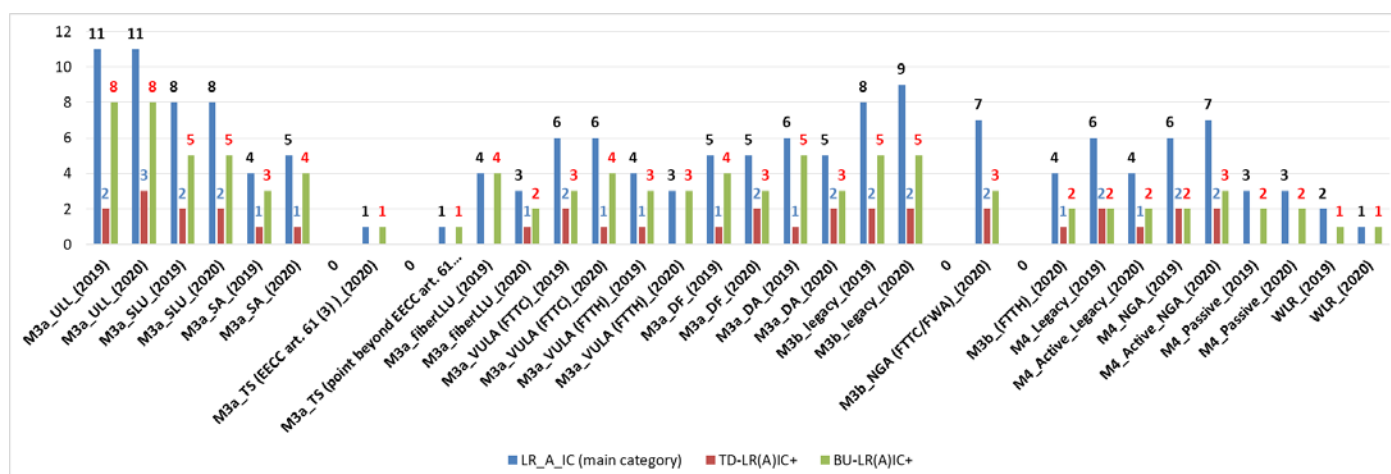
Source: BEREC RA Database 2020

The most frequent cost allocation approach remains LRIC/LR(A)IC almost for all products/markets. LRIC is the preferred approach for termination markets (not shown). FDC is the preferred approach for Market 4 and WLR. In Market 3b for legacy products, both methods are used. With respect to previous year's survey, the use of a modelling approach is increasing.

In Figure 21 and Figure 22 the sub categories of allocation methodologies are represented<sup>30</sup>. As for the main categories, information on NRAs that apply a price control method is given in terms of percentage of adoption of the corresponding methodology. When LR(A)IC/LRIC has been chosen as the main category, the most common approach is Bottom-up. In case sub categories were not selected, it generally means that a hybrid approach is in use.

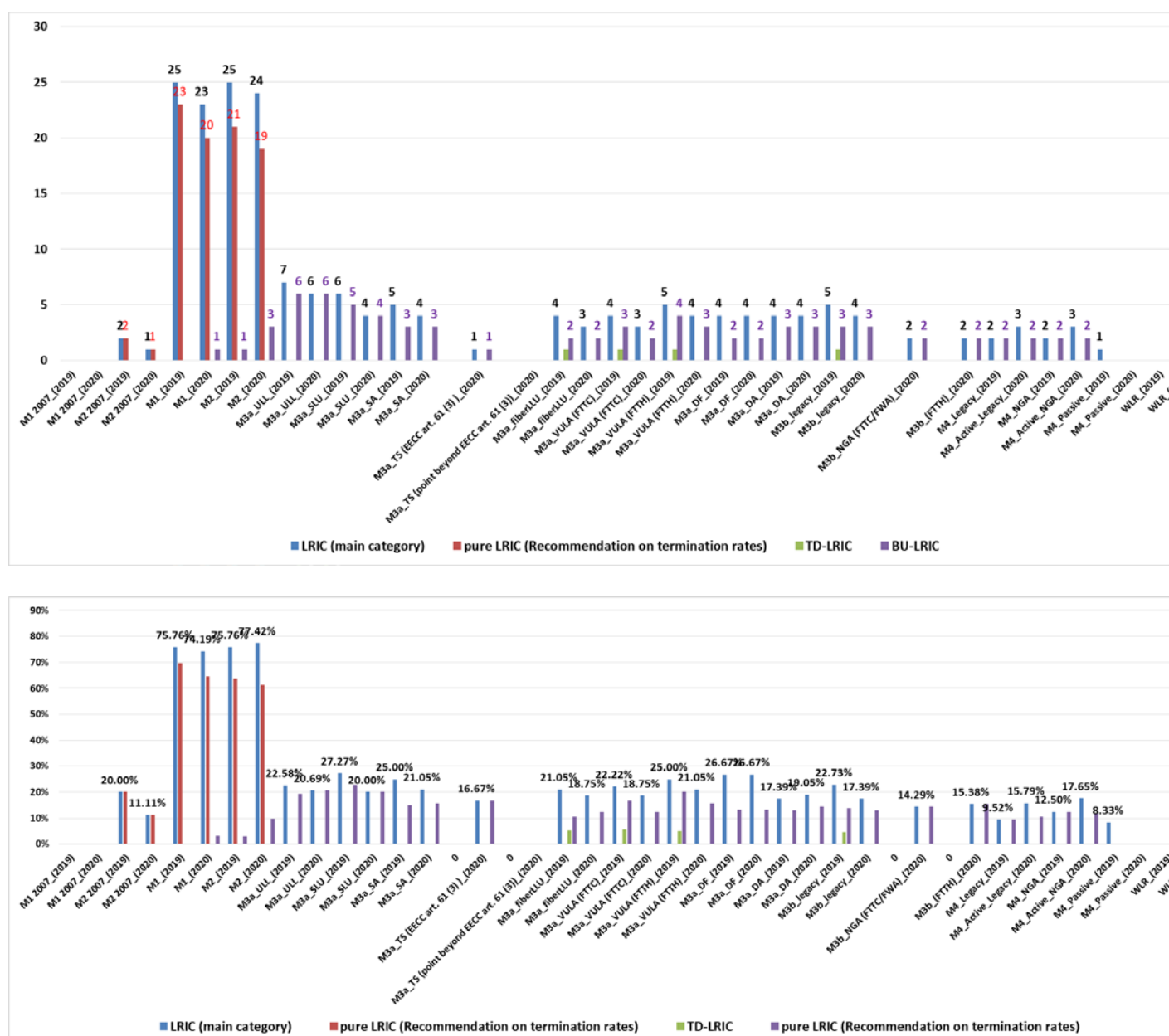
<sup>30</sup> The sum for sub categories is lower than the record for the main category when NRAs did not provide info for sub categories.

Figure 21 - Allocation methods LR(A)IC sub categories



Source: BEREC RA Database 2020

Figure 22 - Allocation methods LRIC sub categories



Source: BEREC RA Database 2020

### 3.4 Combination of price control methods/cost base/allocation methodologies

To obtain a more accurate picture of the NRAs regulatory accounting approach, we analyse how price control and costing methodologies are applied according to main indicators of the competitive situation.

This section provides a view of the relationship between price control methodologies and applied costing methodologies. For this analysis, sub categories classified as LR(A)IC (TD), LRIC (TD) and LR(A)IC (BU), LRIC (BU) have been grouped together.<sup>31</sup>

The following combinations of price control and cost accounting methodologies have been considered:

Figure 23 - Price control and costing methodologies

| Price control and costing methodologies take into account |
|---|
| Cost orientation Alone/LRIC-LRAIC (BU)/CCA                |
| Cost orientation Alone/LRIC-LRAIC (TD)/CCA                |
| Cost orientation Alone/Pure LRIC/CCA                      |
| Cost orientation Alone/FDC/CCA                            |
| Cost orientation Alone/FDC/HCA                            |
| Price cap/LRIC-LRAIC (BU)/CCA                             |
| Price cap/LRIC-LRAIC (TD)/CCA                             |
| Price cap /Pure LRIC/CCA                                  |
| Price cap/FDC/CCA   |
| Price cap/FDC/HCA   |
| ERT/LRIC-LRAIC (BU)/CCA                                   |
| ERT/LRIC-LRAIC (TD)/CCA                                   |
| ERT /Pure LRIC/CCA  |
| ERT/FDC/CCA   |
| ERT/FDC/HCA   |

Source: BEREC RA Database 2019

The goal is to examine if there is a relation between the way price control is imposed related to costing methodologies applied in different products/markets.

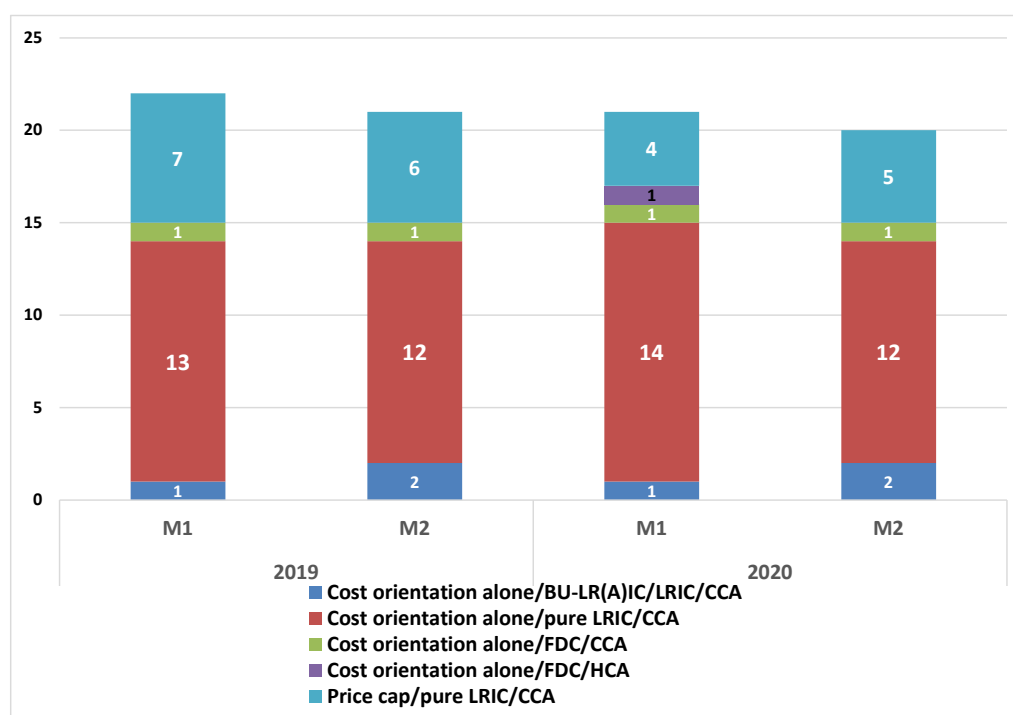
Differences between NRAs may be explained with specific country conditions, e. g. taking into account different competitive conditions in relevant markets. Forms of price regulation and accounting systems currently in force represent the “fine tuning” of regulatory instruments used by NRAs in order to address different competitive situations. This indicates that regulatory accounting has become more sophisticated over time, adapting to more complex market situations.

### 3.4.1 Retail and interconnection markets

In Figure 24 the combination of costing methodology and price control is represented for the retail and termination markets (only combinations with at least one record are shown). For terminations markets, a pure LRIC and CCA approach is the standard.

<sup>31</sup> In the figures in this section NRAs that did not provide information on sub categories are not represented. For this reason the number of NRAs may be different from the number reported previously (overall number of NRAs that have provided information).

Figure 24 - Combination price control / costing methodologies (M1/2014 and M2/2014)



Source: BEREC RA Database 2020

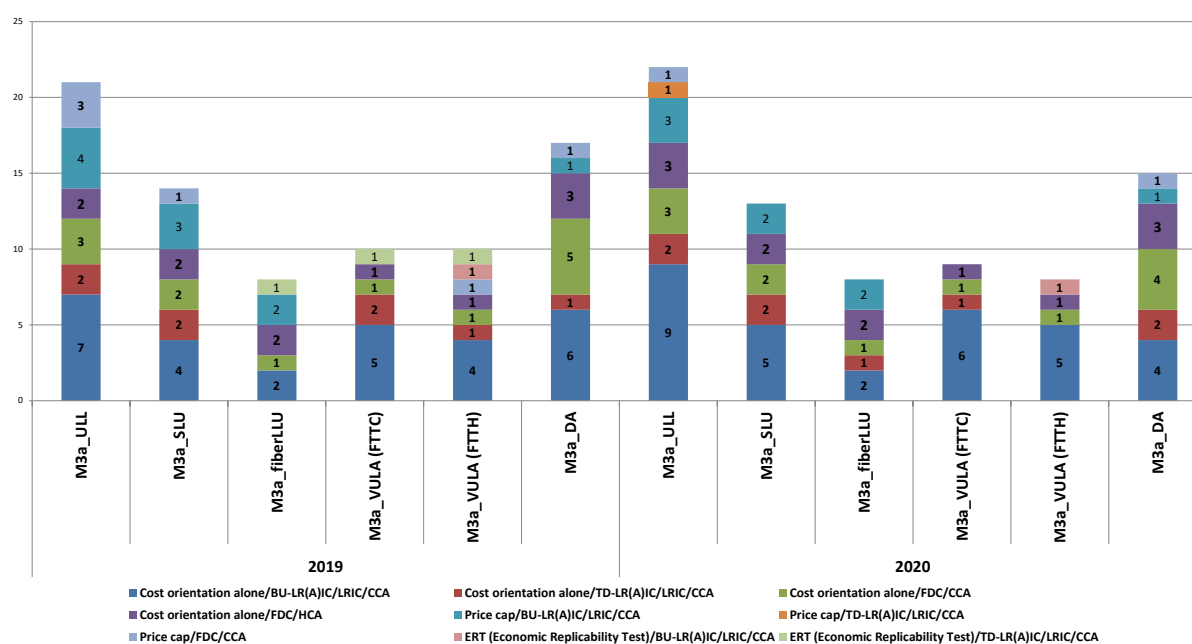
In relation to the asset base currently applied in markets where a price control obligation is in charge, the following can be summarised:

- In termination markets, in line with the Commission Recommendation 2009/396/EC, a bottom up approach is more frequent, independently from the kind of price control in use.
- In retail markets, the accounting cost base (TD/accounting methods) is used as a tool to apply price control obligations for the few cases where NRAs still regulate market 1/2007. The asset base of the SMP operator seems to remain more relevant in market 2/2007.

### 3.4.2 Products in Market 3a

In Figure 25 the combination of costing methodologies and price control is represented for products in market 3a (only combinations with at least one record are shown). There seems to be no clear preference of costing methodologies in relation to the kind of price control in use, apart from the main legacy product (LLU). For this product most NRAs apply a cost orientation alone/LRIC-LR(A)IC/CCA approach – more than in last year's survey.

Figure 25 – Combination price control / costing methodologies (M3a)



Source: BEREC RA Database 2020

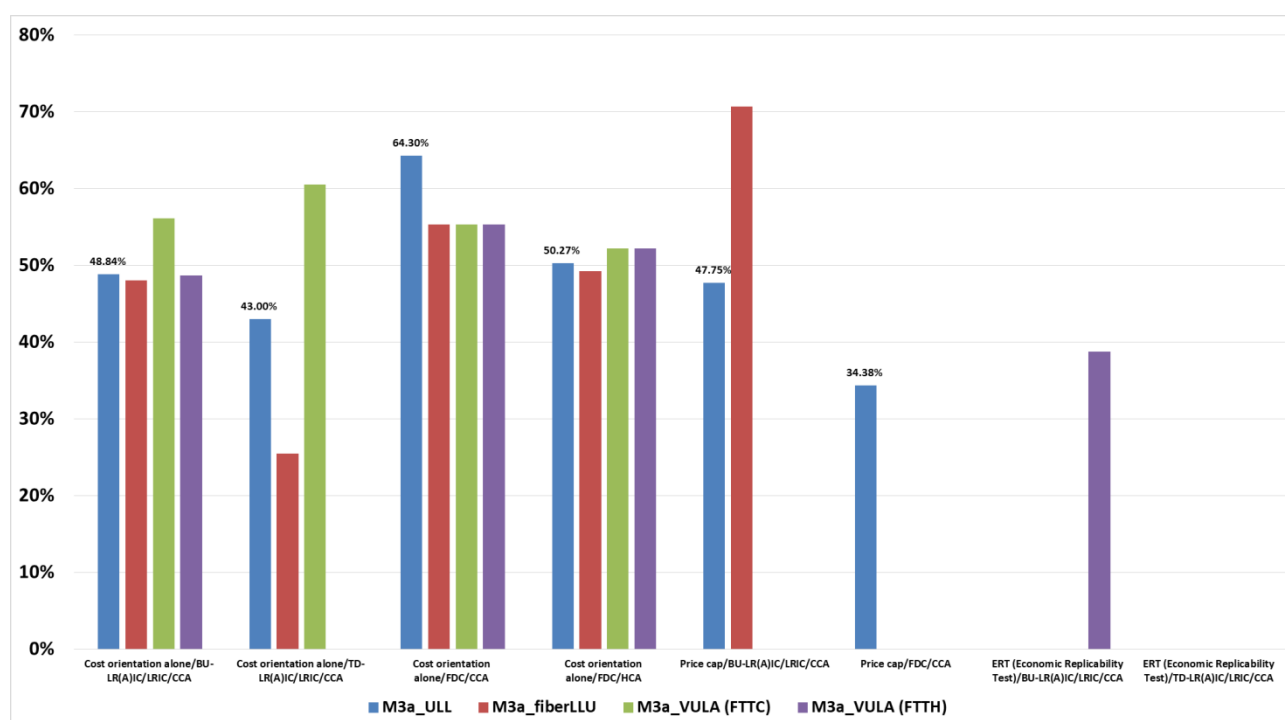
With reference to the asset base in use for these products, a bottom-up model is most common when cost orientation alone is used as price control methodology. Generally there is an increase in the use of the combination of cost orientation alone with BU-LRIC approach.

In general, NRAs have declared homogeneous costing methodologies for products in each market in comparison to previous years.

As in the 2019 report, a preliminary analysis on the relation between a measure of competition and price control/costing methodology is provided (Figure 26). The main evidence for the “anchor product” LLU (for which more data is available): cost orientation/price cap applied with BU/TD-LR(A)IC+ is the most frequent combination in case competition in the broadband market is at an intermediate stage (i. e. SMP retail broadband market share is between 40 % and 50 %). On the other side, cost orientation in combination with FDC(CCA/HCA) is more frequent in a less competitive market.

The specific combination cost orientation and BU-LR(A)IC+ model in market 3a is the main methodology applied in more competitive markets. With respect to last year’s report the number of NRAs that can be grouped in this combination for LLU has increased by one, while the arithmetic average of the SMP market share has slightly increased. In any case the main conclusion of the analysis can still be maintained. For other products the outcome is less conclusive.

Figure 26 – Combination price control / costing methodologies according to  
SMP retail market share (M3a)



Source: BEREC RA Database 2020

In an empirical analysis on the distribution of NRA's approaches in terms of methodology and the intensity of competition, coverage and fixed broadband take-up (taken from the structural information survey) is provided for three main flagship products: LLU (legacy), VULA FTTC and VULA-FTTH (NGA) - or Fibre LLU in case VULA FTTH is not included as a remedy.

In Figure 27 and 28 the situation for LLU legacy product and FTTx VULA is considered. Two main structural variables - the SMP BB market share and the broadband take up - are analysed in combination with the type of price control and costing methodology adopted.

