Body of European Regulators for Electronic Communications

BEREC

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BEREC Report
Regulatory Accounting in Practice 2014

26 September 2014

1. Executive summary

This is the tenth annual report in a series summarising the findings of a detailed survey of regulatory accounting frameworks across Europe. The information has been gathered from National Regulatory Authorities (NRAs) and covers the implementation of regulatory cost accounting methodologies, which include allocation as well as annualisation methodologies[1], systems and processes.

These regulatory accounting frameworks provide NRAs with financial information essential to facilitate some of their significant regulatory decisions such as setting price controls, monitoring compliance with *ex ante* obligations (such as cost orientation of charges and non-discrimination) and informing market reviews.

The document provides an up-to-date factual report on the regulatory accounting frameworks implemented by NRAs and an assessment of the level of consistency achieved. The report sets out an overview of the regulatory accounting frameworks updated to April 2014 and also illustrates, where possible, trends and comparisons with data collected each year, starting from 2006.

The report develops a deeper analysis that concentrates on the following four key wholesale markets: Wholesale Line Rental (WLR), Unbundled Access (M4), Broadband Access (M5) and Leased Lines Terminating Segments (M6). Moreover an analysis is given of the cost base and allocation methodologies used for fixed (M3) and mobile (M7) termination markets.

Furthermore, as in last year's report, to emphasise factors influencing NRAs regulatory strategy, additional structural data (e.g. population, market structure, infrastructure) have been collected from NRAs. Not surprisingly, considerable differences in the market/competitive situation as well as infrastructure in place can be observed between (and within) the responding countries reflecting different external and technical requirements which NRAs need to take into account.

The report also looks at annualisation methodologies provided by respondent NRAs. As in last year's report, accounting information for some products in market 4, such as copper access (including LLU, SA, SLU), fibre access (LLU, VULA), dark fibre access and duct access have been analysed.

Moreover, this year the Report includes the two following additional themes:

[1] The Report is more precise with regard to the "labelling" of the areas covered, however this does not imply a change of the cost (accounting) methodologies covered, i.e. continuity of the time series is ensured.

- an overview of the implementation of the Recommendation 2013/466/EU on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment of 11 September 2013 with regard to costing methodologies;
- a section on the actual implementation of the Termination Rates Recommendation 2009/396/EC of 7 May 2009.

Key findings

The overall picture 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), cost base (current cost accounting – CCA) and allocation methodologies (mainly long run incremental costs (LR(A)IC) with fully distributed costs (FDC) preferred only in a few – mainly retail – markets). The degree of consistent application of methodologies continues to be high and accommodates the use of elements or parameters that reflect national circumstances. These findings reflect the primary cost base or allocation methodology selected by an NRA but do not bring out situations where an NRA would strengthen its financial analysis by comparing outcomes from one principal methodology with alternative approaches such as comparing bottom-up models with top-down or incurred costs. For all markets except Market 1 the combination of CCA and (FL) LR(A)IC is the most favoured approach, in particular this combination is preferred in the termination markets (Market 3 and Market 7), where the LRIC approach often takes the form of pure LRIC to comply with the Recommendation 2009/396/EC on termination rates.

The analysis over time of the key wholesale markets – Unbundled Access (Market 4), Broadband Access (Market 5) and Leased Lines Terminating Segment (Market 6) – has shown a clear preference for cost orientation, a trend towards CCA and a fairly even distribution of LRIC and FDC accounting methods. Slightly different results are observed for the Wholesale Line Rental, where retail minus is the favoured price control method, HCA (historical cost accounting) and CCA are used quite in the same proportion and FDC is clearly the preferred choice of allocation methodology.

Taking into account the information detailed for different products in market 4, it results that cost orientation is the preferred price control method for all products under analysis, together with CCA as cost base. As far as the allocation methodology is concerned, LR(A)IC is prevailing for copper access, while for duct access products a clear preference in favour of FDC is observed.

Overall the 2014 data confirms the trend towards an increasingly consistent approach to regulatory accounting obligation among NRAs. We see signs of stabilisation in the application of particular methods for cost valuation or cost allocation by NRAs. The latter indicates that NRAs are providing predictable and stable regulatory environments in their countries.

Future development

Good progress has been made in developing effective regulatory accounting frameworks to meet the needs of NRAs. However, this is a complex and highly technical topic which requires regular maintenance and enhanced implementation of the regulatory accounting framework as competition develops, technology improves and new regulatory challenges emerge.

2. Introduction

2.1 Background

The BEREC Regulatory Accounting EWG has been gathering and reporting data from National Regulatory Authorities (NRAs) with the aim of describing how regulatory accounting systems are implemented in Member States with respect to cost-orientation or non-discrimination obligations or to assist price control decisions. This is the tenth annual report summarising the results of this survey.

The report has been updated since 2005 in order to monitor the level and trend in harmonisation of regulatory accounting systems across Europe over time.[2] By the end of the first quarter 2006 several countries had completed the first round of their market reviews, therefore it was possible to start evaluating how various Member States implemented the obligations provided for by articles 10, 11 and 13 of the Access Directive (for wholesale markets), by article 17 of the Universal Service Directive (for retail markets) and the principles contained in the new European Commission Recommendation on Cost Accounting and Accounting Separation of September 2005.[3] The previous years' reports showed a clear trend towards an increasingly consistent approach to regulatory accounting obligation among BEREC countries. This trend is further confirmed by the 2014 data, though with signs of stabilising at a high level of applying particular methods for cost valuation or cost allocation. The latter indicates that NRAs are providing predictable and stable regulatory environments in their countries.

2.2 Current report

This report provides an update on the status of regulatory accounting systems across Europe. It monitors how regulatory accounting methods and models have been developed as a consequence of the adoption by NRAs of decisions regarding market analyses. This year's

[2] - 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.

[3] 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. The Commission has worked on a new recommendation covering "Costing methodologies for key wholesale access prices". BEREC has provided detailed input to the public consultation, cf. Document BoR (11) 65. Furthermore it has submitted the BEREC Opinion on the draft recommendation on non-discrimination and costing methodologies on March 26th 2013, cf. Document BoR (13) 41. The Commission has published the new "Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment (2013/466/EU)" (C(2013) 5761) on 11 September 2013.

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 33 authorities (listed in Annex 1) with most NRAs responding to the majority of the questions, thus providing a solid base for further analysis.

The information provided in this report refers to those markets for which the market analyses are either concluded or under consultation. The report reflects, therefore, also measures which are planned to be implemented by the end of 2014, although the final decisions may still be subject to further consultations and may therefore still be part of the next market analysis rounds.

2.3 The data collection process

NRAs can, in principle, use a variety of objective and appropriate regulatory accounting methodologies depending on their market analysis[4], however NRAs should aim at following regulatory best practice.