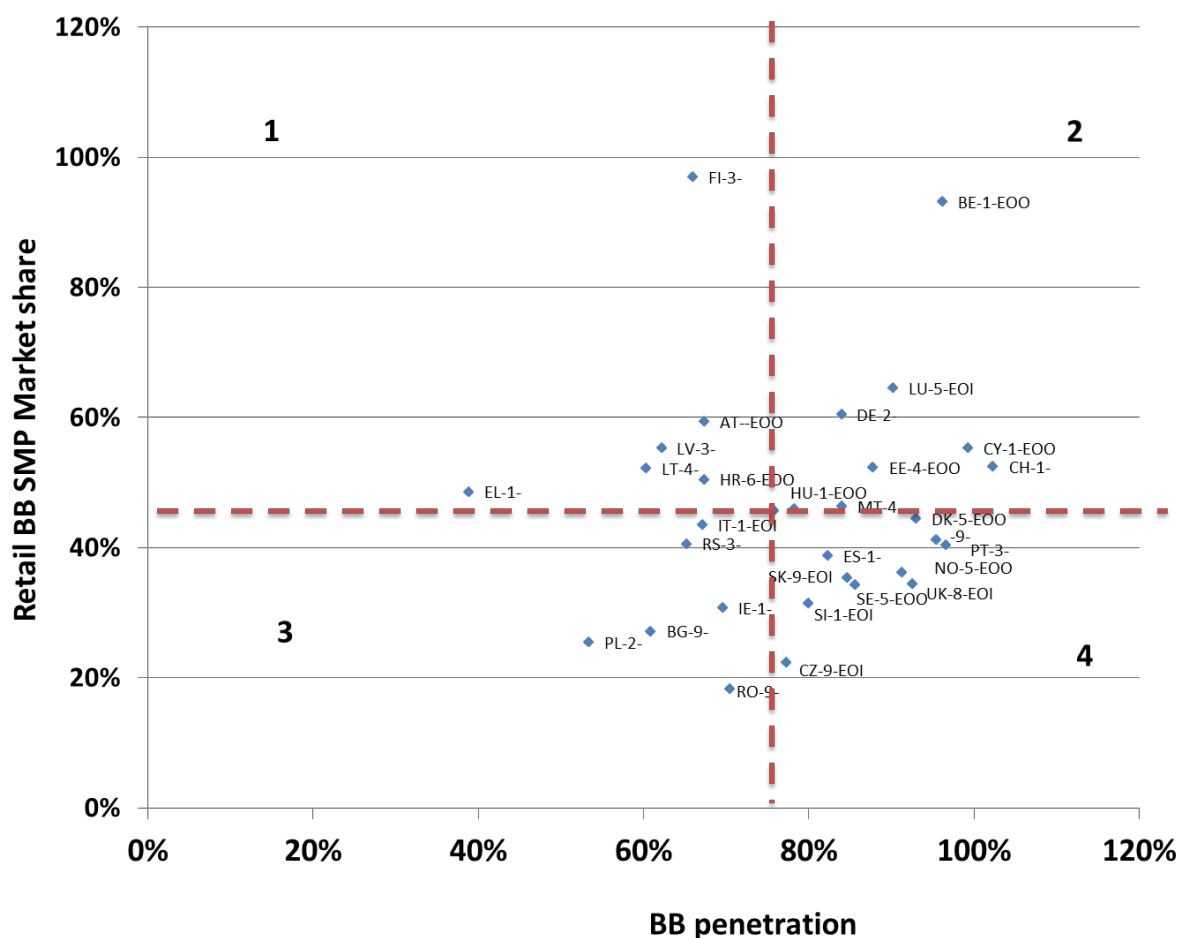
On the x-axis "Fixed Broadband Penetration is reported, on the y-axis the SMP market share. In the corresponding label associated with each country, the category (from 1 to 9) of the combination of price control and costing methodology is provided in the label associated with each country in combination with the equivalence model in charge (see next figure).<sup>32</sup>

Four clusters are identified by the averages of the 2 variables. In cluster 1 competition conditions are less favourable in combination with a lower fixed penetration. On the opposite, in cluster 4 a higher level of competition is combined with a higher penetration of fixed broadband. This analysis can be useful to obtain a picture on the conditions from the demand side and from the supply side that can induce the choice of the corresponding costing methodology. Information on the Equivalence model adopted for ULL is also provided. Eol is more frequent

<sup>32</sup> Annex I provides a summary of the number of countries that belong to the corresponding 9 combinations of price control and costing methodologies for each cluster (figure 77 and 78).

in cluster four (better competition conditions and take up). In a small number of cases Eoi is applied in combination with a more flexible approach to price control.<sup>33</sup>

Figure 27 – Combination price control / costing methodologies LLU service



Source: BEREC RA Database 2020

In clusters 1, 2 and 3 cost orientation seems to be the most common approach, while in cluster 4 the most common approach for price control is a price cap in combination with BU-LRIC / FDC and CCA approaches. This also shows countries where cost orientation is removed.

In Figure 28 a similar analysis is carried out considering regulated NGA in combination with two relevant indicators for the demand and supply side: i) penetration rate of NGA services ii) Market share of the SMP operator of retail BB provided via FTTx.

The first indicator has been obtained considering the household penetration rate of BB and the % of BB lines via FTTx which are provided by NRAs in the structural data questionnaire.

<sup>33</sup> RO and BG: no regulation is in charge in market 3a. In Belgium, the regulators designated in their decision of 29 June 2018 cable operators with a SMP-position on the broad-band market (M3b). Since 2011, the cable operators had a SMP position on the broad-cast market but with ancillary obligations on the broadband market. Therefore, the overall market share of the SMP operators on the retail broadband market (DSL SMP operator and cable operators combined) is now 93,20%.



Four clusters are shown: spanning from cluster 1, characterised by low penetration and high market share of the SMP operator, to cluster 4, characterised by higher penetration and lower market share of the SMP operator.

The label allocated to each country shows the combination of the price control and costing methodology (1-9), the corresponding regulatory obligation as well as the equivalence model in charge.<sup>34</sup>

In cluster 4, the most common approach is to not regulate/allow more flexibility (in line with the Commission Recommendation on costing methodology). At the same time stricter obligations on price regulation for NGA are more frequent in cluster 1 where both market share and penetration are lower; in this case BU-LRIC is the most frequent approach.<sup>35</sup>

Outliers with respect to this distribution are mainly due to specific situations which are related to national specificity, such as strong presence of cable networks (RO) both in terms of coverage and take-up. Eol is adopted more frequently when the penetration rate is higher (justifying the requirement for scale economy to overcome cost of implementation) and it is also more frequent in combination with a more flexible approach in terms of prices regulation for NGA. Regulatory obligations are homogeneous with respect to the FTTC/FTTH architecture when applied to both. Absence of FTTC regulation is generally the case where it is not relevant for the market (i. e. incumbent operator and OAO are not deploying FTTC as only FTTH target investments are considered).

Where FTTC is relevant, NGA price flexibility is less frequent. In this case, FTTC becomes the main focus of the regulation and would become a sort of anchor product for the transition on FTTH investment.

In this case the choice to apply the full set of remedies including cost orientation on FTTH - other than FTTC - is more frequent when the NGA penetration (not including cable) is at an initial stage (1 and 3). The choice of not regulating FTTH in this case (FTTC is a relevant intermediate step) is mainly due to the fact that coverage and take-up of FTTH are at the initial stage for both SMP and OAO.

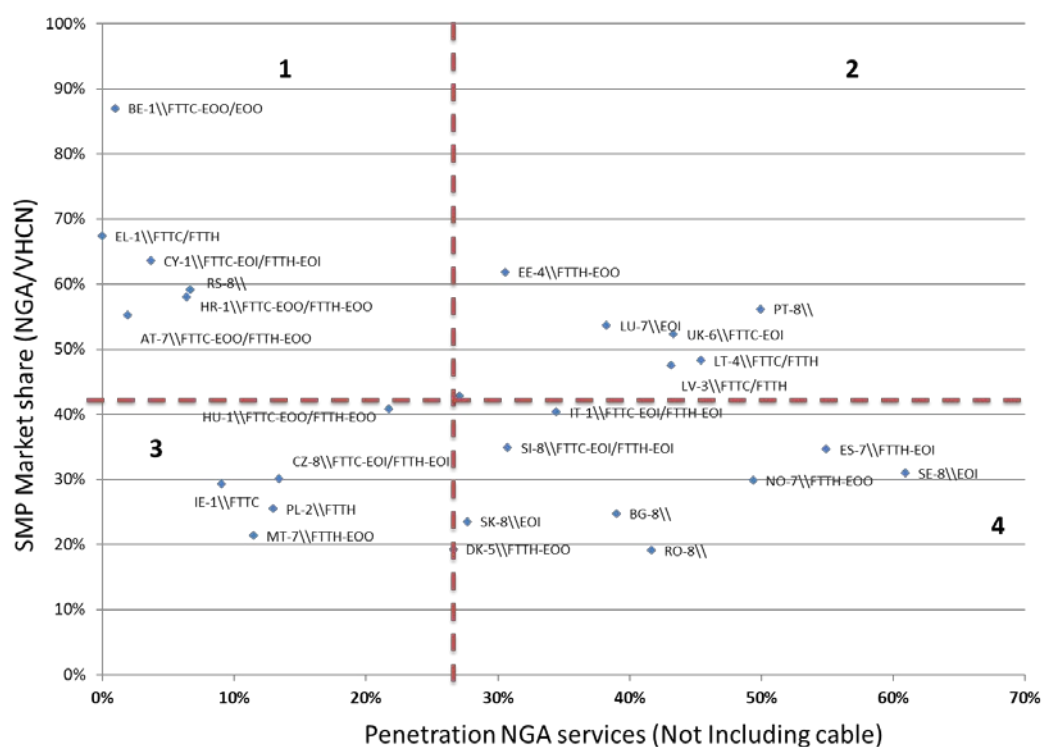
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<sup>34</sup> In case different approach are applied between FLLU or VULA FTTH VULA have been considered.

<sup>35</sup> Appendix I provides a summary of the number of countries that belong to the corresponding 9 combinations of price control and costing methodologies for each cluster.

Figure 28 – Combination of price control / costing methodologies<sup>36</sup>

VULA FTTC/FTTH/Fibre LLU and penetration



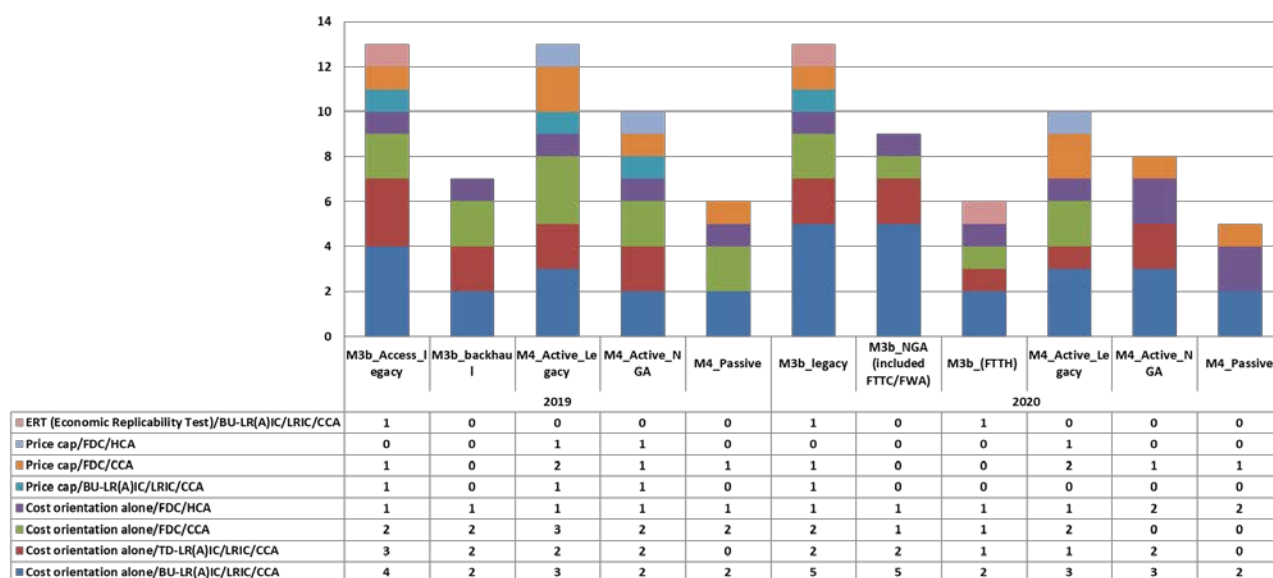
Source: BEREC RA Database 2020

### 3.4.3 Market 3b and 4

In Figure 29 the combination of costing and price control methodologies is presented for products in markets 3b and 4. No clear preference of costing methodologies can be detected.

<sup>36</sup> NO have been classified as category “7” as ERT is the main price control obligations approach applied when “Other/Combination” has been marked as price control method.

Figure 29 - Combination price control / costing methods (M3b and 4)



Source: BEREC RA Database 2020

Referring to the cost base, there is no clear preference to use an accounting asset base instead of a BU approach.

### 3.5 Implementation of the Non-discrimination and Costing Methodologies Recommendation

This section provides an update of the implementation of the NDCM (2013/466/EU)", with regard to costing methodologies. Data assume more significance considering that the 31 December of 2016 was the deadline for the implementation of the Recommendation.

NRAs were asked how they implement the framework of the Recommendation in Market 3a, by choosing the following options: i) Rec. 30-37 (CCA-BU LRIC+); or ii) Rec. 40.

Figure 30 - EC Recommendations

| EC Recommendations | Content   |
|--------------------|---|
| Rec. 30-37         | When “cost orientation” is imposed to legacy and NGA access services the costing methodology should follow a forward looking CCA BU-LRIC+ approach.   |
| Rec. 40            | NRAs may continue to apply beyond 31 December 2016 the costing methodology that they use at the time of entry into force of the Recommendation, if it meets the general objectives of consistency, predictability and price stability over time during the migration from legacy network to NGA network (recital 25-28) and <i>inter alia</i> : <ol style="list-style-type: none"> <li>it should reflect a gradual shift from copper network to an NGA network;</li> <li>it should apply an asset valuation method that takes into account that certain civil infrastructure assets would not be replicated in the competitive process;</li> <li>it should guarantee that copper network prices do not fluctuate significantly and therefore will remain stable over a long time period;</li> <li>it should require only minimal modifications with respect to the costing methodology already in place.</li> </ol> |

This year, 18 NRAs provided explicit information with respect to the proposed questions. Results are presented in Figure 31.

Figure 31 - NRA implementation of EC Recommendations

|   | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|------|------|------|------|------|
| Do you implement Recommendations 30-37 (CCA BU-LRIC+) | 7    | 9    | 14   | 14   | 15   |
| Do you implement Recommendation 40                    | 6    | 5    | 4    | 4    | 5    |

Source: BEREC RA Database 2020

Based on Rec. 30-37 and 40 of the Commission Recommendation, a few relevant questions have been included for some elements addressed by the Recommendation referred to DEA targets and reusable infrastructures<sup>37</sup>.

<sup>37</sup> Specifically in the Rec. 32 the Commission consider the following elements: “When modelling an NGA network NRAs should define a hypothetical efficient NGA network, capable of delivering the Digital Agenda for Europe targets set out in terms of bandwidth, coverage and take-up, which consists wholly or partly of optical elements. When modelling an NGA network, NRAs should include any existing civil engineering assets that are generally also capable of hosting an NGA network as well as civil engineering assets that will have to be newly constructed to host an NGA network. Therefore, when building the BU LRIC + model, NRAs should not assume the construction of an entirely new civil infrastructure network for deploying an NGA network”. Recommendation 40 states: “if not modelling an NGA network, it should reflect a gradual shift from a copper network to an NGA network”. On the base of this statement of the Recommendation, some questions about DEA targets and reusable infrastructure have been added.

Replies by NRAs are summarised in Figure 32.

Figure 32 - NRAs information on Recommendations 37 and 40

|                     | Number of NRAs      | Do you consider the DEA target in your model | Do you take into account reusable civil infrastructure ? | Do you consider copper cable to be reusable infrastructure? | Is a gradual shift from copper network to NGA network taken into account? |
|---------------------|---------------------|--|--|---|---|
| <b>Recommend 37</b> | <b>15 (14) (14)</b> | <b>6 (7) (7)</b>                             | <b>12 (10) (10)</b>                                      | <b>3 (3) (3)</b>  | <b>7 (6) (6)</b>  |
| <b>Recommend 40</b> | <b>5 (4) (4)</b>    | <b>2 (1) (1)</b>                             | <b>2 (2) (2)</b>   | <b>2 (3) (3)</b>  | <b>3 (3) (3)</b>  |

Source: BEREC RA Database 2020

From this analysis, we understand that DEA targets<sup>38</sup> are explicitly implemented in the BU-LRIC model by 8 NRAs.

The majority of NRAs that implemented Rec. 30-37 or Rec. 40 have included reusable civil infrastructure in their modelling process and the number has increased in comparison to the last year; copper cable is considered to be reusable infrastructure by 3 NRAs. Furthermore, the analysis shows that the level of the depreciated infrastructure is derived mainly from the accounting data of the SMP operator.

Figure 33 summarises the responses provided concerning the asset life of civil infrastructure, the percentage of civil infrastructure considered reusable and the percentage of asset life already depreciated.<sup>39</sup> Only few NRAs provided information on this aspect.

<sup>38</sup> The coverage at least of 30 Mbps to 100 % and take-up of the population at 50 % at 100 Mbps.

<sup>39</sup> In the figure only maximum and minimum are shown as only few NRAs have provided information.

Figure 33 - NRA information on civil infrastructure

|   | Rec. 30-37                                   | Rec. 40            |
|---|--|--------------------|
| <b>Civil infrastructure asset life (number of years) (minimum - maximum)</b>                              | 30-47<br>(arithmetic av.: 39%)<br>9 NRAs     | 30-40<br>3 NRAs    |
| <b>Percentage of civil infrastructures considered reusable (minimum - maximum)</b>                        | 18%-100%<br>(arithmetic av. : 66%)<br>8 NRAs | 90%-100%<br>3 NRAs |
| <b>Percentage of asset life already depreciated of reusable civil infrastructures (minimum - maximum)</b> | 20%-66%<br>3NRAs                             | 53%<br>1 NRA       |

Source: BEREC RA Database 2020

### 3.6 Cost model technical implementation

The 2020 report also provides information on technical cost model implementation by NRAs<sup>40</sup>.

NRAs were asked to provide information on: i) asset base used; ii) network modelling approach (scorched earth vs scorched node); iii) Topology of the network modelled and architecture; iv) the way in which the level of coverage of the network is considered; and v) adjustments adopted for capex/opex efficiency in case top down models are used. Figure 34 summarises the information provided by NRAs for markets 3a and 3b.

#### Asset base

The asset base used in case a cost model is implemented is summarised in Figure 34. The options provided in the questionnaire were: Bottom-up, Top down, or Hybrid (mix of top down and bottom up).

Figure 34 - Asset base applied

| Asset base | M3a_ULL         | M3a_SLU    | M3a_SA   | M3a_fiber<br>LLU | M3a_VUL<br>A (FTTC) | M3a_VUL<br>A (FTTH) | M3a_DF   | M3a_DA   | M3b_lega<br>cy | M3b_2014<br>_NGA<br>(included<br>FTTC/FWA<br>) | M3b_2014<br>_FTTH |
|------------|-----------------|------------|----------|------------------|---------------------|---------------------|----------|----------|----------------|--|-------------------|
| BU         | 13 (12)<br>(12) | 10 (8) (5) | 6(6) (5) | 5(5) (6)         | 6(5) (5)            | 5(5) (5)            | 6(5) (5) | 5(5) (5) | 7(4) (6)       | 3  | 3                 |
| TD         | 5 (8) (6)       | 2 (4) (3)  | 5(8) (4) | 3(5) (3)         | 0(2) (1)            | 0(2) (1)            | 1(2) (1) | 5(5) (4) | 4(5) (3)       | 2  | 2                 |
| Hybrid     | 3 (3) (4)       | 2(1) (1)   | 0(0) (0) | 0(0) (0)         | 1(0) (0)            | 0(0) (0)            | 1(0) (0) | 1(1) (2) | 0(0) (0)       | 0  | 0                 |

Source: BEREC RA Database 2020

When a cost model is applied, most NRAs adopt a BU asset base for all products/markets; this is mostly evident for VULA products.