In order to obtain a general view of cost accounting systems across Europe, the Regulatory Accounting EWG has collected a broad range of data since 2005, including, *inter alia*, a comparison between the cost-base (e.g. historical cost versus current cost) and the allocation methodology (e.g. fully distributed cost – FDC – or long run incremental cost – LRIC) chosen by different NRAs.

Such data, providing a valuable source of information, form a database, which is an informal data exchange tool among NRAs.[5] It includes the following information:

- cost base;
- accounting system/allocation methodology;
- price control method;
- auditing process;
- WACC calculation methodology; and
- remedies imposed on Significant Market Power (SMP) operators.

In order to improve data comparability the following pre-defined options were included in the data request:

[4] For an exhaustive 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.

[5] The database contains confidential information and therefore is not published.

For the Cost base:

- *HCA Family (Historical Cost Accounting)*
- *CCA Family (Current Cost Accounting and Forward Looking – Current Cost Accounting)*
- *Other cost base methodologies that do not appear in the above definitions*

For the Accounting System / Cost Model[6]:

- *LRIC, LRAIC (Long Run Incremental costs, Long Run Average Incremental costs)*
- *FDC (Fully Distributed Costs)*

For the Price control method:

- *Cost orientation (alone)*
- *Price Cap (alone)*
- *Retail Minus*
- *Cost orientation and Price cap*
- *Benchmarking*
- *Benchmarking in compliance with Recommendation of 11 Sept 2013*
- *Other price control methods that do not appear in the above definition.*

Besides the above mentioned data, countries have provided further information regarding the approach used to develop cost models (e.g. Top-Down (TD) or Bottom-Up (BU).

Data for other markets not listed in the 2007 EC Recommendation[7] on relevant markets as susceptible to *ex ante* regulation are also collected.

Finally, in order to simplify the data presentation and also to respect the confidentiality request made by some NRAs for certain data, this report, as in the previous years, does not present and comment all the data collected. The report concentrates on the markets listed in the 2007 Recommendation, which are typically subject to regulatory accounting remedies.

[6] According to Recommendation 2005/698/EC "*The purpose of imposing an obligation to implement a cost accounting system is to ensure that fair, objective and transparent criteria are followed by notified operators in allocating their costs to services in situations where they are subject to obligations for price controls or cost-oriented prices.*"

[7] Recommendation 2007/879/EC.

3. Outline of the Results

3.1 A snapshot of 2014 regulatory accounting data for markets listed in 2007 EC Recommendation

The information collected for the Regulatory Accounting Report has been referred, until last year's data collection, to the 18 markets listed in the Recommendation 2003/311/EC. This Recommendation was substituted by a new Recommendation (2007/879/EC) in December 2007 which, following the evolution observed in electronic communication markets over recent years, revised the list of relevant markets of the previous one and reduced the number of markets susceptible to *ex ante* regulation.

Seven markets are now identified, one at the retail level[8] and the other six at the wholesale level (Appendix A.5).[9]

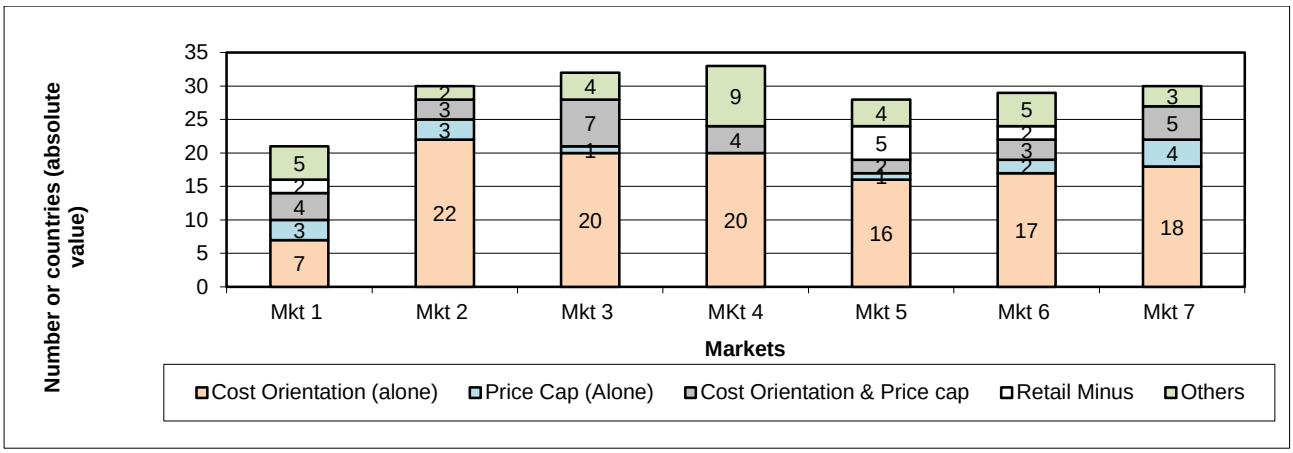
The following figures show a snapshot of the "Price control method", the "Cost base" (incl. the "Annualisation methodology") and the "Allocation methodology" used in the year 2014 for regulating the markets listed in the Recommendation (2007/879/EC), which the Commission is currently reviewing.

In this regard it has to be noted that the 2009 framework that had to be transposed by Member States until 25 May 2011 did not bring much changes with regard to Art. 13 and Art. 11 Access Directive (2002/19/EC).

[8] Market 1: "*Access to the public telephone network at a fixed location for residential and non-residential customers*" (Markets 1 and 2 of 2003/311/EC Recommendation).

[9] Market 2: "*Call origination on the public telephone network provided at a fixed location*" (Market 8 of 2003/311/EC Recommendation) ; Market 3: "*Call termination on individual public telephone networks provided at a fixed location*" (Markets 9 of 2003/311/EC Recommendation); Market 4: "*Wholesale network infrastructure access at a fixed location*" (Markets 11 of 2003/311/EC Recommendation); Market 5: "*Wholesale broadband access*" (Markets 12 of 2003/311/EC Recommendation); Market 6: "*Wholesale terminating segments of leased lines*" (Markets 13 of 2003/311/EC Recommendation) and Market 7: "*Voice call termination on individual mobile networks*" (Markets 16 of 2003/311/EC Recommendation).

Figure 1 – Price control method used in 2014 in the markets listed in Recommendation 2007/879/EC



Source: BEREC RA database 2014

In particular, the Figure above gives an overview of the price control methods used to regulate the markets listed in the EC 2007 Recommendation in the year 2014.[10] In order to better reflect the actual price control methods in particular markets, as in last year's Report, BEREC has streamlined the possible price control options.

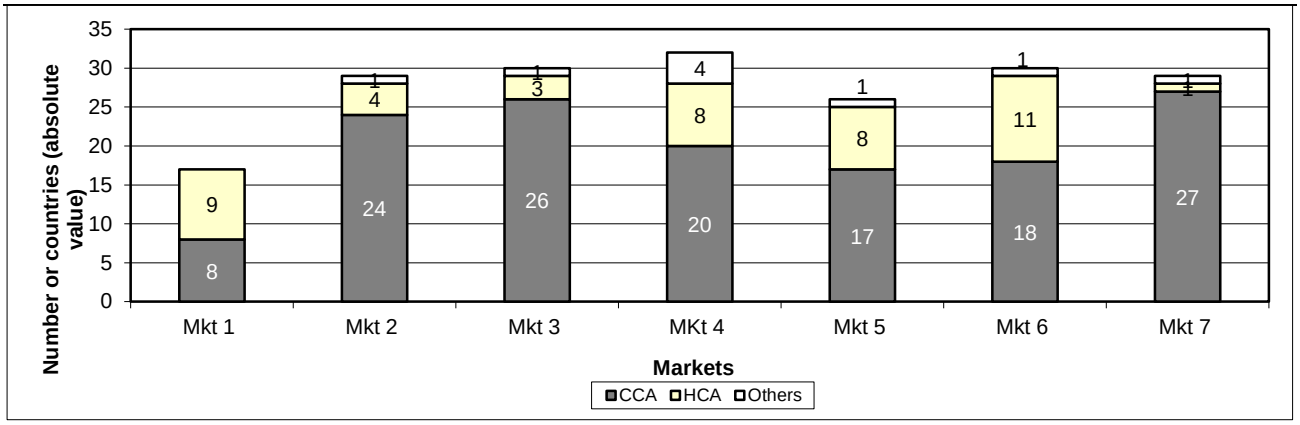
Figure 1 shows that cost orientation remains the most commonly used price control method in wholesale markets. In market 5 (Wholesale Broadband Access - WBA), the Retail Minus method is applied by five NRAs to set prices. Another common price control method used in wholesale markets is cost orientation accompanied by a price cap. The situation is different for retail markets where other methods are also used.

Compared to 2013 data, where "Benchmarking" was adopted by two NRAs in market 2, by three NRAs in market 3 and by six NRAs in market 7, in 2014 "Benchmarking" is applied by one NRA in market 2, by two NRAs in market 3 and by three NRAs in market 7.

As far as the cost base is concerned, Figure 2 shows that in 2014 CCA is again by far the most commonly used methodology for wholesale markets.

[10] In general the "Others" option also includes "Benchmarking" and "*ex-post* price control". For market 4, "Others" has also been used when the answers differ according to the different product of market 4 (see also Appendix A.3).

Figure 2 – Cost base used in 2014 in the markets listed in Recommendation 2007/879/EC

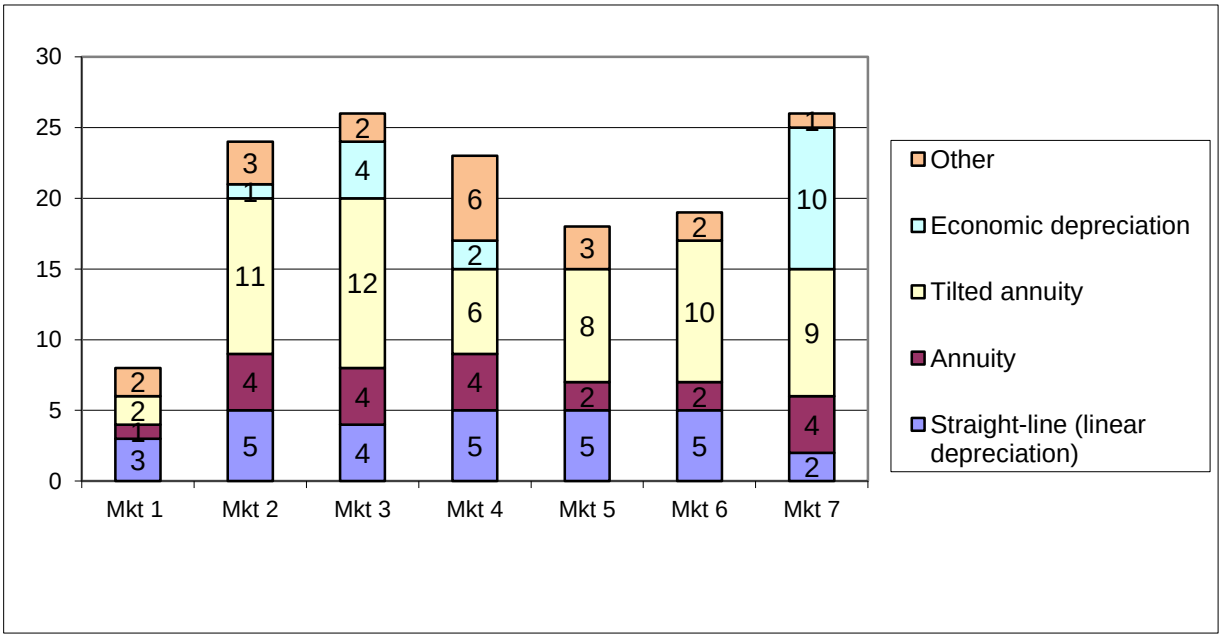


Source: BEREC RA database 2014

As last year NRAs were asked to provide information on the annualisation methodologies chosen when using CCA as cost base (Figure 3). NRAs were able to choose among different options.[11]

Considering those countries with no missing data for this variable, it can be observed that the most widespread annualisation methodology used by NRAs is, in general, the "tilted annuity", while for mobile termination market the "economic depreciation" is also recurrent among NRAs.

Figure 3 – Annualisation methodologies used in 2014 in the markets listed in Recommendation 2007/879/EC when CCA is the cost base