<sup>40</sup> The information reported is independent from the main price control method (such as Cost orientation/Price cap/ERT) declared by NRAs in each market.

### Network modelling approach

Figure 35 summarises the main approaches used by NRAs to implement cost models. 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.

Figure 35 – General network modelling approach

|                        | M3a_ULL      | M3a_SLU  | M3a_SA   | M3a_fiberLLU | M3a_VULA (FTTC) | M3a_VULA (FTTH) | M3a_DF   | M3a_DA   | M3b_legacy | M3b_2014_NGA (included FTTC/FWA) | M3b_2014 (FTTH) |
|------------------------|--------------|----------|----------|--------------|-----------------|-----------------|----------|----------|------------|----------------------------------|-----------------|
| Scorched Node          | 10 (11) (12) | 6(7) (7) | 5(6) (6) | 3(4) (5)     | 5(6) (5)        | 4(5) (5)        | 3(3) (5) | 2(3) (5) | 5(4) (6)   | 3                                | 2               |
| Scorched earth         | 1(1) (2)     | 1(1) (0) | 1(1) (0) | 1(1) (1)     | 0(0) (0)        | 0(0) (0)        | 0(1) (0) | 0(0) (0) | 1(1) (1)   | 1                                | 1               |
| Modified Scorched node | 7(6) (4)     | 6(4) (2) | 2(2) (1) | 3(3) (2)     | 2(0) (0)        | 1(1) (1)        | 4(2) (1) | 4(2) (2) | 2(1) (1)   | 0                                | 1               |
| Other                  | 2(2) (1)     | 1(1) (0) | 1(1) (0) | 1(1) (0)     | 0(0) (0)        | 0(0) (0)        | 0(0) (0) | 0(0) (0) | 0(0) (0)   | 0                                | 0               |

Source: BEREC RA Database 2020

A scorched node is the most frequent approach used, also for NGA.

### Network topology and architecture

Figure 36 summarises the topology configuration used by NRAs for modelling purposes in markets 3a and 3b (2019 figures in brackets). The following options were provided: i) MDF/ODF area; ii) Municipality; a mix of the two; iii) other. Choosing the first option means that the model is implemented taking into account the footprint of the copper access network and/or the fibre network of the incumbent operator. The second option (municipality) means that the model considers an administrative area as a footprint for the access network (like postal codes).

The most frequent approach is the MDF/ODF area in line with the replies provided for the node location approach (scorched node). It is relevant to consider that for an NGA network the footprint of the network may differ from the one used for modelling a copper based product.

Figure 36 - Network architecture applied

|                           | M3a_ULL      | M3a_SLU    | M3a_SA    | M3a_fiberLLU | M3a_VULA (FTTC) | M3a_VULA (FTTH) | M3a_DF   | M3a_DA   | M3b_legacy | M3b_2014_NGA (included FTTC/FWA) | M3b_2014 (FTTH) |
|---------------------------|--------------|------------|-----------|--------------|-----------------|-----------------|----------|----------|------------|----------------------------------|-----------------|
| MDF/ODF area              | 20 (19) (15) | 13(12) (7) | 10(9) (6) | 7(7) (6)     | 5(4) (3)        | 4(4) (3)        | 6(4) (3) | 5(4) (4) | 8(6) (6)   | 3                                | 3               |
| Municipality              | 0 (0) (0)    | 0 (0) (0)  | 0(0) (0)  | 0(0) (0)     | 0(0) (0)        | 0(0) (0)        | 0(0) (0) | 1(1)     | 0(0) (0)   | 0                                | 0               |
| Municipality/MDF-ODF area | 1 (0) (1)    | 1 (0) (0)  | 0(1) (0)  | 0(0) (1)     | 1(0) (0)        | 0(0) (0)        | 1(0) (0) | 1(0) (0) | 0(0) (0)   | 0                                | 0               |
| Other                     | 0(0) (1)     | 0 (0) (1)  | 0(0) (0)  | 1(1) (0)     | 1(1) (1)        | 1(1) (2)        | 0(1) (1) | 0(0) (3) | 0(0) (1)   | 1                                | 1               |

Source: BEREC RA Database 2020

Figure 37 shows the technology used for modelling purposes. It is interesting to see that some NRAs that model an all FTTH network nevertheless apply price control for legacy products (CH, ES, FR, SE, SI).

Figure 37 - Network technology applied

|                | M3a_UL | M3a_SL<br>U | M3a_SA | M3a_fiberLLU | M3a_VULA (FTTC) | M3a_VULA (FTTH) | M3a_DF | M3a_DA | M3b_legacy | M3b_2014_NGA (included FTTC/FWA) | M3b_2014_(FTTH) |
|----------------|--------|-------------|--------|--------------|-----------------|-----------------|--------|--------|------------|----------------------------------|-----------------|
| FTTH           | 6(5)   | 4(3)        | 1(1)   | 1(0)         | 1(0)            | 2(2)            | 2(1)   | 2(2)   | 1(0)       | 1                                | 1               |
| FTTE-FTTC-FTTH | 3(3)   | 3(3)        | 3(3)   | 3(3)         | 3(3)            | 3(3)            | 2(2)   | 0(1)   | 2(2)       | 1                                | 2               |
| FTTH-FTTC      | 0(1)   | 0(1)        | 0(0)   | 0(2)         | 2(3)            | 0(1)            | 1(2)   | 0(0)   | 0(0)       | 0                                | 0               |
| FTTE-FTTC      | 0(0)   | 0(0)        | 0(1)   | 0(0)         | 1(0)            | 0(0)            | 0(0)   | 0(0)   | 0(0)       | 1                                | 0               |
| FTTE           | 2(2)   | 1(1)        | 0(0)   | 0(0)         | 0(0)            | 0(0)            | 0(0)   | 0(0)   | 0(1)       | 0                                | 0               |
| Other          | 6(6)   | 3(3)        | 3(3)   | 3(3)         | 0(0)            | 0(0)            | 0(0)   | 0(1)   | 1(2)       | 1                                | 1               |

|          | M3a_2014_M4_2007_ULL | M3a_2014_M4_2007_SLU | M3a_2014_M4_2007_SA | M3a_2014_M4_2007_fiberLLU | M3a_2014_M4_2007_VULA (FTTC) | M3a_2014_M4_2007_VULA (FTTH) | M3a_2014_M4_2007_DF | M3a_2014_M4_2007_DA | M3b_2014_Access_legacy |
|----------|----------------------|----------------------|---------------------|---------------------------|------------------------------|------------------------------|---------------------|---------------------|------------------------|
| GPON/P2P | 4                    | 4                    | 1                   | 5                         | 3                            | 2                            | 4                   | 2                   | 1                      |
| GPON     | 4                    | 3                    | 2                   | 2                         | 3                            | 4                            | 1                   | 0                   | 2                      |
| P2P      | 4                    | 3                    | 1                   | 1                         | 0                            | 0                            | 0                   | 1                   | 1                      |
| Other    | 0                    | 0                    | 0                   | 0                         | 0                            | 0                            | 0                   | 0                   | 0                      |

Source: BEREC RA Database 2020

### Coverage

Figure 38 summarises the coverage network estimation used for modelling purposes: i) forward looking; ii) as-is. The first option means that coverage is achieved in a forward looking way taking into account a medium term horizon with respect to the current situation; the second option considers that the coverage for network modelling purpose is taken as it is at the time of estimation of service costs. Most NRAs use a forward looking estimation, only for DF and Market 3b this approach is less frequent.

Figure 38 – Estimated network coverage

|                 | M3a_ULL      | M3a_SL<br>U | M3a_SA   | M3a_fiberLLU | M3a_VULA (FTTC) | M3a_VULA (FTTH) | M3a_DF   | M3a_DA   | M3b_legacy | M3b_2014_NGA (included FTTC/FWA) | M3b_2014_(FTTH) |
|-----------------|--------------|-------------|----------|--------------|-----------------|-----------------|----------|----------|------------|----------------------------------|-----------------|
| Forward Looking | 11 (10) (11) | 9(8) (7)    | 5(5) (4) | 3(3) (4)     | 5(4) (4)        | 4(4) (4)        | 4(4) (3) | 4(4) (5) | 6(4) (3)   | 4                                | 3               |
| As is           | 3(4) (4)     | 2(3) (2)    | 2(2) (2) | 4(5) (3)     | 1(2) (1)        | 1(2) (2)        | 2(2) (3) | 0(0) (2) | 2(2) (3)   | 0                                | 1               |

Source: BEREC RA Database 2020

The approach used for the level of coverage from a geographical point of view (spatial domain) is reported in Figure 39. Two options have been provided in the questionnaire: National and sub national. Most NRAs consider a “national” network coverage for modelling purposes in line with a forward looking estimation.



Figure 39 – Estimated geographical coverage

|              | M3a_ULL     | M3a_SLU    | M3a_SA    | M3a_fiberLLU | M3a_VULA (FTTC) | M3a_VULA (FTTH) | M3a_DF   | M3a_DA   | M3b_legacy | M3b_2014_NGA (included FTTC/FWA) | M3b_2014 (FTTH) |
|--------------|-------------|------------|-----------|--------------|-----------------|-----------------|----------|----------|------------|----------------------------------|-----------------|
| National     | 16(19) (20) | 11(13) (9) | 9(11) (8) | 5(8) (8)     | 6(7) (4)        | 5(7) (5)        | 5(5) (5) | 7(7) (8) | 8(6) (8)   | 4                                | 3               |
| Sub national | 0(0) (0)    | 0(0) (1)   | 0(0) (0)  | 2(2) (2)     | 0(0) (1)        | 0(0) (1)        | 1(1)(1)  | 0(0) (1) | 0(0) (0)   | 0                                | 1               |

Source: BEREC RA Database 2020

Figure 40 includes elements of the main source of coverage for NGA modelling purposes for FTTH/FTTC. In the questionnaire 6 options were provided: i) SMP coverage; ii) OAO coverage; iii) SMP and OAO coverage iv) National and v) Sub national<sup>41</sup>. Most NRAs use SMP coverage in a forward looking way. In other cases a National coverage is used independently from other sources of information.

Figure 40 – Source used as a base for NGA network coverage in modelling

|                  | M3a_UL | M3a_SLU | M3a_SA | M3a_fiberLLU | M3a_VULA (FTTC) | M3a_VULA (FTTH) | M3a_DF | M3a_DA | M3b_legacy | M3b_2014_NGA (included FTTC/FWA) | M3b_2014 (FTTH) |
|------------------|--------|---------|--------|--------------|-----------------|-----------------|--------|--------|------------|----------------------------------|-----------------|
| SMP coverage     | 6(9)   | 4(7)    | 5(7)   | 3(7)         | 1(4)            | 1(4)            | 2(3)   | 3(3)   | 3(4)       | 2                                | 2               |
| OAO coverage     | (0)    | (0)     | (0)    | 0(0)         | 0(0)            | 0(0)            | 0(0)   | 0(0)   | 0(0)       | 0                                | 0               |
| SMP+OAO coverage | 3(2)   | 3(1)    | 1(1)   | 1(0)         | 2(0)            | 1(0)            | 1(0)   | 1(0)   | 1(0)       | 0                                | 0               |
| National         | 8(7)   | 6(5)    | 3(3)   | 4(3)         | 3(3)            | 3(3)            | 3(3)   | 5(3)   | 5(3)       | 3                                | 3               |
| Sub national     | (0)    | (0)     | (0)    | 0(0)         | 0(0)            | 0(0)            | 0(0)   | 0(0)   | 0(0)       | 0                                | 0               |

Source: BEREC RA Database 2020

Figure 41 shows cost averaging: an average cost for the whole country or for a specific target area where regulation is in charge. The most part of the respondents consider an average price based on a national average.

<sup>41</sup> Options iv and v are independent of effective coverage by operators (SMP or OAOs).

Figure 41 - Cost averaging

|  | M3a_ULL  | M3a_SL<br>U | M3a_SA | M3a_fiberLLU | M3a_VU<br>LA<br>(FTTC) | M3a_VU<br>LA<br>(FTTH) | M3a_DF | M3a_DA | M3b_leg<br>acy | M3b_20<br>14_NGA<br>(include<br>d<br>FTTC/F<br>WA) | M3b_20<br>14_(FTT<br>H) |
|--|----------|-------------|--------|--------------|------------------------|------------------------|--------|--------|----------------|--|-------------------------|
| National<br>average  | 18 (18 ) | 12 (12)     | 9 (10) | 6 (7)        | 6 (6)                  | 5 (6)                  | 4 (5)  | 7(6)   | 9(6)           | 5  | 4                       |
| Target<br>areas<br>where<br>regulati<br>on is in<br>charge | 0(0)     | 0(0)        | 0(0)   | 1 (1)        | 0(0)                   | 0(0)                   | 1 (0)  | 0(0)   | 0 (1)          | 0  | 1                       |

Source: BEREC RA Database 2020

## 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.

These structural differences may have an influence on NRAs regulatory strategy and therefore the choice of price control method. The influence of factors such as infrastructure competition, demand and supply side factors is analysed in more detail in the BEREC Report on challenges and drivers of NGA rollout infrastructure competition (BoR (16) 96). 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 31 NRAs<sup>42</sup> have provided data for this section. If data is confidential and can therefore not be shown in the analysis or if it has specificities, this will be shown in the footnotes.

The following structural data have been collected (data as at 1<sup>st</sup> April 2020 – unless indicated otherwise in the footnotes):

<sup>42</sup> Austria (AT), Belgium (BE), Bulgaria (BG), Switzerland (CH), Cyprus (CY), Czech Republic (CZ), Germany (DE), Denmark (DK), Estonia (EE), Greece (EL), Spain (ES), Finland (FI), France (FR), Croatia (HR), Hungary (HU), Ireland (IE), Italy (IT), Lithuania (LT), Luxembourg (LU), Latvia (LV), Malta (MT), Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Republic of Serbia (RS), Sweden (SE), Slovenia (SI), Slovakia (SK), Kosovo\* (XK). No data has been provided by: Albania (AL), Iceland (IS), Liechtenstein (LI), Montenegro (ME), North Macedonia (MK), United Kingdom (UK), Turkey (TR)

Figure 42 - Structural Data Collected

|       |  |
|-------|--|
| 1     | Population and surface area  |
| 1.1   | Number of inhabitants <sup>43</sup>  |
| 1.1a  | Number of private households <sup>44</sup>   |
| 1.2   | Population density <sup>45</sup>   |
| 1.2.1 | Metro population density (Capital City Metro Area) <sup>46</sup>                     |
| 1.2.2 | Non-metro population density <sup>47</sup>   |
| 1.3   | Household Connectivity: households and businesses with internet access <sup>48</sup> |
| 2     | Market situation   |
| 2.1   | Mobile broadband penetration (subscription as % of the total population)             |
| 2.2   | Fixed broadband penetration (subscription as a % of the total households)            |
| 2.2.1 | Technology share: % of (V)DSL  |
| 2.2.2 | Technology share: % of cable (coax, HFC)   |
| 2.2.3 | Technology share: % of FTTx  |
| 2.2.4 | Technology share: % of other technologies (i.e. satellite, BWA etc.)                 |
| 3     | Market share SMP operator / competitors  |
| 3.1   | Share of fixed BB subscriptions  |
| 3.1.1 | SMP/Incumbent operator   |
| 3.1.2 | Competitors  |
| 3.1.3 | Cable operators  |
| 3.2   | Share of DSL BB subscriptions  |
| 3.2.1 | SMP/Incumbent operator   |
| 3.2.2 | Competitors  |
| 3.3   | Share of NGA (FTTx) BB subscriptions   |
| 3.3.1 | SMP/Incumbent operator   |
| 3.3.2 | Competitors  |
| 3.3.3 | Cable operators  |
| 3.4   | Coverage on own network  |
| 3.4.1 | SMP/Incumbent FTTB/C (via SLU) coverage  |
| 3.4.2 | SMP/Incumbent FTTH coverage  |
| 3.4.3 | SMP/Incumbent cable coverage   |
| 3.4.4 | Other access operator(s) FTTB/C (via SLU) coverage                                   |
| 3.4.5 | Other access operator(s) FTTH coverage   |
| 3.4.6 | Other access operator(s) cable coverage  |

The data for this section is now sourced mainly from the eurostat database, which includes data for EU and EFTA countries and some data for EU candidate and potential EU candidate countries. Eurostat does not update all of their data yearly; data in this report is always based on the latest available data.

<sup>43</sup> Source: eurostat - population projection on 1<sup>st</sup> January 2020 (EU and EFTA countries)

[https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=proj\\_19np&lang=en](https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=proj_19np&lang=en)

Source for RS, XK: eurostat Candidate countries and potential candidates: population – demography (2016)

[https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=cpc\\_psdemo&lang=en](https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=cpc_psdemo&lang=en)

<sup>44</sup> Source: 1. eurostat: households in the EU end of 2019 [https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=cpc\\_psdemo&lang=en](https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=cpc_psdemo&lang=en), 2. NRAs (AT, CZ, DK, ES, HR, NL, XK), 3. National statistical bureaus (CH, NO)

<sup>45</sup> Source: eurostat – population density 2018 <https://ec.europa.eu/eurostat/databrowser/view/tps00003/default/table?lang=en> XK: Fischer Weltalmanach 2019 (eurostat data unavailable)

<sup>46</sup> Source: eurostat 2016 [https://ec.europa.eu/eurostat/databrowser/view/met\\_d3dens/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/met_d3dens/default/table?lang=en)

<sup>47</sup> Source: eurostat 2016 [https://ec.europa.eu/eurostat/databrowser/view/met\\_d3dens/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/met_d3dens/default/table?lang=en)

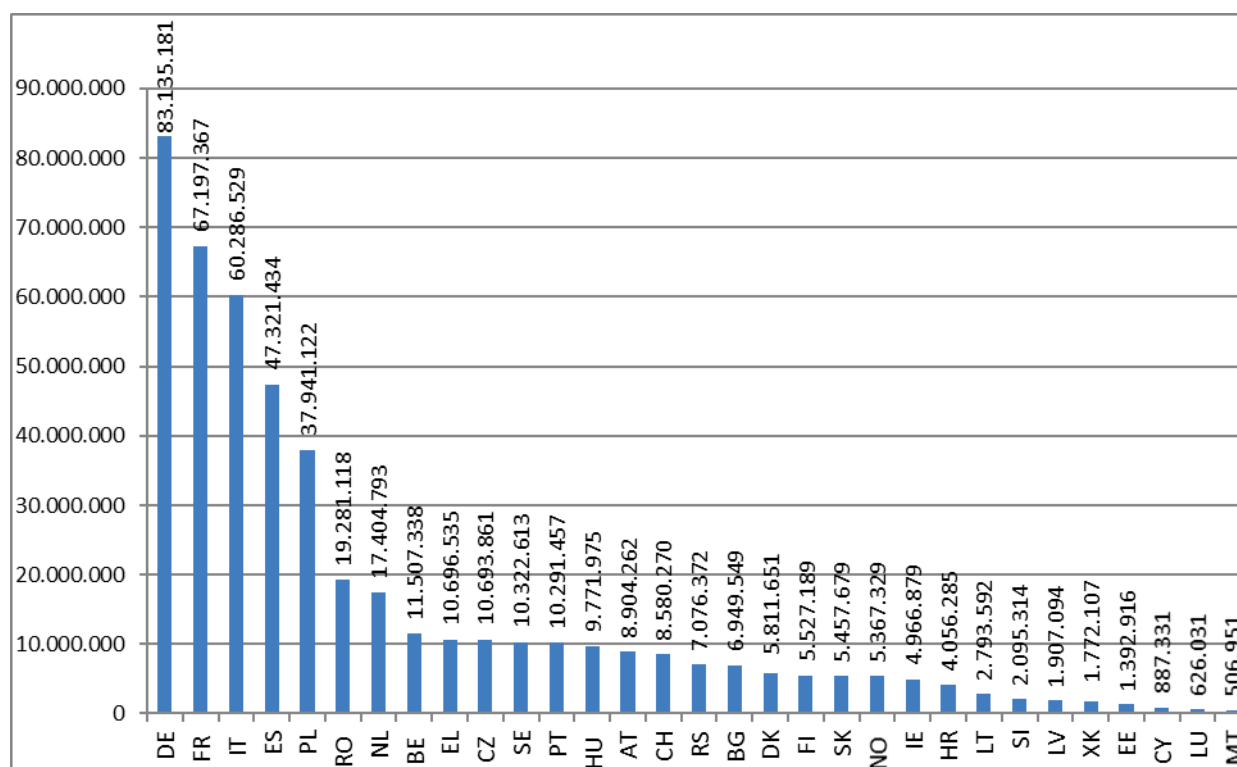
<sup>48</sup> Source: eurostat 2019 <https://ec.europa.eu/eurostat/databrowser/view/tin00134/default/table?lang=en>  
[https://ec.europa.eu/eurostat/databrowser/view/isoc\\_ci\\_in\\_en2/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/isoc_ci_in_en2/default/table?lang=en)

## 4.1 Population and population density

The data, which is naturally static and remains largely unchanged in comparison to previous years, can have a considerable influence on the cost of telecommunications infrastructure. For instance: a high population density in urban areas vs. few users in sparsely populated rural areas results in different investment risk for telecommunications companies.