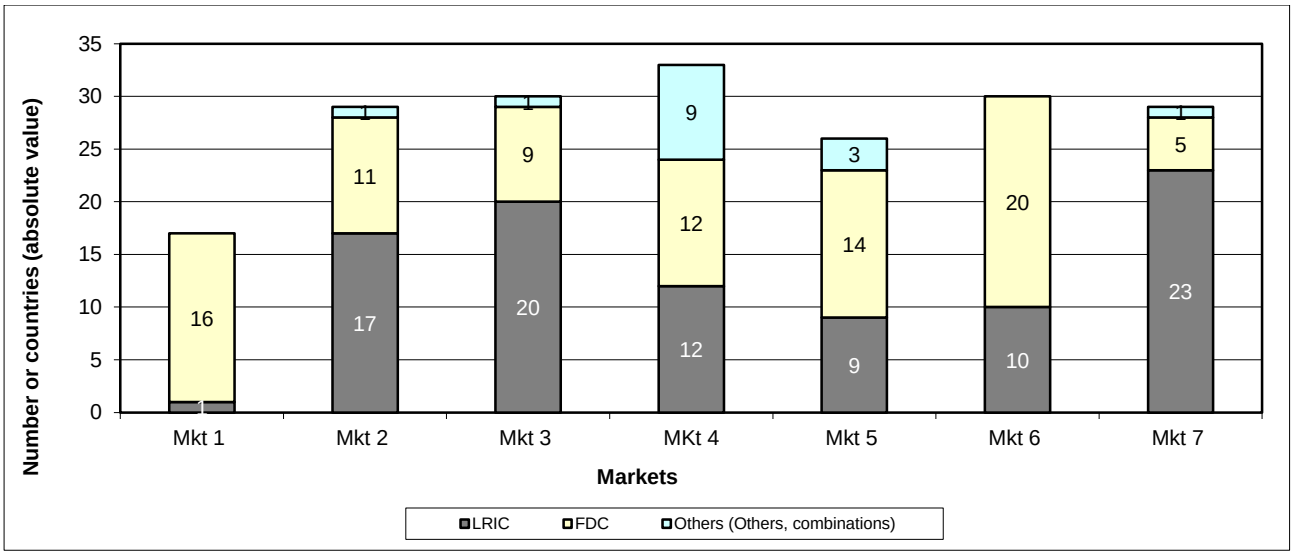
Source: BEREC RA database 2014

[11] For an explanation of the terms see the Glossary in Annex A.4.

NRAs were also required to give details on the treatment of fully depreciated assets. In general it can be said that in many countries fully depreciated assets are excluded from the cost base, since their value has already been recovered through past depreciation or because there is no mechanism to control whether there are depreciated assets in use by the SMP operator. Alternatively they have a zero value in the financial accounting system or are replaced by new assets. In one country the case of assets being fully depreciated does not occur since by applying CCA, gross replacement costs are used and the efficient asset base is re-valued with current prices and then written off.

Figure 4 below shows the allocation methodology used in the different markets. As in the case of the price control method a difference can be observed between retail and wholesale markets: while all respondent NRAs use FDC for retail markets (apart from one NRA declaring LRIC), they mainly use LRIC in wholesale markets (except markets 5 and 6). In particular for markets 3 and 7, pure LRIC is applied by eight (market 3) or ten (market 7) NRAs.

Figure 4 – Allocation methodology used in 2014 in the markets listed in Recommendation 2007/879/EC



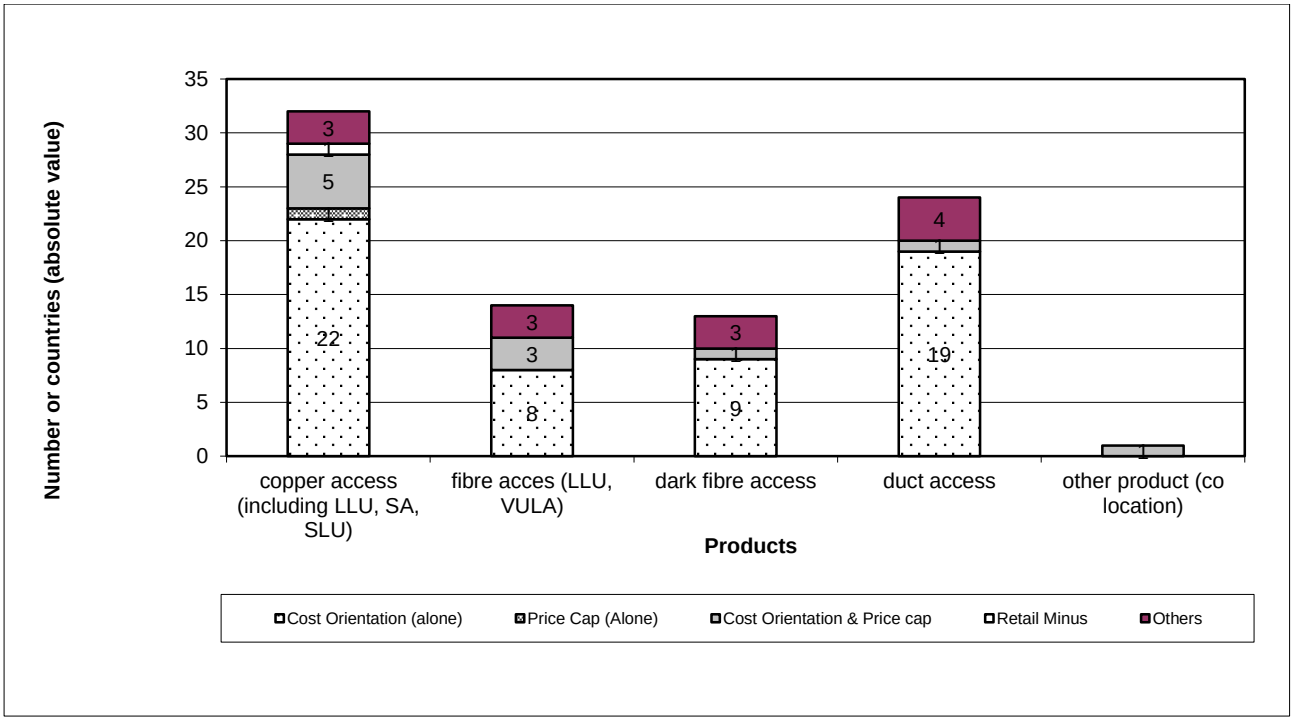
Source: BEREC RA database 2014

3.2 Focus on market 4

Also this year the data collection focused on important products in market 4: 1) copper access (including LLU, SA, SLU), 2) fibre access (LLU, VULA); 3) dark fibre access and 4) duct access.

NRAs were asked to detail the price control method, the cost base and the allocation methodology for the above products.[12] Taking into account only those countries with no missing data for the detailed products, cost orientation is the most commonly used price control method for all products. In some cases there is currently no price regulation for fibre access or dark fibre access or regulation is prohibited by law. Some NRAs specified that for dark fibre access and duct access the price is primarily subject to commercial negotiation. If negotiations are unsuccessful, the NRA intervenes and can decide on a cost-oriented price and reasonable conditions.