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

Figure 43 - Total Population



Source: eurostat 2020

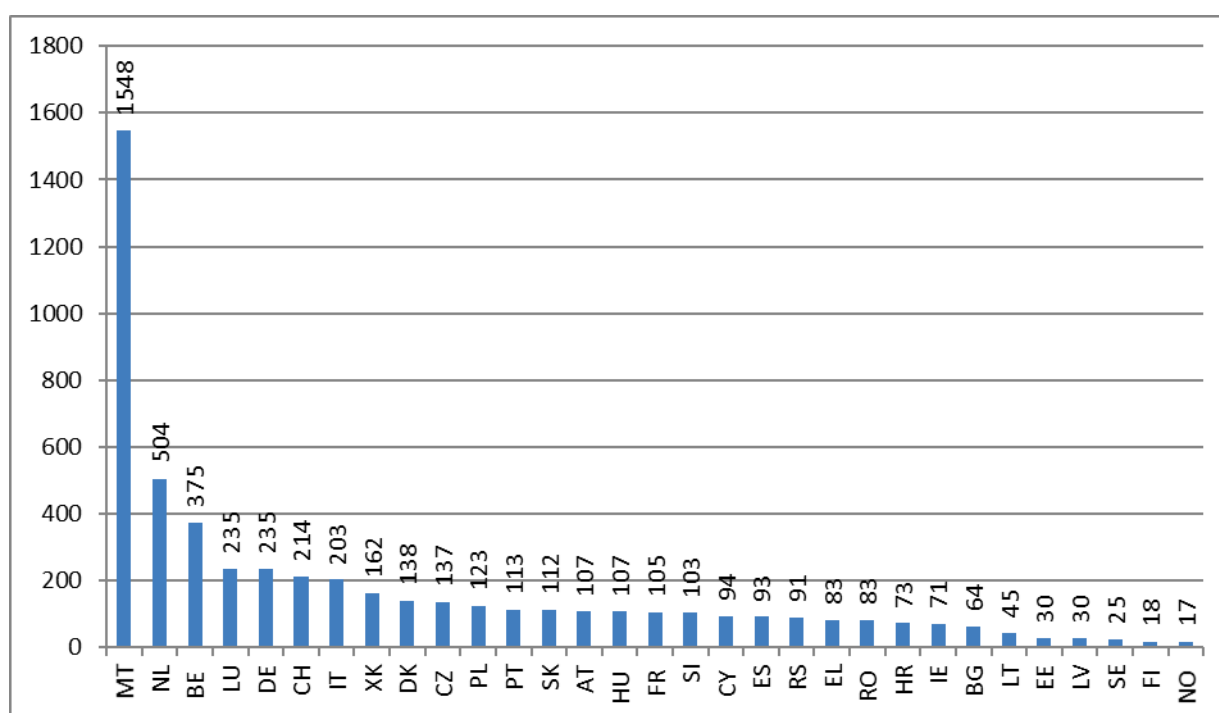
The number of households (generally an average of two people per household)<sup>49</sup> is not shown in a separate figure, however this number is used in this report to calculate the fixed broadband penetration per household.

In terms of **population density**<sup>50</sup> (i.e. the number of inhabitants per square kilometre) the top countries with at least 200 people per square km are Malta, the Netherlands, Belgium, Germany, Switzerland and Italy.

<sup>49</sup> except the Kosovo\* (=6)

<sup>50</sup> For CH, LU, RS, XK eurostat data is unavailable, data source: Fischer Weltatmanach 2019

Figure 44 - Population Density

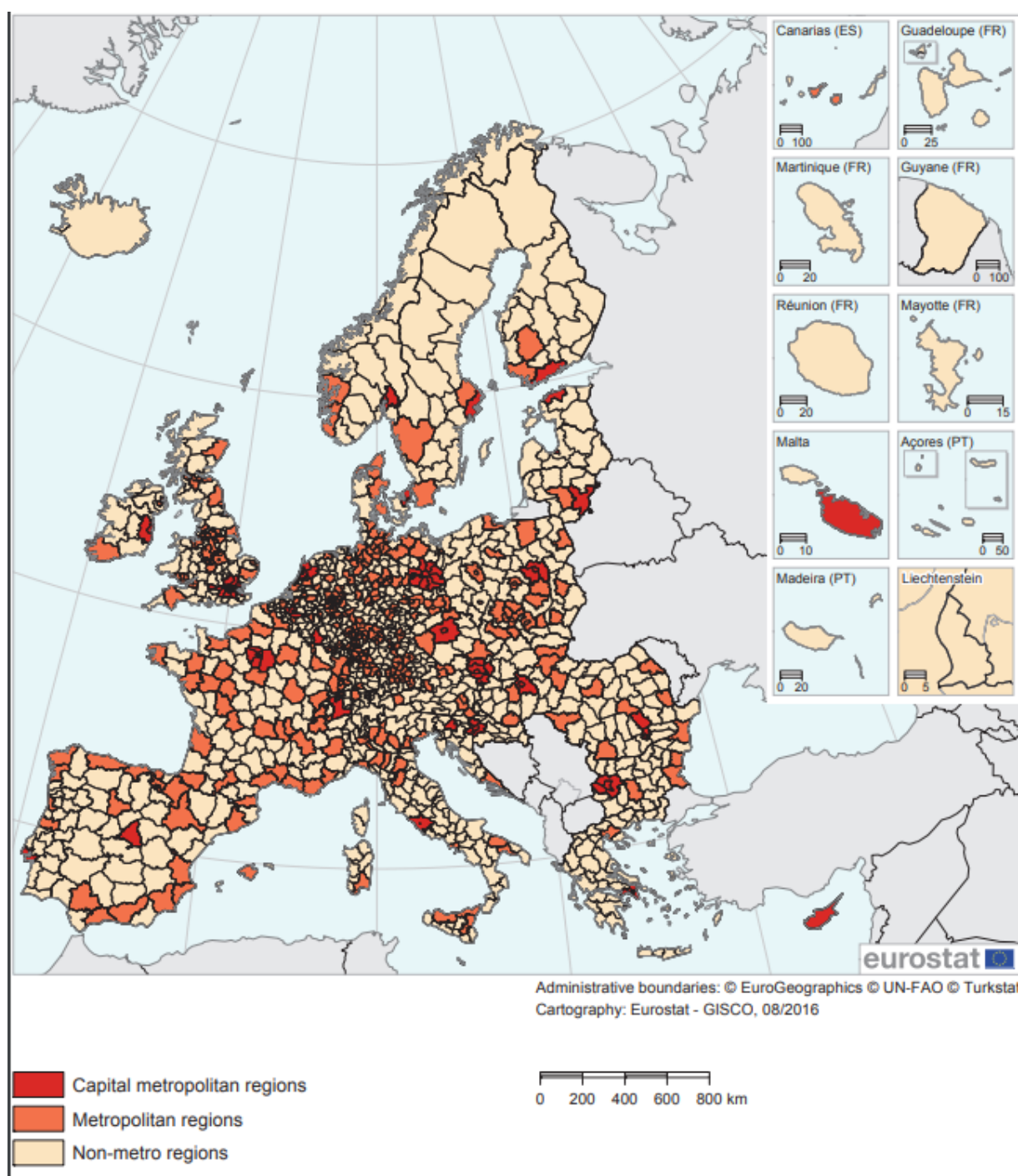


Source: eurostat 2018

When looking at the **metro<sup>51</sup> (here: capital city) population density**, an impression is given of the different effort and cost required by operators to provide infrastructure access to the population in metro and country areas.

<sup>51</sup> eurostat metro-regions are based on agglomerations, which include the commuter belt around a city

Figure 45 – Regional Population Density

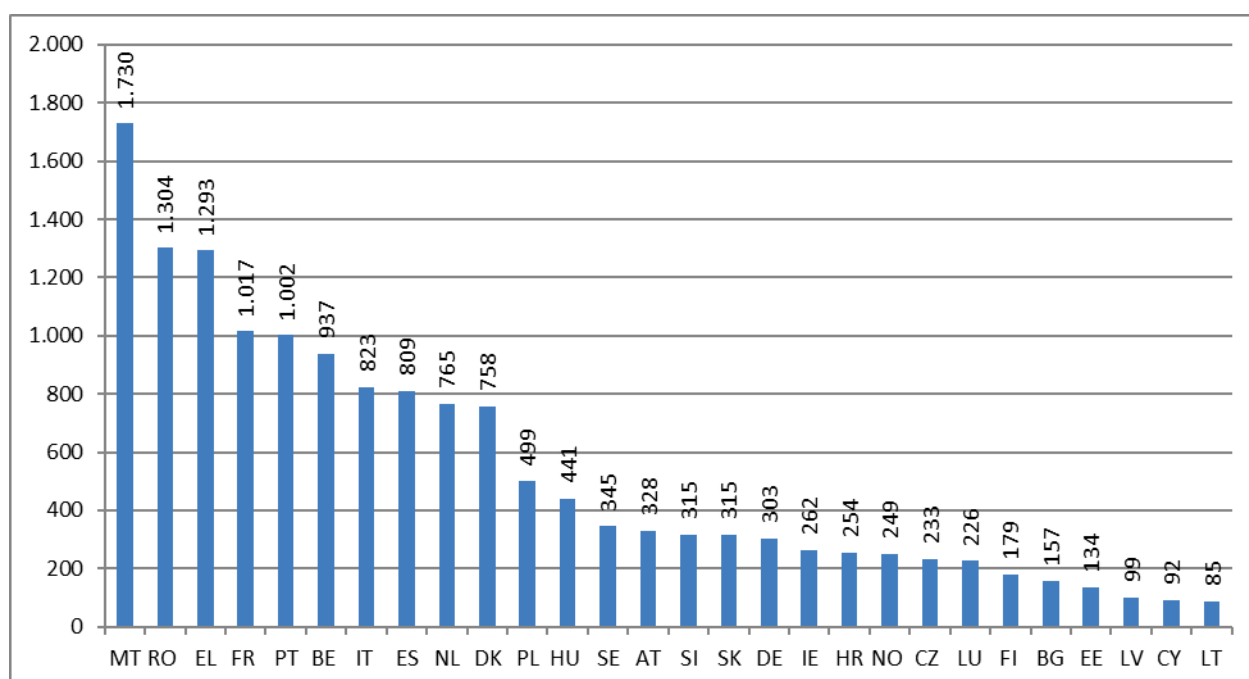


Source: EuroGeographics/eurostat 2016

The population density in the capital city metro area<sup>52</sup> (in most cases the most densely populated area of the country) is highest in Valetta (MT), Bucharest (RO), Athens (EL), Paris (FR) and Lisbon (PT).

<sup>52</sup> Not available for CH, RS, XK

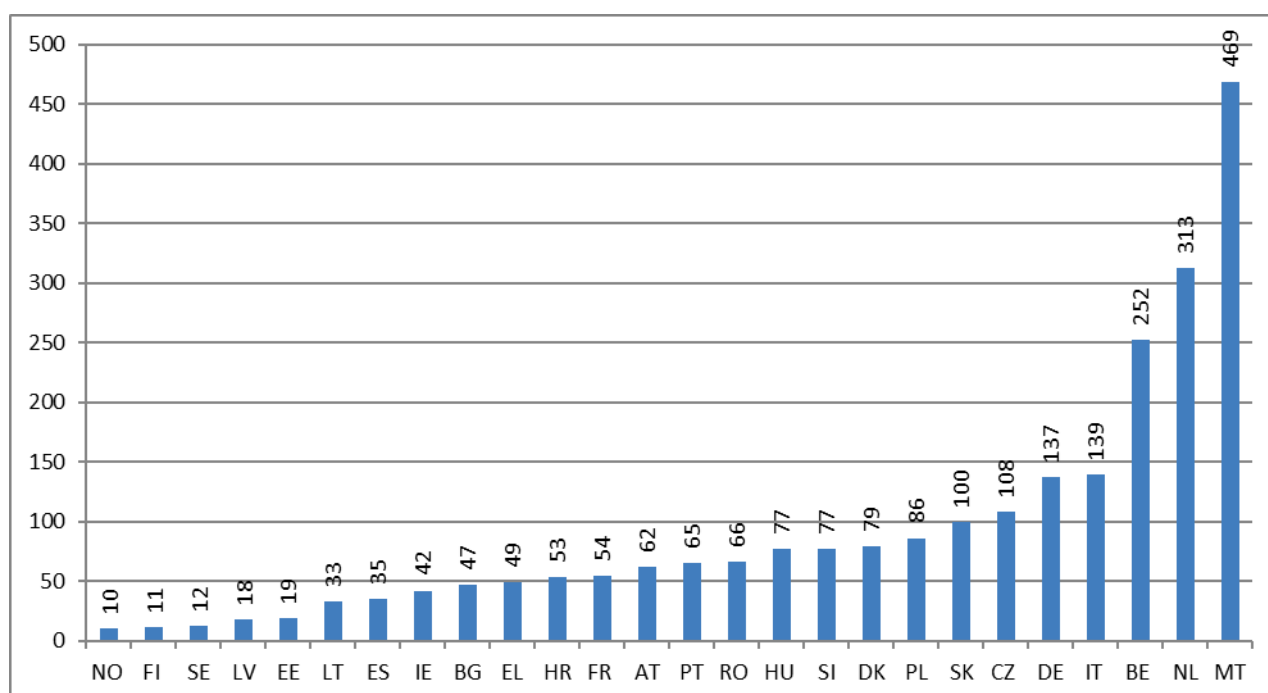
Figure 46 - Metro Population Density (Capital City Metro Area)



Source: eurostat 2016

The non-metro population density<sup>53</sup> shows the Scandinavian and Baltic countries but also Spain, Ireland, Bulgaria and Greece to have the least densely populated countryside.

Figure 47 – Non-Metro Population Density



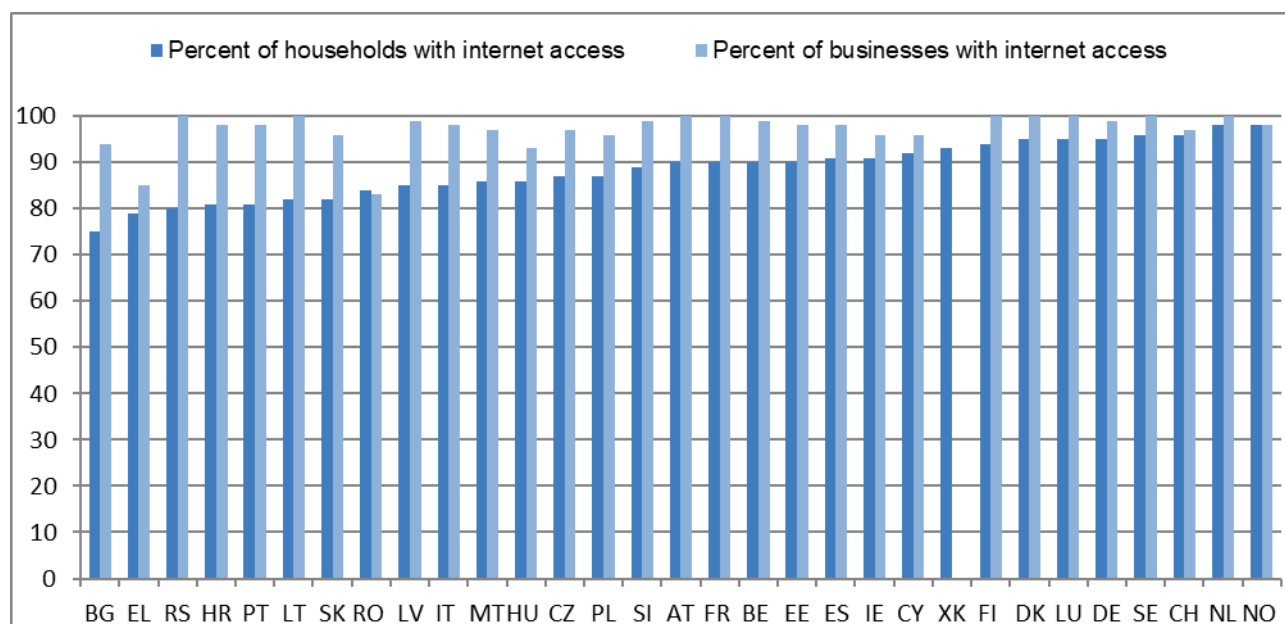
Source: eurostat 2016

## 4.2 Household connectivity

This section has been added to illustrate each country's current situation with regard to basic internet<sup>54</sup> available to households and businesses, as recorded by Eurostat.

Close to 100 % of businesses and 80 % of households have access to the Internet in every country.

Figure 48 – Internet Access



Source: eurostat 2019

## 4.3 Market and competitive situation

The market and competitive situation within the different countries, which has a direct influence on the regulatory regime, shows considerable disparity. This data has been sourced from NRAs<sup>55</sup>.

Concurrent with the last reports, this report focusses on the increasingly important broadband usage rather than subscriptions to classical fixed and mobile telephones, which are also depicted in other reports<sup>56</sup>.

The **mobile broadband penetration**, represents mobile broadband end users as a percentage of the total population<sup>57</sup> (excluding M2M). Percentages are only shown for 2020. They vary between 73 per cent in the Kosovo<sup>\*58</sup> and 155 per cent in Finland. The countries

<sup>53</sup> Not available for CH, CY, LU, RS, XK

<sup>54</sup> Percentage of households/businesses who have internet access at home/at the office. All forms of internet use are included. Business data not available from eurostat for CH, XK. CH have provided own business data. Business data not available for XK

<sup>55</sup> CZ: mainly Q2 2019 data, LT: data as of 31.12.2019, RO: data as of 01.01.2020

<sup>56</sup> i. e. BEREC Report on European Termination Rates

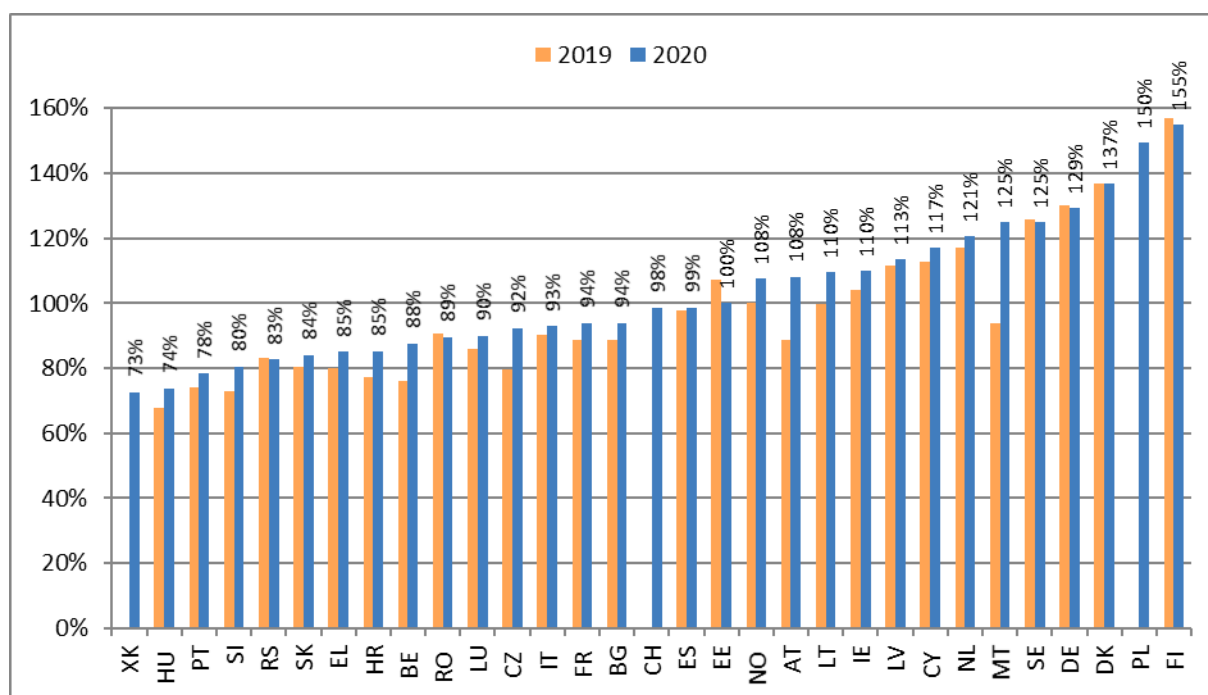
<sup>57</sup> HR: Q1 2020, incl. FWA LTE. IE: total mobile voice and data SIMs (smartphones) plus dedicated data SIMs. SI: based on 2018 eurostat population of 2.080.908 DE: data end of 2019

<sup>58</sup> \*This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.



with a mobile broadband penetration rate in 2020 of around or more than 100 per cent are Estonia, Norway, Austria, Lithuania, Ireland, Latvia, Cyprus, Netherlands, Malta, Sweden, Germany Denmark, Poland and Finland. Shown in comparison is the penetration rate (as a percentage of the total population) in 2019<sup>59</sup>. On the whole, mobile broadband penetration is on the increase.

Figure 49 - Mobile Broadband Penetration (per total population)

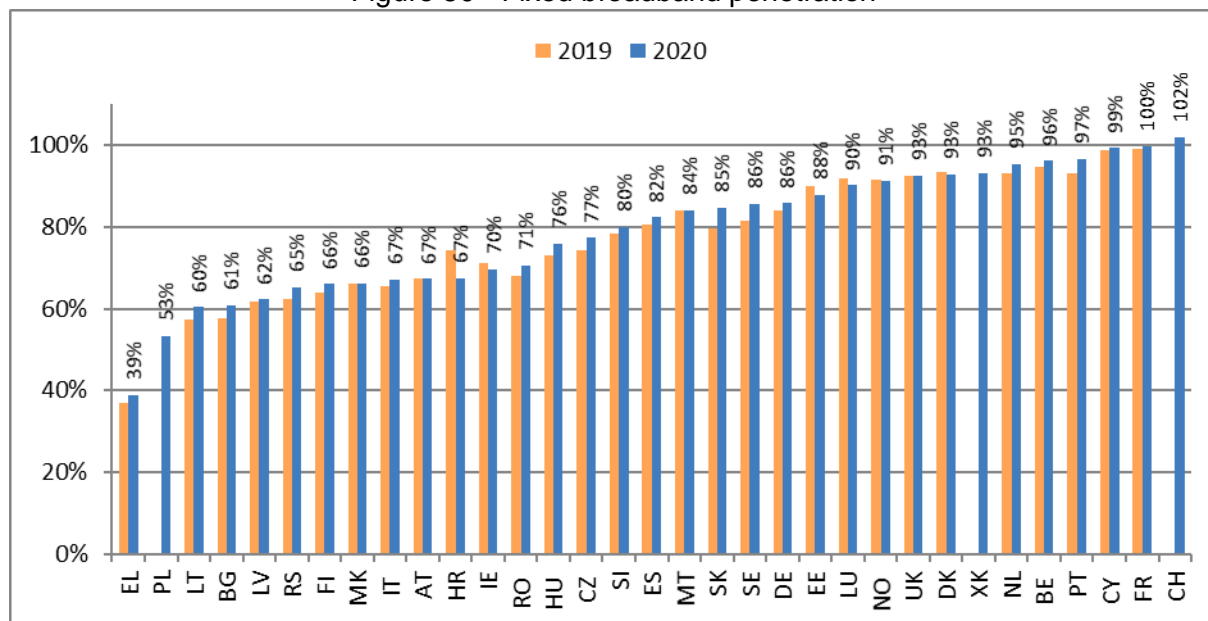


Source: BEREC RA database 2020

<sup>59</sup> XK, CH, PL: 2019 figures not available

The **fixed broadband penetration** represents fixed broadband subscriptions as a percentage of the total number of households. Percentages are only shown for 2020 and vary between 39 per cent in Greece and 100 per cent in France<sup>60</sup>. The countries with a fixed broadband penetration rate of around 100 per cent are Cyprus and France. Shown in comparison is the penetration rate (of the total number of households) in 2019<sup>61</sup>. Fixed broadband penetration has not considerably increased in comparison to the previous year in most countries.

Figure 50 - Fixed broadband penetration



Source: BEREC RA database 2020

The following table shows the percentage share of fixed broadband technology<sup>62</sup>:

- (V)DSL lines (including ADSL, naked DSL, VDSL)
- Cable (via coax, HFC<sup>63</sup>)
- FTTx (via FTTH, FTTB/C)<sup>64</sup>
- Other technologies (BWA,<sup>65</sup> satellite, fixed LTE etc.)

<sup>60</sup> DE: end of 2019 data IE: = xDSL, VDSL, fibre, cable, FWA, satellite residential subscriptions. SI: based on eu-rostat households in 2018 (887.100)

<sup>61</sup> 2019 data not available for CH, PL, XK

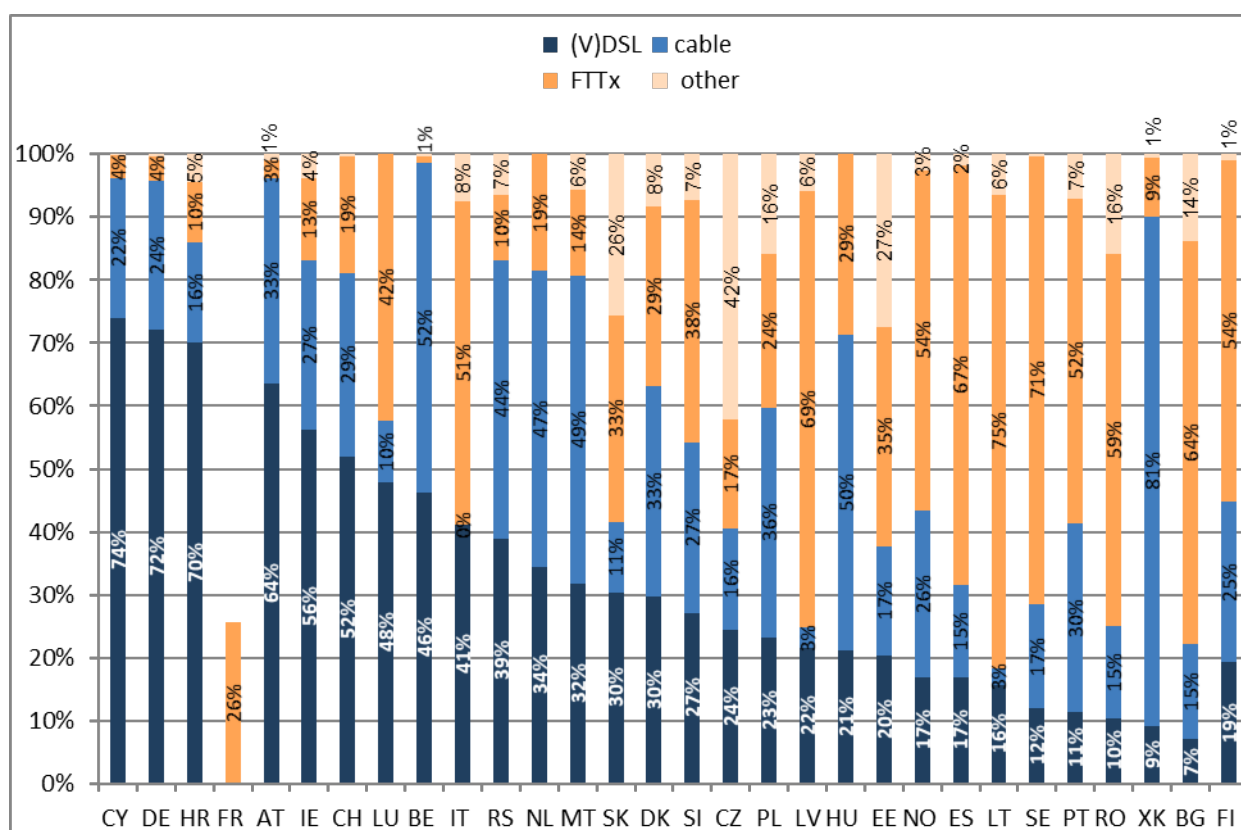
<sup>62</sup> EL: no information

<sup>63</sup> Hybrid fibre-coax cable

<sup>64</sup> FTTx = fibre to "x" connection, i.e. FTTH = fibre to the home, FTTB/C = fibre to the building/curb

<sup>65</sup> BWA = Broadband wireless access

Figure 51 – Technology share of fixed broadband



Source: BEREC RA database 2020

**(V)DSL lines**<sup>66</sup> as a percentage of fixed broadband range from just over 7 percent in Bulgaria to 74 percent in Cyprus. The countries with a share higher than 50 per cent are Switzerland, Ireland, Austria, France, Croatia, Germany and Cyprus.

**Cable**<sup>67</sup> as a percentage of fixed broadband (no cable coverage in Italy and Greece) range from 3 per cent in Lithuania to over 50 per cent in Hungary, Belgium and the Kosovo\*. The use of **FTTx** technology is very low in Austria, Belgium, Cyprus and Germany. A share of at least 50 per cent is recorded for Italy, Portugal, Norway, Finland, Romania, Bulgaria, Spain, Lithuania, Latvia and Sweden.

**Other**<sup>68</sup> technologies reported by some countries may include satellite, fixed LTE etc. These seem to be on the increase and may receive more focus in future reports. The Czech Republic has the highest share with over 40 per cent. Bulgaria, Romania, Poland, Slovakia and Estonia record shares between 14 and 30 per cent.

#### 4.4 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(s) vs. the market shares of alternative operators (OAO other access operators/competitors) as well as cable operators. This includes DSL and NGA (FTTx) broadband users. The data analysis shows a considerable

<sup>66</sup> FR: confidential

<sup>67</sup> FR: confidential. No cable coverage in IT and EL.

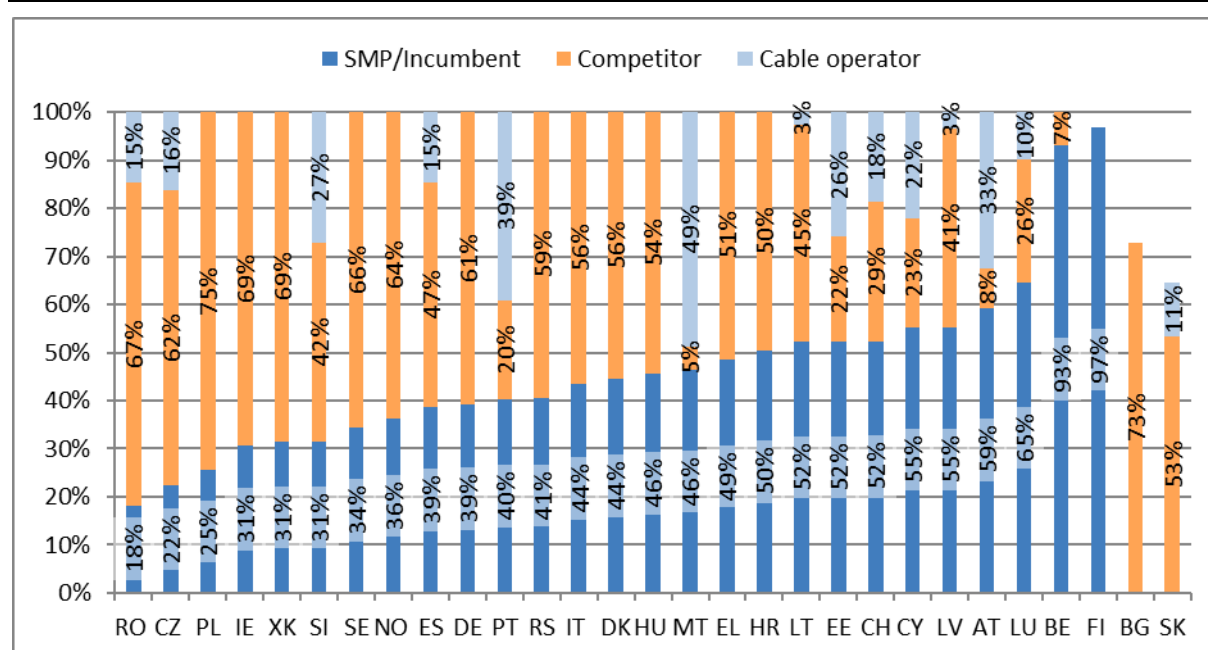
<sup>68</sup> CZ: incl. LTE in fixed locations.

disparity in market shares and therefore points to differences in the national competitive situation, thereby affecting regulatory strategy<sup>69</sup>.

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

- Share of the SMP(s)/Incumbent operator(s): in some countries, they also operate cable<sup>70</sup>. The share ranges from a minimum of 18 per cent in Romania to 97 per cent in Finland. The SMP has a market share of greater than 50 per cent in Croatia, Lithuania, Estonia, Switzerland, Cyprus, Latvia, Austria, Luxemburg, Belgium and Finland.
- Share of competitors: market shares range from 5 per cent in Malta to over 80 per cent in Romania. In some countries, competitor data includes cable, which makes shares difficult to compare with countries that record shares separately<sup>71</sup>.
- Share of cable operators: not all NRAs record data/record data separately from competitor data<sup>72</sup>. Where it is recorded separately shares range from around 3 per cent in Lithuania/Latvia to over 50 per cent in Poland.

Figure 52 – Fixed broadband market share



Source: BEREC RA database 2020

<sup>69</sup> CZ: The former SMP operator was separated into two legal entities: 1) CETIN – SMP operator on market 3a and 3b, infrastructure and wholesale service provider and 2) O2 – retail service provider. Data provided in this section is O2 data

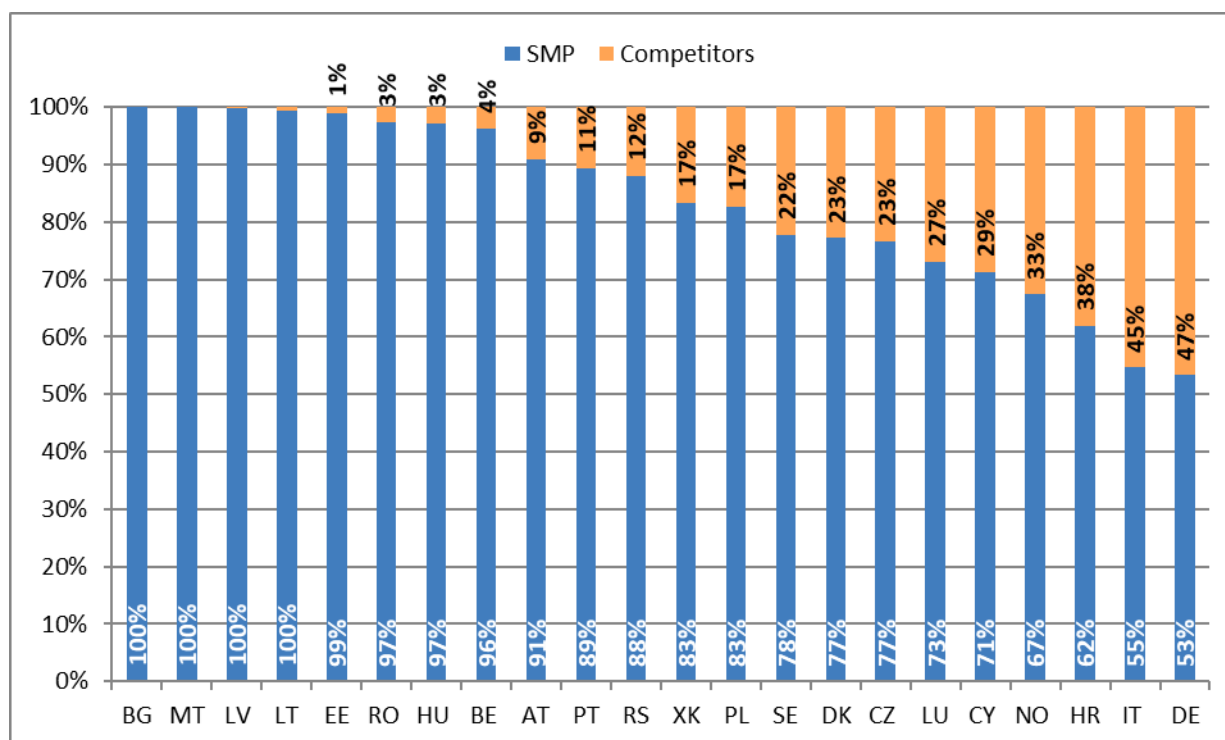
<sup>70</sup> SMP operates cable in BE, DK, XK. For BE, the market shares of the cable operators are included in the SMP market shares as cable operators are considered as SMP operators as well. Data is confidential in BG, FR, NL, SK. RO: market share of the incumbent.

<sup>71</sup> Competitors include cable operators in HR, HU, IE, NO, PL, RS. Data is confidential in FR, NL

<sup>72</sup> DE: cable share is not known (not regulated). No cable coverage in IT, EL. Data is confidential in FR, NL. In XK, cable is included in SMP and competitor data.

The **DSL broadband** share (including docsis prior to 3.0, excluding VDSL)<sup>73</sup> is the traditional domain of SMP operators. Their market share ranges from a 53 per cent in Germany to 100 per cent in Latvia, Lithuania, Malta and Bulgaria (only the SMP operator offers DSL). Shown in the same figure are competitor market shares, ranging from around 1 per cent in Estonia to 47 per cent in Germany.

Figure 53 - DSL broadband market share



Source: BEREC RA database 2020

Looking at **NGA (FTTx) broadband** share (including VDSL, FTTH, FTTB, cable docsis 3.0),<sup>74</sup> the SMP/Incumbent's share ranges from 5 per cent in the Kosovo\* to 87 per cent in Belgium. Shown in the same figure are the competitor and cable operator's market shares<sup>75</sup>.