Figure 5 – Price control method declared in 2014 for some products in market 4

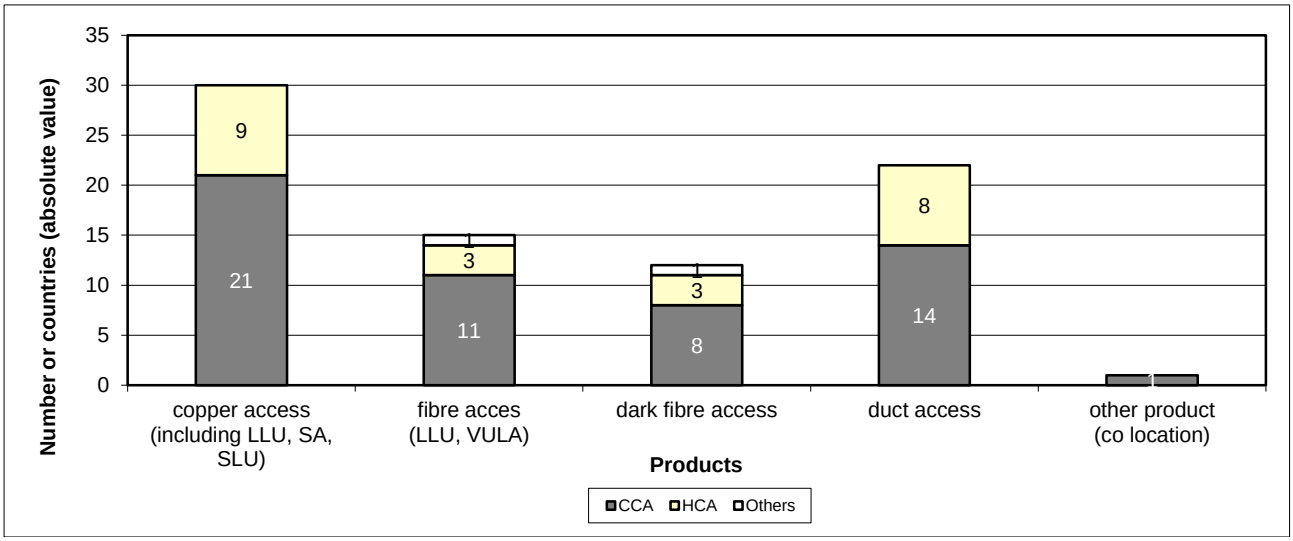


Source: BEREC RA database 2014

Figure 6 shows that the most commonly used methodology for all products in market 4 is CCA. HCA is also still in use for copper access and duct access.

[12] For one country all the answers of next three figures are referred to the co-location service. For one country it was specified that VUA (virtual unbundled access) is not included in market 4, but in market 5 and SA (shared access) is considered apart from other copper access products such as LLU and SLU.

Figure 6 – Cost base* declared in 2014 for some products in market 4

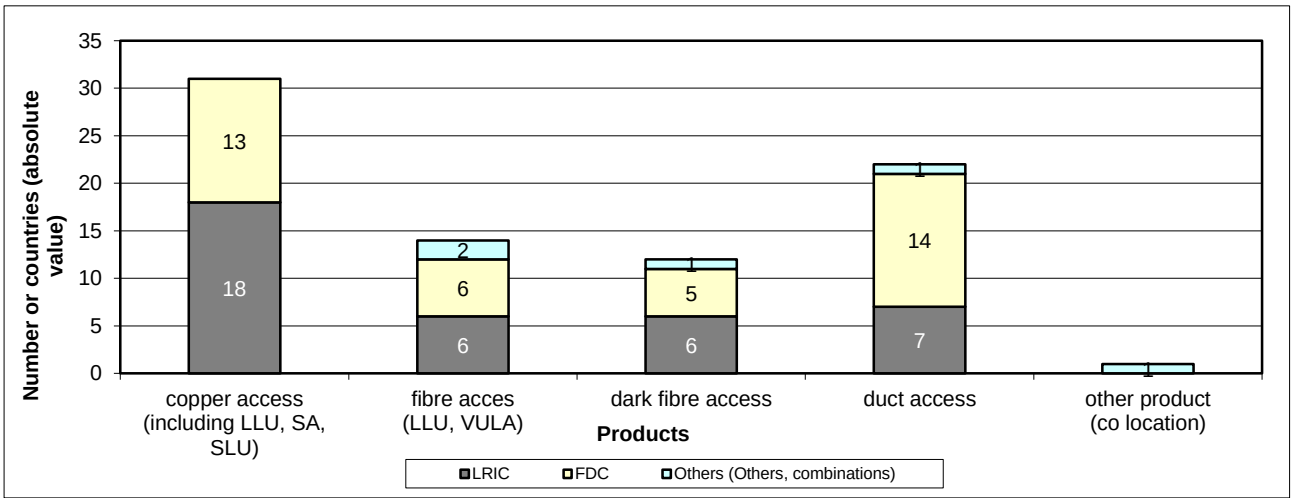


Source: BEREC RA database 2014

** Cost Base is referred to all asset base except legacy civil engineering.*

As far as the allocation methodology for different products in market 4 is concerned, data analysis shows that FDC is popular for duct access, LRIC is widespread for copper access, while for fibre access and dark fibre access LRIC and FDC are spread more or less in the same proportion.

Figure 7 – Allocation methodology declared in 2014 for some products in market 4



Source: BEREC RA database 2014

3.3 Markets outside the scope of 2007 EC Recommendation

In some countries, markets not listed in the 2007 EC Recommendation as susceptible to *ex ante* regulation, are still regulated, as NRAs assessed that they are not yet competitive.

NRAs declared to regulate in particular market 18 2003/311/EC Recommendation, followed by

market 3 and market 5 2003/311/EC Recommendation. A few NRAs impose remedies also on SMS termination that, as known, is not included in the old Recommendation.

3.4 Cost base, allocation methodology and price control method over time

While in the previous paragraphs a snapshot of the current situation (year 2014) in the various markets has been illustrated as far as price control, cost base, allocation methodology, annualisation methodologies and treatment of fully depreciated assets are concerned, the following paragraphs illustrate the development of regulatory accounting practices across Europe over time. To put it another way, the paragraphs illustrate the evolution of accounting and price control remedies over time, concentrating on WLR services and on the following three wholesale markets listed in the EC Recommendation as susceptible to *ex ante* regulation: Wholesale physical access network infrastructure (including shared of fully unbundled access) at a fixed location (market 4), Wholesale Broadband Access (market 5) and Wholesale terminating segments of leased lines (market 6).

In order to present a reliable trend analysis, data have only been included where respondent NRAs provided information for at least seven years. Therefore the number of countries analysed may vary[13] and differ from the number of countries taken into account in the previous paragraphs.

As far as the cost base and the allocation methodology are concerned, it is often the case that an NRA, when setting up its regulatory accounting framework for the fixed notified operator/s, will apply a consistent cost base and accounting methodology to all regulated fixed markets. In the following paragraphs it is therefore to be expected that those countries that moved for example from HCA to CCA, did that for all relevant markets.