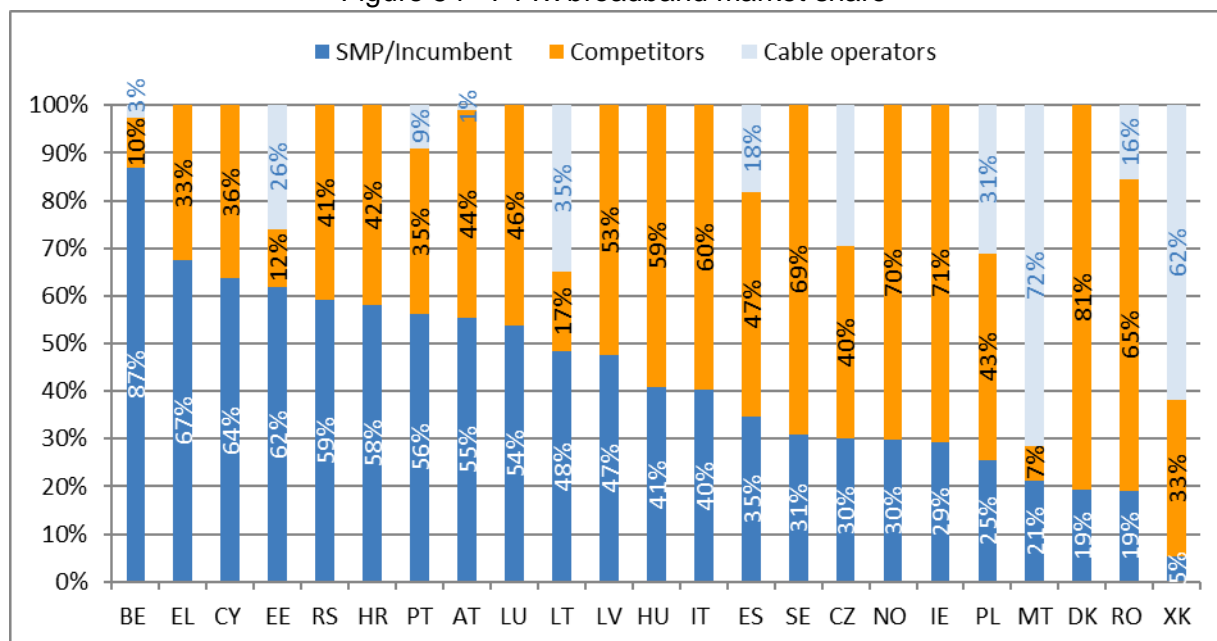
<sup>73</sup> Data is confidential in FR, NL, SK. No information in CH, FI. IE: SMP = retail percentage of total DSL subscriptions. PL: SMP = the biggest operator's (Orange Polska) share. RO: there is no SMP, market share of the incumbent.

<sup>74</sup> Data is confidential in BG, FR, NL, SK and not available in CH, DE, FI.

<sup>75</sup> DK: cable operators incl. in incumbent share (SMP = biggest cable operator). CZ: SMP operator's share on total NGA subscriptions (VDSL, FTTH/B and CATV). FTTC represented by all VDSL subscriptions, competitor's share on all VDSL, FTTH/B and CATV subscriptions, cable operator's share of CATV competitors on all VDSL, FTTH/B and CATV subscriptions.

In HR, HU, IE, LU, NO, PL, PT, RS and RO cable operators are included in competitor's share.

Figure 54 - FTTx broadband market share

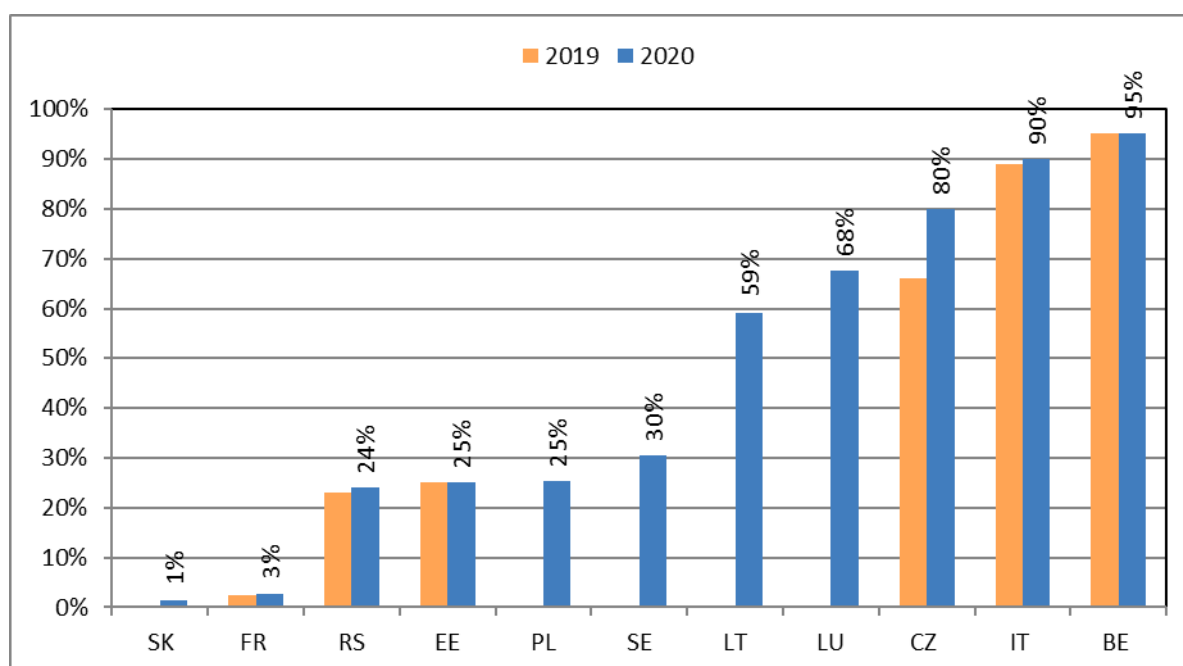


Source: BEREC RA database 2020

When looking at the **SMP's coverage of Fibre to the Building/Curb (FTTB/C) infrastructure via SLU<sup>76</sup>**, a total of 13 NRAs supplied data (not shown are Spain and Malta with 0 per cent coverage). Where recorded, coverage is slightly increasing in comparison to last year.

<sup>76</sup> Data is confidential in CZ, NL, SK and not available in AT, CH, CY, DE, DK, EL, FI, HR, HU, IE, LV, NL, NO, PT, RO, SI, XK. BG: residential subscriptions as a % of total households. CZ: Preliminary data for 4Q 2019. FTTC is represented by all NGA VDSL lines ( $\geq 30$  Mbit/s) as a % of total households. LT: FTTx (AON and xPON) lines, separate figures on FTTB or FTTH unavailable. SE: 2019 data is confidential.

Figure 55 – Incumbent FTTB/C coverage (via SLU): % of households

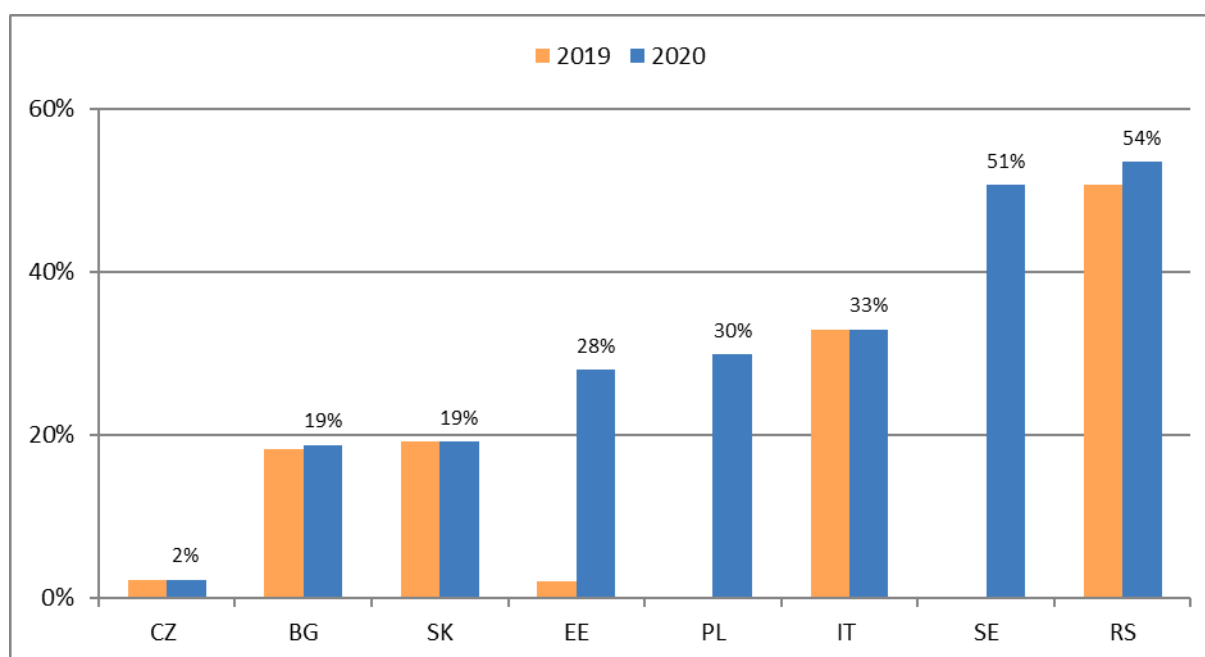


Source: BEREC RA database 2020

The total coverage of the main **OAo Fibre to the Building/Curb (FTTB/C) via SLU<sup>77</sup>** is provided by 11 NRAs (not shown in the graph are Spain, France, Malta with 0 per cent). In comparison to 2019, figures are slightly on the increase.

<sup>77</sup> Confidential in FR and not available in AT, BE, CH, CY, DE, DK, EL, FI, HR, HU, IE, LT, LU, LV, NL, NO, PT, RO, SI, XK. BG: residential subscriptions as a % of total households. CZ: % of total households. Decrease of coverage in comparison with previous year (questionnaire) due to increase of the total number of households in Czechia. Number of lines of main OAo remain almost the same. PL: % of households. SE: Includes both FTTH and FTTB, i.e. SDUs and MDUs. No FtC in Sweden. Refers to premises connected (only data available). Figures not available in 2019. SK: The data is based on the minimum coverage in the selected site, as the maximum possible coverage of one operator in the selected site is included in the calculation. Ultimately, this is the minimum coverage that can be greater. Data includes only FTTB.

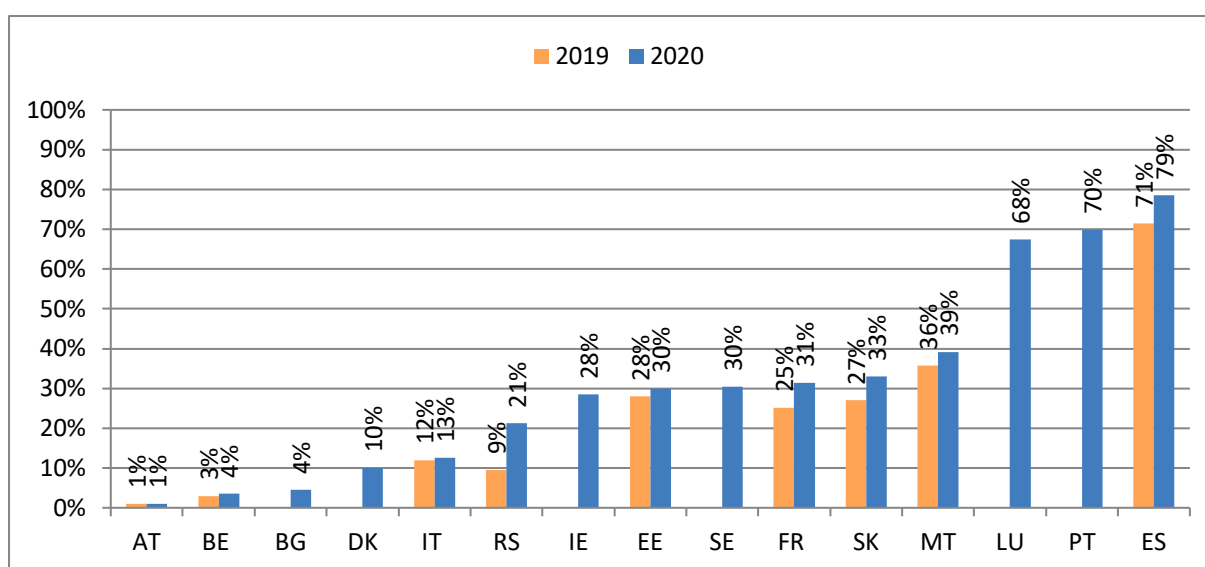
Figure 56 – Main OAO coverage on own network FTTB/C: % of households



Source: BEREC RA database 2020

The **SMP's coverage of Fibre to the Home (FTTH)** was provided in 2020 by 15 NRAs<sup>78</sup>. The coverage is around/above 70 per cent of total households in Luxembourg, Portugal and Spain. The remaining NRAs record a coverage of half that percentage or less.

Figure 57 – Incumbent FTTH coverage: % of total households



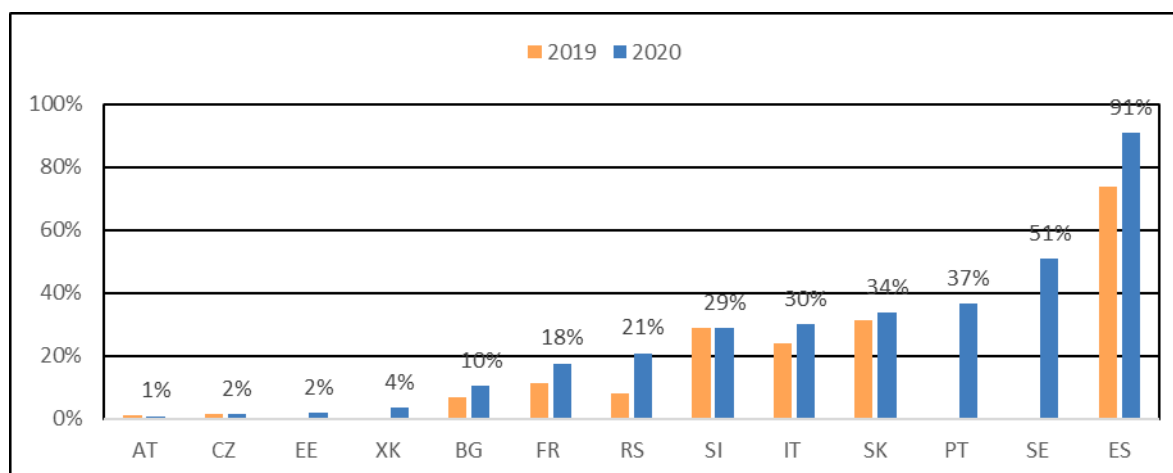
Source: BEREC RA database 2020

<sup>78</sup> Confidential in CZ, NL, SK and not available in CH, CY, DE, EL, FI, HR, HU, LT, LV, NO, PL, RO, XK. BG: Residential subscriptions as a % of total households. IE: % of total households. SE: Includes both FTTH and FTTB, i.e. SDUs and MDUs. Refers to premises connected (only data available). Data was recorded differently in 2019 and can therefore not be shown in comparison.



**Fibre to the Home (FTTH) coverage of the main OAO via their own infrastructure**<sup>79</sup> resulted in 15 NRAs reporting data (Malta and Ireland are not shown in the graph since coverage is 0 per cent), the highest coverage being recorded in Spain, increased in comparison to 2019.

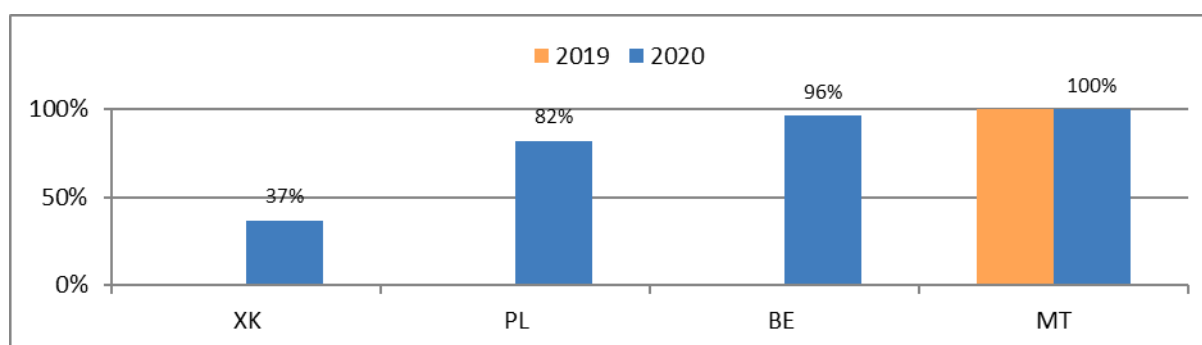
Figure 58 - OAO coverage on own network FTTH: % of households



Source: BEREC RA database 2020

The total **cable coverage of the SMP operator**<sup>80</sup> resulted in a response of a total of 19 NRAs (not shown are Austria, the Czech Republic, Germany, Estonia, Spain, France, Italy, Lithuania, Portugal, the Republic of Serbia and Slovakia with 0 per cent, Sweden and Slovenia with insignificantly above 0 per cent). The SMP has significant coverage only in the Kosovo\*, Poland, Belgium and Malta.

Figure 59 - SMP cable coverage: % of households



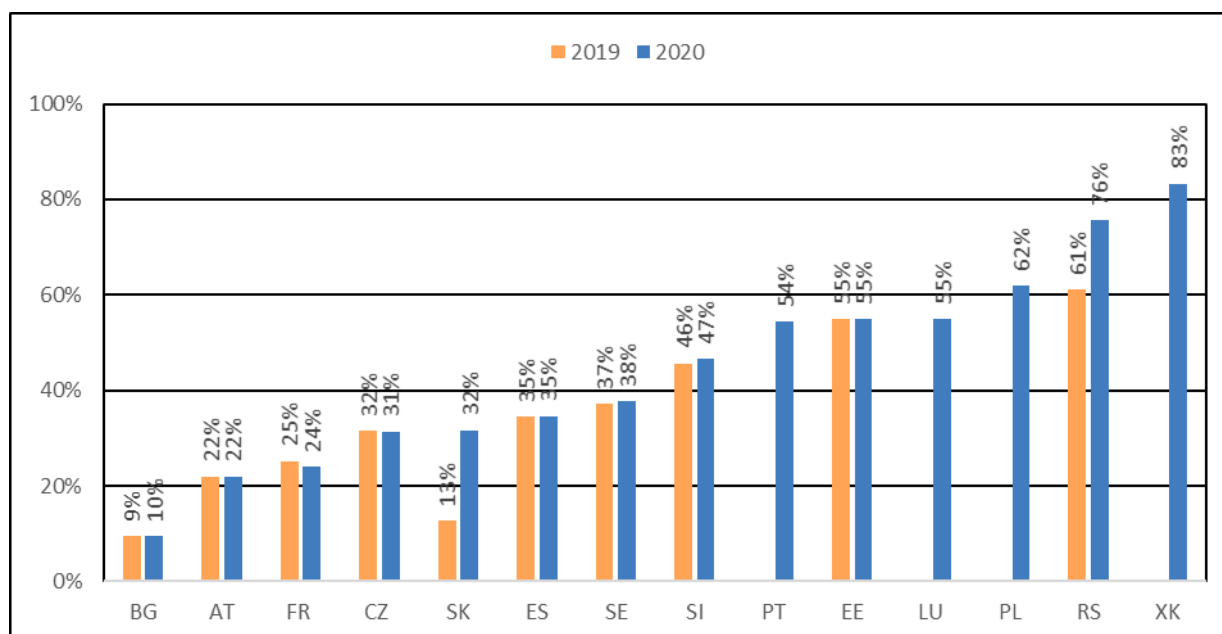
Source: BEREC RA database 2020

<sup>79</sup> Confidential in FR and not available in BE, CH, CY, DE, DK, EL, FI, HR, HU, LT, LV, NL, NO, PL, RO. BG: Residential subscriptions as a % of total households. CZ: % of total households. IE: % of total households. ES: he value is high because some houses have more than one line. SE: Includes both FTTH and FTTB, i.e. SDUs and MDUs. Refers to premises connected (only data available). Data was recorded differently in 2019 and is therefore not comparable. SK: The data is based on the minimum coverage in the selected site, as the maximum possible coverage of one operator in the selected site is included in the calculation. Ultimately, this is the minimum coverage that can be greater. Data includes only FTTB. PT: Data was computed differently in 2019 and is therefore not comparable.

<sup>80</sup> Confidential in NL and not available in CH, CY, DK, EL, FI, HR, HU, IE, LU, LV, NO, RO. SMP has no cable network in IE, DE.

The total **cable coverage of OAO on own cable network**<sup>81</sup> resulted in a response of a total of 16 NRAs (not shown are Italy with no cable coverage and Malta, where the SMP has 100% cable coverage). Except for Slovakia and the Republic of Serbia, little development is observed in comparison to 2019.

Figure 60 – OAO cable coverage on own cable network: % of households



Source: BEREC RA database 2020

<sup>81</sup> Confidential in NL and not available in BE, CH, CY, DE, DK, EL, FI, HR, HU, IE, LT, LV, NO, RO. BG: residential subscriptions as a % of total households. CZ: % of total households. Decrease of coverage in comparison with previous year due to increase of the total number of households in Czechia. Number of lines of main OAO remain almost the same. PL: % of households. SK: The data is based on the minimum coverage in the selected site, as the maximum possible coverage of one operator in the selected site is included in the calculation. Ultimately, this is the minimum coverage that can be greater. Data includes only FTTB. PT: Data was recorded differently in 2019 and is therefore not comparable. FR: % of total premises. Decrease in coverage in comparison with previous year is due to an update of the number of premises. There is no decrease in the number of lines of main OAO.

## Appendix I

### List of Participating Countries/NRAs

The following countries / NRA's have provided data for the 2020 RA Report:

|    |                               |
|----|-------------------------------|
| AT | Austria (RTR)                 |
| BE | Belgium (BIPT)                |
| BG | Bulgaria (CRC)                |
| CH | Switzerland (BAKOM)           |
| CY | Cyprus (OECPR)                |
| CZ | Czech Republic (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)                 |
| LV | Latvia (SPRK)                 |
| LT | Lithuania (RRT)               |
| LU | Luxemburg (ILR)               |
| 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)                 |
| XK | Kosovo <sup>*82</sup> (ARKEP) |

The following countries may be represented in previous years' data, however have not provided information for the 2020 report:

|    |                        |
|----|------------------------|
| IS | Iceland (PTA)          |
| LI | Liechtenstein (AK LLV) |
| MK | North Macedonia (AEC)  |
| UK | United Kingdom (OFCOM) |

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<sup>82</sup> \*This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.

### Accompanying Tables (based on the 2020 survey)

Figure 61 – Ref Figure 3 – Number of NRAs applying obligations ex art. 9-13 of AD to single products/markets

[illegible]

Figure 62 – Ref Figure 5 – Margin squeeze test

|                                   | M1_2007 | M2_2007 | M1_2007_M3_2007 | M2_2007_M7_2007 | M3a_2014_M4_2007_UL | M3a_2014_M4_2007_SL | M3a_2014_M4_2007_SA | M3a_2014_M4_2007_Termination segment (in line with definition of art. 61 (3)) | M3a_2014_M4_2007_Termination segment (point beyond the first concentration point art. 61 (3)) | M3a_2014_M4_2007_VULA (FTTC) | M3a_2014_M4_2007_VULA (FTTH) | M3a_2014_M4_2007_DF | M3a_2014_M4_2007_DA | M3b_2014_M4_2007_Legacy | M3b_2014_NGA (included FTTC/FWA) | M3b_2014_FTH | M4_2014_Active_Legacy | M4_2014_Active_NGA | M4_2014_Passive | WLR      |
|-----------------------------------|---------|---------|-----------------|-----------------|---------------------|---------------------|---------------------|---|---|------------------------------|------------------------------|---------------------|---------------------|-------------------------|----------------------------------|--------------|-----------------------|--------------------|-----------------|----------|
| ex - ante MS test                 | EL IE   | DE EL   | DE              | DE              | CZ EL IT            | CZ EL IT            | CZ EL               |   | CZ DE   | CZ EL IE IT                  | CZ EL IE IT                  | DE EL               | DE EL               | AT DE EL IE IT PL PT RS | AT DE EL IT PL                   | AT IE IT PL  | DE EL NL              | DE EL              | EL              | EL IT LI |
| ERT (Economic Replicability Test) |         |         | IS              | IS              | AT CY IS SK         | CY IS               | CY IS SK            |   | IS LU SE SI SK  | AT CY IS SI SK               | AT CY ES IS LU MK NO SI SK   | IS                  | IS                  | ES IS LU MK SK          | CY IS LU SK                      | LU NO SK     | IS PT                 | IS PT              | IS              |          |
| ex post MS test                   | HR      | DE LT   |                 |                 | DK EE LT            | EE LT               | DK EE LT            | LT  | DK EE LT  | LT                           | LT                           | LT                  | EE LT               | EE                      | EE                               | EE           | LT                    | ES LT              | ES LT           |          |

Figure 63 – Ref Figure 7 – Geographical remedies/market regulation

|          | M1_2007 | M2_2007 | M1_2007_M3_2007 | M2_2007_M7_2007 | M3a_2014_M4_2007_UL | M3a_2014_M4_2007_SL | M3a_2014_M4_2007_SA | M3a_2014_M4_2007_Termination segment (in line with definition of art. 61 (3)) | M3a_2014_M4_2007_Termination segment (point beyond the first concentration point art. 61 (3)) | M3a_2014_M4_2007_VULA (FTTC) | M3a_2014_M4_2007_VULA (FTTH) | M3a_2014_M4_2007_DF | M3a_2014_M4_2007_DA | M3b_2014_M4_2007_Legacy | M3b_2014_NGA (included FTTC/FWA) | M3b_2014_M4_2007_FTH | M4_2014_Active_Legacy | M4_2014_Active_NGA | M4_2014_Passive | WLR         |             |    |
|----------|---------|---------|-----------------|-----------------|---------------------|---------------------|---------------------|---|---|------------------------------|------------------------------|---------------------|---------------------|-------------------------|----------------------------------|----------------------|-----------------------|--------------------|-----------------|-------------|-------------|----|
| Market   |         | PL      | HU PL           | HU PL           | FI HU PL            | FI HU PL            | FI HU PL            | HU  |   | FI HU PL                     | FI HU                        | FI HU               | FI HU PL            | HU PL                   | HU PL                            | DE ES FI HU IE PL PT | DE HU IE PL           | ES FI HU PL        | FI UK PT        | AT FI IE UK | AT FI IE PL | PL |
| Remedies |         |         | MK              | MK              | BE                  |                     | BE                  | FR  | FR  | DK                           | BE IT                        | BE IT MK            | MK                  | MK                      | BE FR MK                         | BE IT SI             | BE IT                 | BE CH FR           | BE CH FR        |             | IT          |    |

Figure 64 – Ref Figure 8 – Equivalence model

|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Figure 65 – Ref Figure 10 – Vectoring regulation

|     | M3a_ULL  | M3a__SLU  | M3a_VUL<br>A (FTTC)                          | M3b_lega<br>cy                            | M4_Activ<br>e_Legacy | M4_Activ<br>e_NGA |
|-----|--|---|--|---|----------------------|-------------------|
| Yes | AT BE CY<br>CZ DE DK<br>EE EL HR<br>HU IT IS<br>LU LV<br>NO SE<br>SI SK UK | AT CY CZ DE<br>EE EL HR<br>HU IT IS<br>LV NO SELV<br>UK | AT BE CY<br>DE EL<br>HR IT IS<br>SI IS<br>UK | AT BE<br>DK EE EL<br>HR HU IT<br>NO<br>RS | HR                   | HR                |
| NO  | FR<br>IE LI  | FR IE   | HU IE<br>SK                                  | FR<br>IE SK                               | FR<br>HU IE          | FR<br>HU IE       |

Figure 66 – Ref Figure 11 – Cable regulation/Presence of wholesale-only operator

|                                     | M3a_2014_M4_2007_ULL | M3a_2014_M4_2007_SLU | M3a_2014_M4_2007_SA | M3a_2014_M4_2007_Terminating segment (in line with definition of art. 61 (3)) | M3a_2014_M4_2007_Terminating segment (point beyond the first concentration point art. 61 (3)) | M3a_2014_M4_2007_fiberLLU     | M3a_2014_M4_2007_VULA (FTTC) | M3a_2014_M4_2007_VULA (FTTH) | M3a_2014_M4_2007_DF | M3a_2014_M4_2007_DA | M3b_2014_14_lega cy | M3b_2014_14_NGA (included FTTC/FWA) | M3b_2014_14_Active_Legacy (FTTH) | M4_2014_Active_Legacy | M4_2014_Active_NGA | M4_2014_Passive |
|-------------------------------------|----------------------|----------------------|---------------------|---|---|-------------------------------|------------------------------|------------------------------|---------------------|---------------------|---------------------|-------------------------------------|----------------------------------|-----------------------|--------------------|-----------------|
| Presence of wholesale-only operator | AT<br>LI LT          | LT                   | LI LT               | FR<br>LT  | FR<br>LT  | BE CH<br>EE IT IS LI<br>LT SI | AT<br>LT SI                  | AT<br>ES LT<br>SI            | IS<br>LT MK         | BE<br>LI LT         | MK                  |                                     | BE<br>IT                         | FR                    | FR<br>PT           |                 |
| Cable regulation                    | DK<br>LI             |                      | DK                  | HU  |   | DK<br>LI                      |                              |                              | DK<br>MK            | HU<br>NO            | DK<br>HU<br>RS      | BE<br>HU                            | BE<br>DK                         |                       |                    |                 |

Figure 67 – Ref Figure 12 - Price control main categories

|                    | M1_2007  | M2_2007 | M1_2014<br>M3_2007   | M2_2014<br>M3_2007   | M3a_2014<br>M4_2007<br>LU   | M3a_2014<br>M4_2007<br>SI  | M3a_2014<br>M4_2007<br>SA  | M3a_2014<br>M4_2007<br>Terminating<br>segment (in line with<br>definition of art. 61<br>(3)) | M3a_2014<br>M4_2007<br>Terminating<br>segment (point<br>beyond the first<br>concentration<br>point art. 61 (3)) | M3a_2014<br>M4_2007<br>fiber(LU)  | M3a_2014<br>M4_2007<br>VULA<br>(FTTC)  | M3a_2014<br>M4_2007<br>VULA<br>(FTTH)                                   | M3a_2014<br>M4_2007<br>DF   | M3a_2014<br>M4_2007<br>DA   | M3b_2014<br>14_NGA<br>(included<br>FTTC/FWA)   | M3b_2014<br>14_Active<br>(FTTH)  | M4_2014<br>Active_Legacy   | M4_2014<br>Active_NGA  | M4_2014<br>Passive | WIR                  |    |
|--------------------|----------|---------|--|--|---|--|--|--|---|---|--|---|---|---|--|--|--|--|--------------------|----------------------|----|
|                    |          |         | AT BE BG<br>CH CY CZ<br>DE DK EL<br>ES FI FR HR ES FI FR<br>HU IE IT LI HU IE IT IS<br>LU LV MT FI FR HU<br>NO PL PT IE IT IS LI LT<br>LV LV MT MT NO PL<br>NO PL SE RS SI | AT BE BG<br>CH CY CZ<br>DE DK EL<br>ES FI FR HR ES FI FR<br>HU IE IT LI HU IE IT IS<br>LU LV MT FI FR HU<br>NO PL PT IE IT IS LI LT<br>LV LV MT MT NO PL<br>NO PL SE RS SI | BE CH CY<br>DE DK EE<br>EL ES FI FR<br>HU IE IT LI HU IE IT IS<br>LU LV MT FI FR HU<br>NO PL PT IE IT IS LI LT<br>LV LV MT MT NO PL<br>NO PL SE RS SI | CH CY<br>DE EE EL<br>DK EE EL<br>FI FR HU<br>IE IT IS LI LT<br>LV LV MT MT NO PL<br>NO PL SE RS SI | BE CY<br>DK EE EL<br>FI FR HU<br>IE IT IS LI LT<br>LV LV MT MT NO PL<br>NO PL SE RS SI | ES   | FR  | DK EE EL<br>FI FR HU<br>IE IT IS LI LT<br>LV LV MT MT NO PL<br>NO PL SE RS SI | BE CY<br>DK EE EL<br>FI FR HU<br>IE IT IS LI LT<br>LV LV MT MT NO PL<br>NO PL SE RS SI | CZ DE<br>HU HU IE<br>IT IS LT LV<br>LV LV MT MT NO PL<br>NO PL SE RS SI | CH DE<br>EE ES FR<br>DE DK EE<br>EL FR HR<br>IE IT IS LI HU IE IT IS<br>LU LV MT MT NO PL<br>NO PL SE RS SI | BE CY<br>DE DK EE<br>EL FR HR<br>IE IT IS LI HU IE IT IS<br>LU LV MT MT NO PL<br>NO PL SE RS SI | AT CH CY<br>DE EE EL<br>DK EE EL<br>FI FR HU<br>IE IT IS LI HU IE IT IS<br>LU LV MT MT NO PL<br>NO PL SE RS SI | AT CH CY<br>DE EE EL<br>DK EE EL<br>FI FR HU<br>IE IT IS LI HU IE IT IS<br>LU LV MT MT NO PL<br>NO PL SE RS SI | CH EL<br>DE EL<br>FI FR HU<br>IE IT IS LI HU IE IT IS<br>LU LV MT MT NO PL<br>NO PL SE RS SI | CH EL<br>DE EL<br>FI FR HU<br>IE IT IS LI HU IE IT IS<br>LU LV MT MT NO PL<br>NO PL SE RS SI | FR                 | ES<br>EL<br>LI<br>UK |    |
| Cost_Orientation   | LI LT    | PL      |  |  |   |  |  |  |   | SI  | AT   | AT  | ES  |   | AT   | ES   |  | ES   |                    |                      |    |
| Retail_minimas     | UK       | HR      | UK   |  |   | UK   |  |  |   |   |  |   |   |   |  |  |  |  |                    |                      |    |
| Benchmarking       |          |         |  | EE<br>LI LT LV<br>RO RS  |   |  |  |  |   |   |  |   |   |   |  |  |  |  |                    |                      |    |
| Others/Combination | AT<br>IE | DE      |  |  | AT<br>SK  | CZ   | AT<br>CZ   | LI<br>SK   | FR  | FR<br>SK  | CZ<br>DE<br>LU<br>SK   | CZ  | BE<br>CZ<br>NO<br>SK  | FR  | BE   | LU<br>SK   | LU<br>SK   | BE<br>IE<br>LU<br>SK   | BE<br>FR           | BE<br>FR             | BE |



Figure 68 – Ref Figure 13 - Price control sub category Cost Orientation

|                                  | M1_2007 | M2_2007                 | M1_2014_M3_2007   | M2_2014_M7_2007   | M3a_2014_M4_2007_UL   | M3a_2014_M4_2007_SL   | M3a_2014_M4_2007_SA   | M3a_2014_M4_2007_Termination segment (in line with definition of art. 61 (3)) | M3a_2014_M4_2007_Termination segment (point beyond the first concentration point art. 61 (3)) | M3a_2014_M4_2007_fiberLLU | M3a_2014_M4_2007_VULA (FTTC)     | M3a_2014_M4_2007_VULA (FTTH) | M3a_2014_M4_2007_DF                 | M3a_2014_M4_2007_DA                          | M3b_2014_Legacy   | M3b_2014_NGA (included FTTC/FWA)    | M3b_2014_FTH               | M4_2014_Active_Legacy                              | M4_2014_Active_NGA                           | M4_2014_Passive         | WLR            |
|----------------------------------|---------|-------------------------|---|---|---|---|---|---|---|---------------------------|----------------------------------|------------------------------|-------------------------------------|--|---|-------------------------------------|----------------------------|--|--|-------------------------|----------------|
| Cost orientation (main category) | LT      | DE ES FR HR IE IT LI PL | AT BE BG CH CY CZ DEDK EL ES FI FR HR HU IE IT LI LU MK MT NL NO PL RO RS SK UK | AT BE BG CH CY CZ DEDK EL ES FI FR HR HU IE IT LI LU MK MT NL NO PL RO RS SK UK | BE CH CY DEDK EL ES FI FR HR HU IE IT LI LU MK MT NL NO PL RS SE SI | CH CY DE EE EL DKEE EL FI FR HU IE IT LI LU MT NO PL SE       | BE CY DE EE EL DKEE EL FI FR HU IE IT LI LU MT NO PL RS SE SI | HR HU LT  | LT  | HR FI HR HU LT LV MT PL   | DE ES EL HR HU IE IT LI LV UK    | CY EL HR HU IT LT LV MK      | CZ DE HR HU IE IT LI LV MK PL RS SI | CH DE ES FR HR HU IE IT LI LV NO PL PT RS SI | BE CY DEDK EL ES FI FR HR HU IE IT LI LV NO PL PT RS SI | BE CY DE EE EL HR HU IE IT LI LV PL | DE ES EL HR HU IT LT LV PL | AT CH CY DE EE EL HR HU IE IT LI LV MT NL PT SI UK | AT CH CY DE EE EL HR HU IE IT LI LV PT SI UK | CH EL IE IT IS LT PL UK | ES FR IE IT PL |
| Cost orientation alone           | ES      | DE ES FR HR IE IT PL    | AT BE BG CH CY CZ DEDK EL ES FI FR HR HU IE IT LI LU MK MT NL NO PL RO RS SK UK | AT BE BG CH CY CZ DEDK EL ES FI FR HR HU IE IT LI LU MK MT NL NO PL RO RS SK UK | BE CH CY DE EE EL DKEE EL FI FR HU IE IT LI LV MT NO PL RS SE SI    | CH CY DE EE EL DKEE EL FI FR HU IE IT LI LV MT NO PL RS SE SI | BE CY DE EE EL DKEE EL FI FR HU IE IT LI LV MT NO PL RS SE SI | HR HU LT  | LT  | HR HU MT PL               | BE CY DE ES EL HR HU IE IT LT LV | CY EL HR HU IT LT LV         | CZ DE HR HU IT LT LV RS SI          | CH DE ES FR HR HU IE IT LT LV NO PL RS SI    | BE CY DE ES EL HR HU IE IT LT LV RS SI                  | BE CY DE ES EL HR HU IT LT LV PL    | HR HU IT LT LV PL          | CH CY DE EE EL HR HU IE IT LT LV MT                | AT CH CY DE EE EL HR HU IE IT LT LV SI       | CH EL IE IT IS LT PL    | ES PL          |
| Price cap alone                  |         | FR                      | LU NO SK UK   | LU NO SK UK   | FR NO SE UK   | FR NO SE UK   | FR NO SE UK   |   |   | DK FI                     | UK                               |                              | DK                                  | SK UK  | DK NO   |                                     | DK                         | IT NL UK   | UK   | UK                      | FR             |

Figure 69 – Ref Figure 14 - Price control sub category Retail minus

|                                     | M1_2007 | M2_2007 | M1_2014_M3_2007 | M2_2014_M7_2007 | M3a_2014_M4_2007_UL | M3a_2014_M4_2007_SL | M3a_2014_M4_2007_SA | M3a_2014_M4_2007_Termination segment (in line with definition of art. 61 (3)) | M3a_2014_M4_2007_Termination segment (point beyond the first concentration point art. 61 (3)) | M3a_2014_M4_2007_fiberLLU | M3a_2014_M4_2007_VULA (FTTC) | M3a_2014_M4_2007_VULA (FTTH) | M3a_2014_M4_2007_DF | M3a_2014_M4_2007_DA | M3b_2014_Legacy | M3b_2014_NGA (included FTTC/FWA) | M3b_2014_FTH | M4_2014_Active_Legacy | M4_2014_Active_NGA | M4_2014_Passive | WLR      |
|-------------------------------------|---------|---------|-----------------|-----------------|---------------------|---------------------|---------------------|---|---|---------------------------|------------------------------|------------------------------|---------------------|---------------------|-----------------|----------------------------------|--------------|-----------------------|--------------------|-----------------|----------|
| Retail minus (main category)        | HR UK   | UK      |                 |                 | UK                  |                     |                     |   | SI  | AT SI                     | AT ES MT SI                  |                              |                     | AT ES               |                 | ES                               |              |                       |                    |                 | EL HR UK |
| ex-ante retail tradition at MS test | HR      |         |                 |                 |                     |                     |                     |   |   |                           |                              |                              |                     |                     |                 |                                  |              |                       |                    |                 | HR LI    |
| ex-ante wholesale MS test           |         |         |                 |                 |                     |                     |                     |   |   |                           |                              |                              |                     |                     |                 |                                  |              |                       |                    |                 |          |
| ERT (Economic Replicability Test)   |         |         |                 |                 |                     |                     |                     |   | SI  | AT SI                     | AT ES MT SI                  |                              |                     | AT ES               |                 | ES                               |              |                       |                    |                 |          |
| Fair and reasonable pricing         | UK      | UK      |                 |                 | UK                  |                     |                     |   |   |                           |                              |                              |                     |                     |                 |                                  |              |                       |                    |                 | UK       |
| Retail minus                        |         |         |                 |                 |                     |                     |                     |   |   |                           |                              |                              |                     |                     |                 |                                  |              |                       |                    |                 |          |