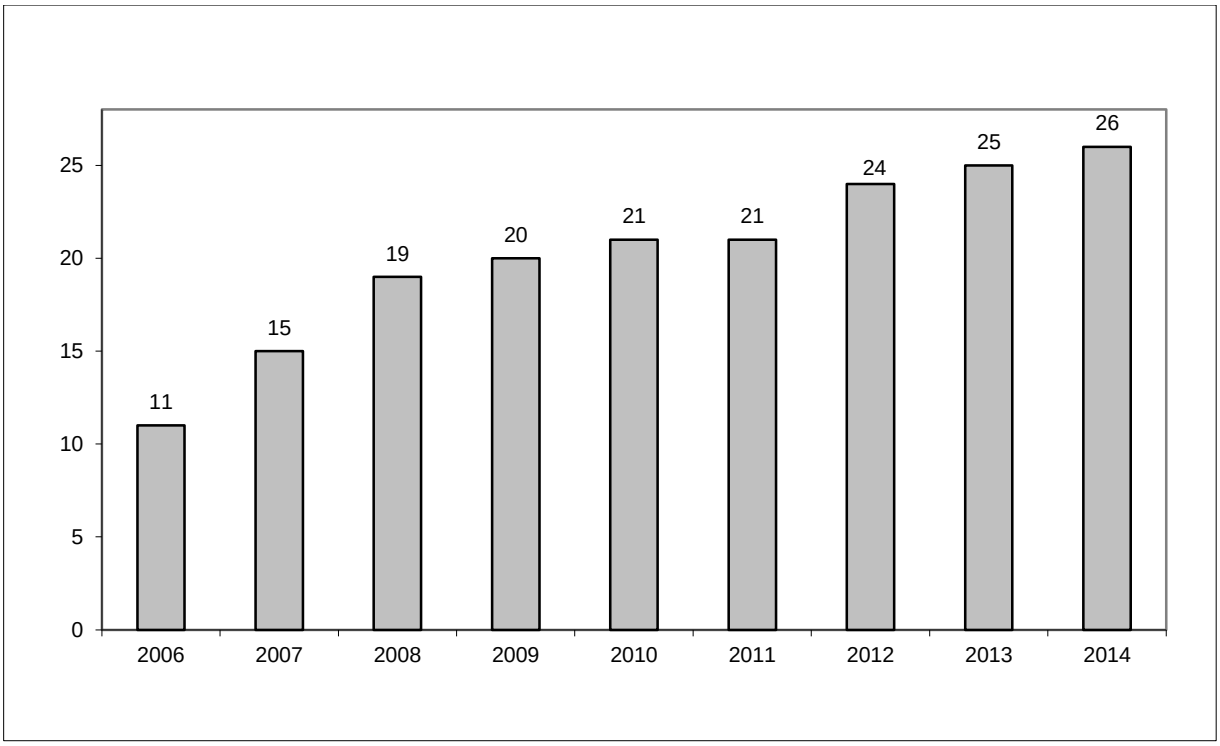
3.4.1 Wholesale Line Rental

Wholesale Line Rental services are those services enabling alternative operators to enter the retail narrowband access market without sustaining the high investments required by ULL services, hence bearing a lower risk. Moreover, the WLR obligation benefits final customers allowing them a larger choice among different access providers.

The number of countries in which the WLR obligation is in force has increased over time. In 11 countries, the WLR obligation has been in place since 2006, but the number more than doubled (20 countries) three years later. In 2014, 26 countries have a WLR offer (Figure 8).

[13]The actual number of countries considered is reported in the footnote below each figure.

Figure 8 – Number of Countries with WLR obligation by year



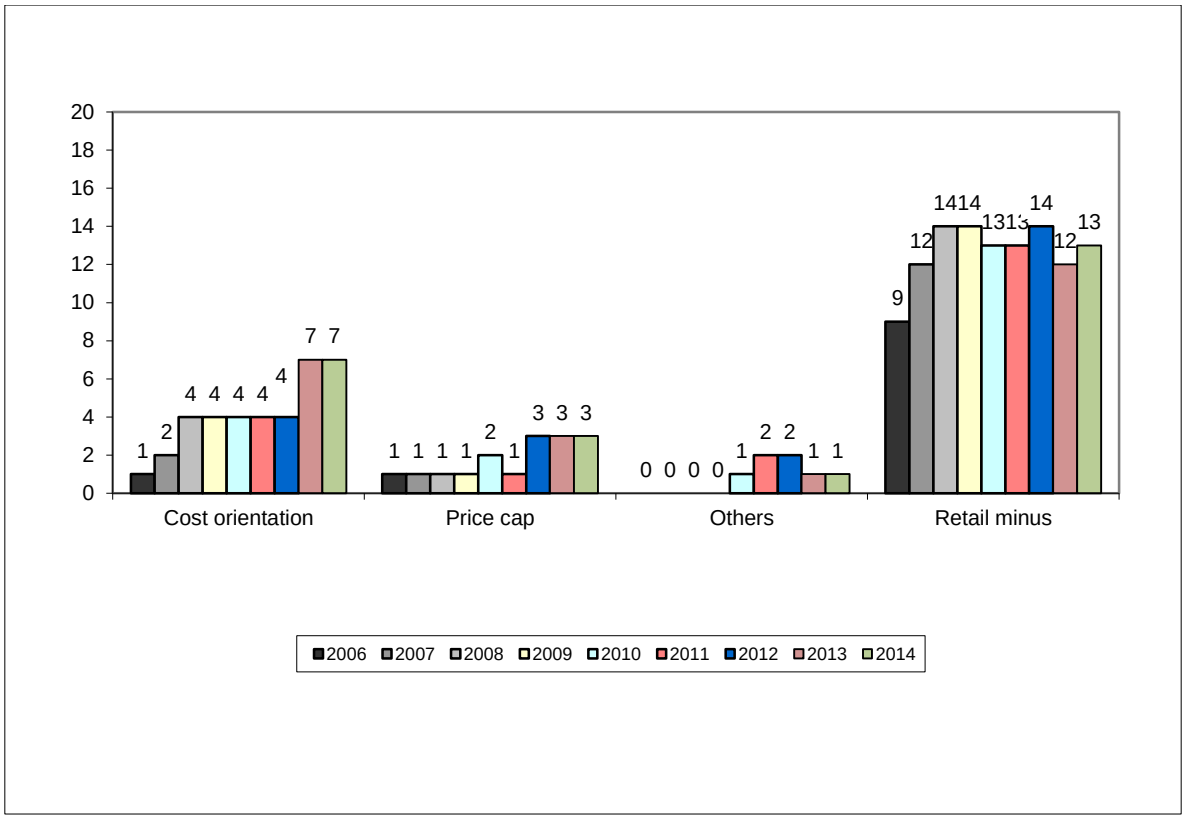
Source: BEREC RA database 2014
Number of countries: From 30 in 2006 to 33 in 2014.