Figure 70 – Ref Figure 15 - Price control sub category Benchmarking

|  | M1_2007 | M2_2007 | M1_2014_M3_2007_7 | M2_2014_M7_2007_7 | M3a_2014_M4_2007_UL | M3a_2014_M4_2007_SL | M3a_2014_M4_2007_SA | M3a_2014_M4_2007_Terminating segment (in line with definition of art. 61 (3)) | M3a_2014_M4_2007_Terminating segment (point beyond the first concentration point art. 61 (3)) | M3a_2014_M4_2007_fiber_LU | M3a_2014_M4_2007_VULA (FTTC) | M3a_2014_M4_2007_VULA (FTTH) | M3a_2014_M4_2007_DF | M3a_2014_M4_2007_DA | M3b_2014_Legacy | M3b_2014_NGA (included FTTC/FWA) | M3b_2014_FTH | M4_2014_Active_Legacy | M4_2014_Active_NGA | M4_2014_Passive | WLR |
|--|---------|---------|-------------------|-------------------|---------------------|---------------------|---------------------|---|---|---------------------------|------------------------------|------------------------------|---------------------|---------------------|-----------------|----------------------------------|--------------|-----------------------|--------------------|-----------------|-----|
| Benchmarking (main category)   |         |         | EE IS LT LV       | EE LT LV          |                     |                     |                     |   |   |                           |                              |                              |                     |                     |                 |                                  |              |                       |                    |                 |     |
| Benchmarking in compliance with Recommendation of 13 Sept 2013 (Access market)                   |         |         | LV                | LV                |                     |                     |                     |   |   |                           |                              |                              |                     |                     |                 |                                  |              |                       |                    |                 |     |
| Benchmarking in compliance with Recommendation of Termination Rates Recommendation of 7 May 2009 |         |         | LT                | LT RO RS          |                     |                     |                     |   |   |                           |                              |                              |                     |                     |                 |                                  |              |                       |                    |                 |     |

Figure 71 – Ref Figure 16 – Cost base used

|     | M1_2007 | M2_2007  | M1_2014_M3_2007_7  | M2_2014_M7_2007_7  | M3a_2014_M4_2007_UL  | M3a_2014_M4_2007_SL  | M3a_2014_M4_2007_SA  | M3a_2014_M4_2007_Terminating segment (in line with definition of art. 61 (3)) | M3a_2014_M4_2007_Terminating segment (point beyond the first concentration point art. 61 (3)) | M3a_2014_M4_2007_fiber_LU  | M3a_2014_M4_2007_VULA (FTTC)   | M3a_2014_M4_2007_VULA (FTTH)   | M3a_2014_M4_2007_DF  | M3a_2014_M4_2007_DA  | M3b_2014_Legacy  | M3b_2014_NGA (included FTTC/FWA)   | M3b_2014_FTH   | M4_2014_Active_Legacy  | M4_2014_Active_NGA   | M4_2014_Passive  | WLR  |
|-----|---------|----------|--|--|--|--|--|---|---|--|--|--|--|--|--|--|--|--|--|--|--|
| CCA |         |          | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK    | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK                    | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK | AT BE BG CH CY CZ DE DK EL ES FI FR HR HU IE IT LT LU MT NO PL RS SE SI UK |
| HCA | HR LT   | IE LI PL | IE LI NL PL  | IE IS NL   | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  | IS LI MT NO   | IS LI MT NO   | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  | IS LI MT NO  |

Figure 72 – Ref Figure 17 – Annualisation methods

|                                     | M1_2007 | M2_2007              | M1_2014_M3_2007_7    | M2_2014_M7_2007_7    | M3a_2014_M4_2007_UL  | M3a_2014_M4_2007_SL  | M3a_2014_M4_2007_SA  | M3a_2014_M4_2007_Terminating segment (in line with definition of art. 61 (3)) | M3a_2014_M4_2007_Terminating segment (point beyond the first concentration point art. 61 (3)) | M3a_2014_M4_2007_fiber_LU | M3a_2014_M4_2007_VULA (FTTC) | M3a_2014_M4_2007_VULA (FTTH) | M3a_2014_M4_2007_DF  | M3a_2014_M4_2007_DA  | M3b_2014_Legacy      | M3b_2014_NGA (included FTTC/FWA) | M3b_2014_FTH         | M4_2014_Active_Legacy | M4_2014_Active_NGA   | M4_2014_Passive      | WLR                  |
|-------------------------------------|---------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---|---|---------------------------|------------------------------|------------------------------|----------------------|----------------------|----------------------|----------------------------------|----------------------|-----------------------|----------------------|----------------------|----------------------|
| Straight-line (linear depreciation) | LI      | ES LI                | EL FI RS             | FI                   | CY EE LI RS          | CY EE LI RS          | CY EE LI RS          | CY EE LI RS   | CY EE LI RS   | CY EE LI RS               | CY EE LI RS                  | CY EE LI RS                  | CY EE LI RS          | CY EE LI RS          | CY EE LI RS          | CY EE LI RS                      | CY EE LI RS          | CY EE LI RS           | CY EE LI RS          | CY EE LI RS          | CY EE LI RS          |
| Annuity                             |         | DE                   | CY DE                | CY DE                | DE IT IS             | DE IT IS             | DE IT IS             | DE IT IS  | DE IT IS  | DE IT IS                  | DE IT IS                     | DE IT IS                     | DE IT IS             | DE IT IS             | DE IT IS             | DE IT IS                         | DE IT IS             | DE IT IS              | DE IT IS             | DE IT IS             | DE IT IS             |
| Tilted annuity                      |         | FR HR IE IT PL       | BG CH CZ DK          | BG CH CZ DK          | BE CH CZ DK          | BE CH CZ DK          | BE CH CZ DK          | BE CH CZ DK   | BE CH CZ DK   | BE CH CZ DK               | BE CH CZ DK                  | BE CH CZ DK                  | BE CH CZ DK          | BE CH CZ DK          | BE CH CZ DK          | BE CH CZ DK                      | BE CH CZ DK          | BE CH CZ DK           | BE CH CZ DK          | BE CH CZ DK          | BE CH CZ DK          |
| Economic depreciation               |         | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK  | AT BE ES HU NL NO UK  | AT BE ES HU NL NO UK      | AT BE ES HU NL NO UK         | AT BE ES HU NL NO UK         | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK             | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK  | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK | AT BE ES HU NL NO UK |
| RAV (Regulatory Asset Value)        | LT      |                      |                      | LT                   | LT                   | LT                   | LT                   | LT  | LT  | LT                        | LT                           | LT                           | LT                   | LT                   | LT                   | LT                               | LT                   | LT                    | LT                   | LT                   | LT                   |



Figure 73 – Ref Figure 18 – Cost Allocation methods

|         | M1_2007 | M2_2007  | M1_2014_M3_2007 | M2_2014_M7_2007 | M3a_2014_M4_2007_UL  | M3a_2014_M4_2007_SL  | M3a_2014_M4_2007_SA  | M3a_2014_M4_2007_Terminating segment (in line with definition of art. 61 (3))                      | M3a_2014_M4_2007_Terminating segment (point beyond the first concentration point art. 61 (3)) | M3a_2014_M4_2007_fiberLU | M3a_2014_M4_2007_VULA (FTTC) | M3a_2014_M4_2007_VULA (FTTH) | M3a_2014_M4_2007_DF | M3a_2014_M4_2007_DA              | M3b_2014_Legacy                  | M3b_2014_NGA (included FTTC/FWA) | M3b_2014_FTH                     | M4_2014_Active_Legacy            | M4_2014_Active_NGA               | M4_2014_Passive                  | WLR                              |
|---------|---------|----------|-----------------|-----------------|--|--|--|--|---|--------------------------|------------------------------|------------------------------|---------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| FDC     | HR LT   | FR PL    | ES LI<br>FR PL  | FI PL<br>IS     | FI LT<br>IS LV<br>MT PT<br>RS UK   | EE LT<br>IS LV<br>MT PT<br>RS UK   | EE LT<br>IS LV<br>MT PT<br>RS UK   | EE LT<br>IS LV<br>MT PT<br>RS UK   | ES LT   | EE LT<br>IS LV<br>MT PT  | IS LT<br>LV UK               | LT LV                        | LT LV<br>RS         | EE LT<br>IS LV<br>MT PT<br>RS UK | EE LT<br>IS LV<br>MT PT<br>RS UK | EE LT<br>IS LV<br>MT PT<br>RS UK | EE LT<br>IS LV<br>MT PT<br>RS UK | ES LT<br>IS LV<br>MT PT<br>RS UK | AT LT<br>IS LV<br>MT PT<br>RS UK | AT LT<br>IS LV<br>MT PT<br>RS UK | EL LT<br>IS LV<br>MT PT<br>RS UK |
| LR_A_IC |         | HR IE IT | CH              | CH              | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>RO SK<br>UK | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>SE SK<br>UK | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>SE SK<br>UK | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>SE SK<br>UK | HR  | HR                       | DK HR<br>PL                  | BE EL<br>HR IE IT            | DE HR<br>IT PL      | BE CH<br>DE IT<br>PL             | BE CH<br>DE IT<br>PL             | BE CH<br>DE IT<br>PL             | BE CH<br>DE IT<br>PL             | DK HR<br>IT PL                   | CH DE<br>EL HR                   | BE CH<br>DE EL<br>FR HR          | CH EL<br>IT                      |
| LRIC    |         | DE       | DE              | DE              | DE   | DE   | DE   | DE   | HU  | HU                       | FI<br>HU SI                  | CY<br>HU SI                  | CY<br>HU SI         | CZ<br>HU MK<br>SI                | HU<br>MK SI                      | ES<br>HU SI                      | CY<br>HU                         | ES<br>HU                         | CY<br>LU SI                      | CY<br>LU SI                      |                                  |

Figure 74 – Ref Figure 19 – Allocation methods LR(A)IC sub categories

|                         | M1_2007 | M2_2007  | M1_2014_M3_2007 | M2_2014_M7_2007 | M3a_2014_M4_2007_UL  | M3a_2014_M4_2007_SL  | M3a_2014_M4_2007_SA  | M3a_2014_M4_2007_Terminating segment (in line with definition of art. 61 (3))                      | M3a_2014_M4_2007_Terminating segment (point beyond the first concentration point art. 61 (3)) | M3a_2014_M4_2007_fiberLU | M3a_2014_M4_2007_VULA (FTTC) | M3a_2014_M4_2007_VULA (FTTH) | M3a_2014_M4_2007_DF | M3a_2014_M4_2007_DA  | M3b_2014_Legacy      | M3b_2014_NGA (included FTTC/FWA) | M3b_2014_FTH         | M4_2014_Active_Legacy | M4_2014_Active_NGA | M4_2014_Passive         | WLR         |
|-------------------------|---------|----------|-----------------|-----------------|--|--|--|--|---|--------------------------|------------------------------|------------------------------|---------------------|----------------------|----------------------|----------------------------------|----------------------|-----------------------|--------------------|-------------------------|-------------|
| LR_A_IC (main category) |         | HR IE IT | CH              | CH              | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>RO SK<br>UK | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>SE SK<br>UK | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>SE SK<br>UK | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>SE SK<br>UK | HR  | HR                       | DK HR<br>PL                  | BE EL<br>HR IE IT            | DE HR<br>IT PL      | BE CH<br>DE IT<br>PL | BE CH<br>DE IT<br>PL | BE CH<br>DE IT<br>PL             | BE CH<br>DE IT<br>PL | DK HR<br>IT PL        | CH DE<br>EL HR     | BE CH<br>DE EL<br>FR HR | CH EL<br>IT |
| TD-LR(A)IC*             |         | HR       |                 |                 | DE<br>HR PL  | DE<br>PL   | PL   |  |   | PL                       | DE                           |                              | DE<br>PL            | DE<br>PL             | DE<br>PL             | DE<br>PL                         | DE<br>PL             | PL                    | DE                 | DE<br>IT                |             |
| BU-LR(A)IC*             |         | EL<br>IT | CH              | CH              | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>RO SK<br>UK | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>SE SK<br>UK | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>SE SK<br>UK | AT BE BG<br>CH CZ DE<br>DK EL ES<br>FR HR HU<br>IE IT LT<br>LU MK<br>MT NL<br>NO PL<br>SE SK<br>UK | HR  | HR                       | DK HR<br>PL                  | BE EL<br>HR IE IT            | DE HR<br>IT PL      | BE CH<br>DE IT<br>PL | BE CH<br>DE IT<br>PL | BE CH<br>DE IT<br>PL             | BE CH<br>DE IT<br>PL | DK HR<br>IT PL        | CH DE<br>EL HR     | BE CH<br>DE EL<br>FR HR | CH EL<br>IT |

Figure 75 – Ref Figure 20 – Allocation methods LRIC sub categories

[illegible]

Figure 76 – Ref Figure 22 – Combination price control / costing methodologies (M1 and M2)

|                        | M1 2007 |                       | M2 2007 |                       | M1_2014_M3_2007 |                       | M2_2014_M7_2007 |                       |
|------------------------|---------|-----------------------|---------|-----------------------|-----------------|-----------------------|-----------------|-----------------------|
|                        | BU      | TD/accounting methods | BU      | TD/accounting methods | BU              | TD/accounting methods | BU              | TD/accounting methods |
| Cost orientation alone | 0 (0)   | 0 (1)                 | 2 (3)   | 4 (4)                 | 14 (14)         | 1 (1)                 | 14 (14)         | 1 (0)                 |
| Price cap              | 0 (0)   | 2 (2)                 | 1 (1)   | 1 (1)                 | 7 (8)           | 0 (0)                 | 6 (7)           | 0 (1)                 |

Figure 77 – Ref Figure 23 – Combination price control / costing methodologies (M3a)

|                        | M3a_2014_M4_2007_ULL |                       | M3a_2014_M4_2007_SLU |                       | M3a_2014_M4_2007_SA |                       | M3a_2014_M4_2007_fiberLLU |                       | M3a_2014_M4_2007_VULA (FTTC) |                       | M3a_2014_M4_2007_VULA (FTTH) |                       | M3a_2014_M4_2007_DF |                       | M3a_2014_M4_2007_DA |                       |
|------------------------|----------------------|-----------------------|----------------------|-----------------------|---------------------|-----------------------|---------------------------|-----------------------|------------------------------|-----------------------|------------------------------|-----------------------|---------------------|-----------------------|---------------------|-----------------------|
|                        | BU                   | TD/accounting methods | BU                   | TD/accounting methods | BU                  | TD/accounting methods | BU                        | TD/accounting methods | BU                           | TD/accounting methods | BU                           | TD/accounting methods | BU                  | TD/accounting methods | BU                  | TD/accounting methods |
| Cost orientation alone | 7 (7)                | 7 (6)                 | 4 (4)                | 6 (5)                 | 4 (5)               | 6 (5)                 | 2 (3)                     | 3 (3)                 | 5 (3)                        | 4 (3)                 | 4 (3)                        | 3 (2)                 | 4 (3)               | 5 (3)                 | 4 (3)               | 10 (6)                |
| Price cap              | 4 (3)                | 3 (3)                 | 3 (1)                | 1 (1)                 | 1 (1)               | 3 (3)                 | 2 (1)                     | 0 (1)                 | 0 (0)                        | 0 (1)                 | 0 (0)                        | 1 (0)                 | 1 (1)               | 0 (0)                 | 1 (2)               | 1 (2)                 |
| ERT                    | 0 (0)                | 0 (0)                 | 0 (0)                | 0 (0)                 | 0 (0)               | 0 (0)                 | 0 (0)                     | 1 (1)                 | 0 (0)                        | 1 (1)                 | 1 (1)                        | 1 (1)                 | 0 (0)               | 0 (0)                 | 0 (0)               | 0 (0)                 |

Figure 78 – Ref Figure 25 – Combination price control / costing methodologies LLU service

|   |  | Dial 1 | Dial 2 | Dial 3 | Dial 4 |
|---|--|--------|--------|--------|--------|
| 1 | Cost orientation alone/BU-LR(A)IC/LRIC/CCA | 1      | 4      | 2      | 2      |
| 2 | Cost orientation alone/TD-LR(A)IC/LRIC/CCA |        | 1      | 1      |        |
| 3 | Cost orientation alone/FDC/CCA             | 2      |        | 1      | 1      |
| 4 | Cost orientation alone/FDC/HCA             | 1      | 2      |        |        |
| 5 | Price cap/BU-LR(A)IC/LRIC/CCA              |        | 1      |        | 3      |
| 6 | Price cap/TD-LR(A)IC/LRIC/CCA              | 1      |        |        |        |
| 7 | Price cap/pure LRIC/CCA                    |        |        |        |        |
| 8 | Price cap/FDC/CCA                          |        |        |        | 1      |
| 9 | No price control/regulation                |        |        | 2      | 3      |

Figure 79 – Ref Figure 26 – Combination price control / costing methodologies VULA FTTC /VULA FTTH/Fibre LLU

|   |   | Dial 1 | Dial 2 | Dial 3 | Dial 4 |
|---|---|--------|--------|--------|--------|
| 1 | Cost orientation alone/BU-LR(A)IC/LRIC/CCA            | 4      |        | 2      | 1      |
| 2 | Cost orientation alone/TD-LR(A)IC/LRIC/CCA            |        |        | 1      |        |
| 3 | Cost orientation alone/FDC/CCA                        |        | 1      |        |        |
| 4 | Cost orientation alone/FDC/HCA                        |        | 2      |        |        |
| 5 | Price cap/BU-LR(A)IC/LRIC/CCA                         |        |        |        | 1      |
| 6 | Price cap/FDC/CCA                                     |        | 1      |        |        |
| 7 | ERT (Economic Replicability Test)/BU-LR(A)IC/LRIC/CCA | 1      | 1      | 1      | 2      |
| 8 | No regulation   | 1      | 1      | 1      | 5      |

Figure 80 – Ref Figure 27 – Combination price control / costing methods (M3b and 4)

|                        | M3b_2014_Access_legacy |       | M3b_2014_backhaul |       | M4_2014_Active_Legacy |       | M4_2014_Active_NGA |       | M4_2014_Passive |       |
|------------------------|------------------------|-------|-------------------|-------|-----------------------|-------|--------------------|-------|-----------------|-------|
|                        | BU                     | TD    | BU                | TD    | BU                    | TD    | BU                 | TD    | BU              | TD    |
| Cost orientation alone | 4 (4)                  | 6 (7) | 2 (2)             | 5 (4) | 3 (2)                 | 6 (6) | 2 (1)              | 6 (6) | 2 (2)           | 4 (3) |
| Price cap              | 1 (1)                  | 1 (1) | 0 (0)             | 0 (0) | 1 (1)                 | 3 (4) | 1 (1)              | 2 (2) | 0 (0)           | 1 (0) |
| ERT                    | 1 (1)                  | 0 (0) | 0 (0)             | 0 (0) | 0 (0)                 | 0 (0) | 0 (0)              | 0 (0) | 0 (0)           | 0 (0) |