Trend analysis:

Price control method

The most used price control method for WLR is retail minus, declared in 2014 by 13 NRAs out of 24. It was also the most common methodology in previous years (Figure 9). From 2013 to 2014, there were no changes in the price control method for WLR.

Figure 9 – Price Control Method for Wholesale Line Rental

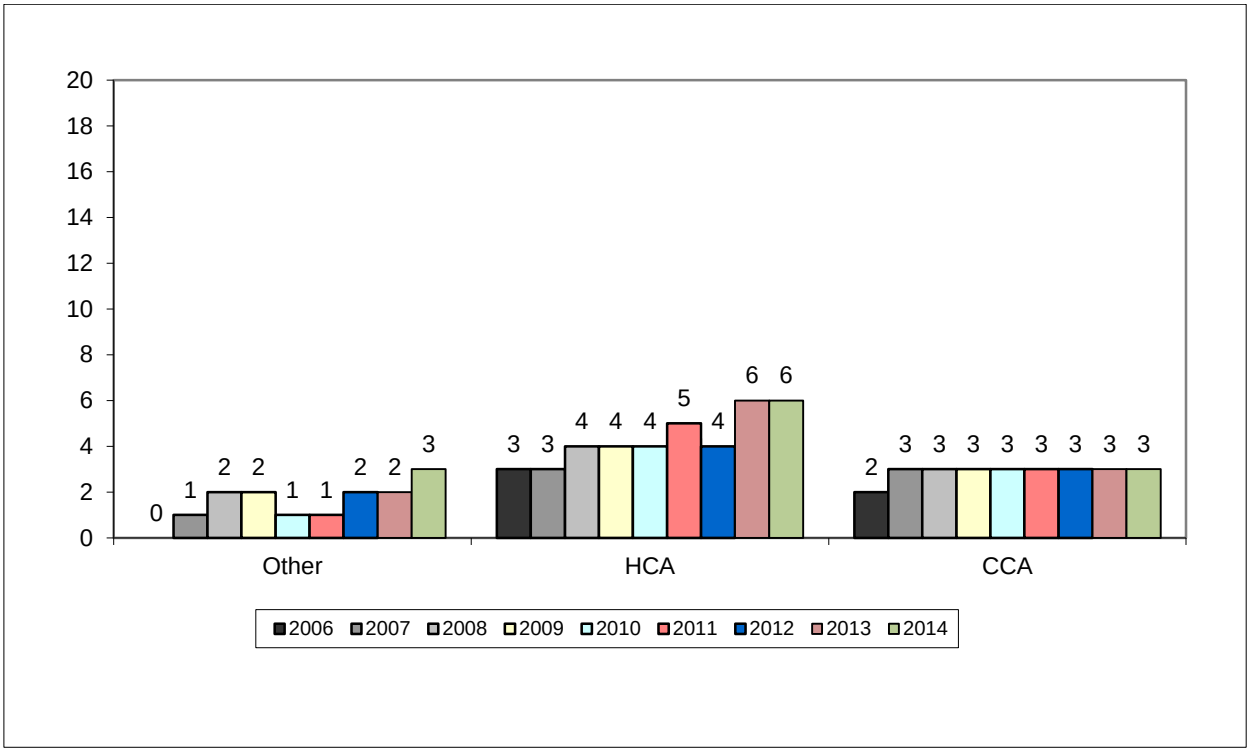


Source: BEREC RA database 2014
Number of countries: From 11 in 2006 to 24 in 2014.

Cost base

Taking into account only those NRAs declaring to impose the WLR obligation with retail minus as price control method, it can be observed that, as far as the cost base is concerned, the preferred cost base in 2014, as in previous years, is HCA, while the trend for CCA has remained stable (3 countries) since 2007 (Figure 10).

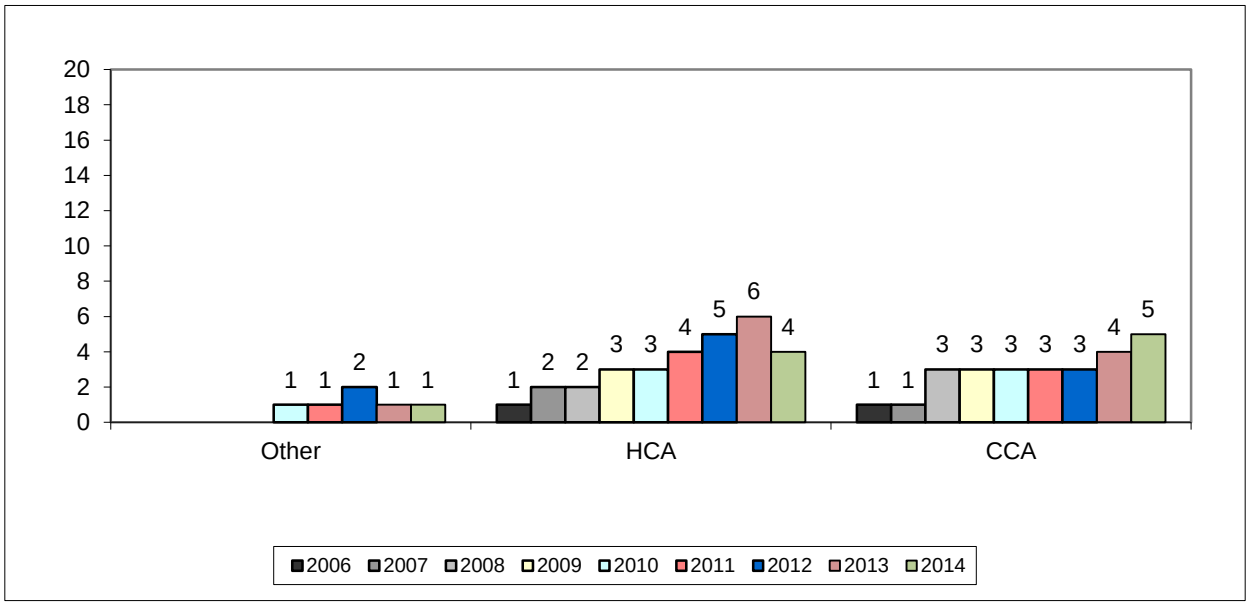
Figure 10 – Cost Base for Wholesale Line Rental for countries with Retail Minus as Price Control Method



Source: BEREC RA database 2014
Number of countries: From 9 in 2006 to maximum 14 in 2012. Missing countries for this variable vary between 1 and 5.

Considering only those NRAs declaring the remaining kinds of price control method (i.e. cost orientation, price cap and others) for the WLR obligation, it can be observed that HCA is the most recurrent cost base over time except for 2014 (Figure 11).

Figure 11 – Cost Base for Wholesale Line Rental for Countries with other kinds of Price Control Method

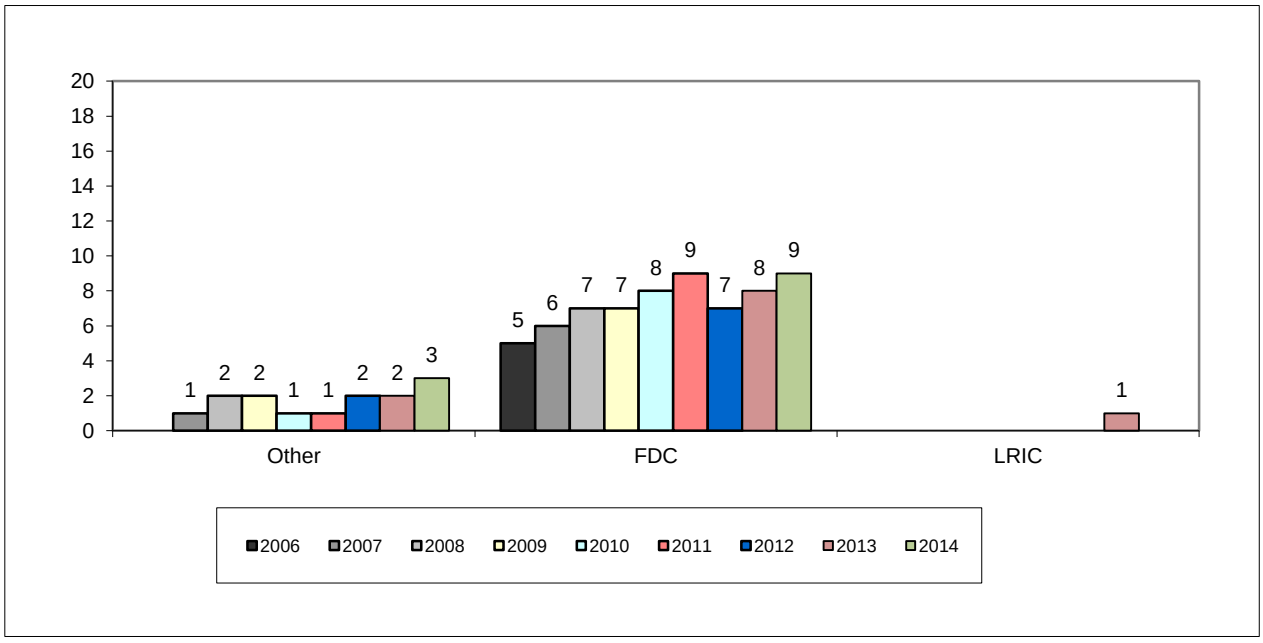


Source: BEREC RA database 2014
Number of countries: From 2 for 2006 to 10 for 2014. Missing countries for this variable vary between 1 and 3.

Allocation methodology

There is clear evidence that FDC is the preferred allocation methodology (Figure 12) for those countries with retail minus as price control method. As a matter of fact its use has increased since 2006. Other allocation methodologies have also been declared since 2007.

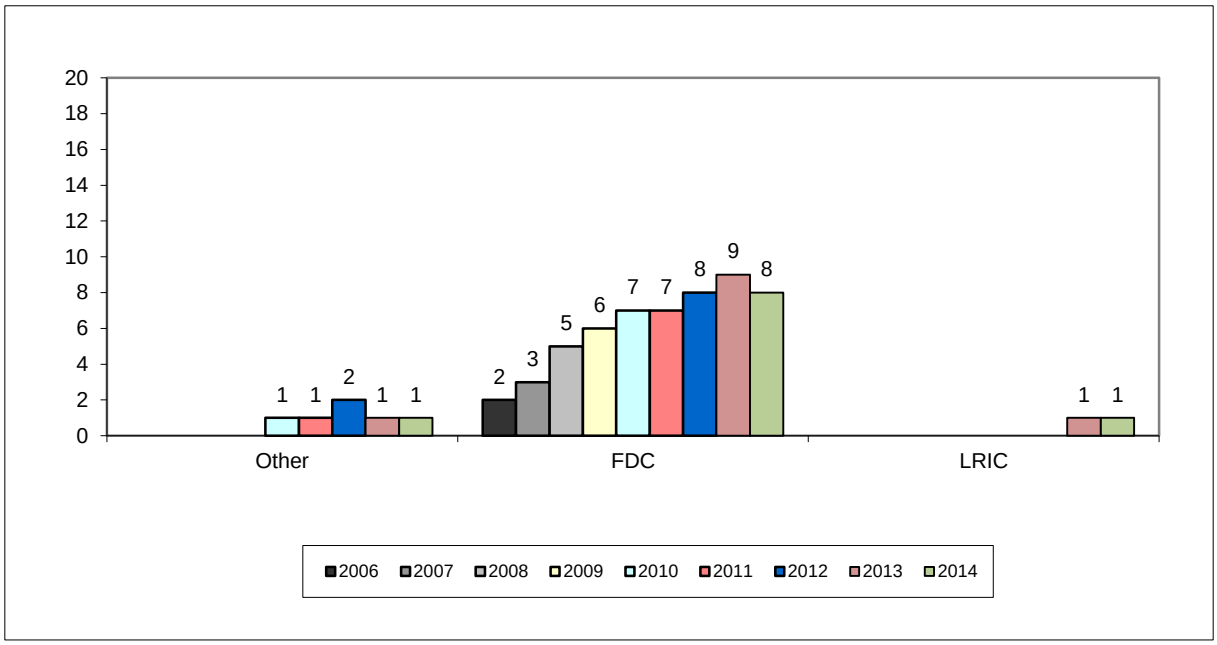
Figure 12 – Allocation Methodology for Wholesale Line Rental for countries with Retail Minus as Price Control Method



Source: BEREC RA database 2014
Number of countries: From 9 in 2006 to maximum 14 in 2012. Missing countries for this variable vary between 1 and 5.

Taking into account those NRAs declaring to impose the WLR obligation with other kinds of price control methods, it can be observed that also in this case FDC is the preferred allocation methodology and its use has increased over time until 2013 (Figure 13).

Figure 13 – Allocation Methodology for Wholesale Line Rental for countries with other types of Price Control Method



Source: BEREC RA database 2014
Number of countries: From 2 in 2006 to 11 in 2014.

<u>Key points for Wholesale Line Rental:</u> Retail minus is the preferred price control method for WLR, while FDC is the most popular allocation methodology. Moreover, the number of countries using HCA as cost base exceeds those using CCA (except in 2014).

3.4.2 Wholesale (physical) network infrastructure access at a fixed location (Market 4)

The 2007 EC Recommendation on relevant markets defines Market 4 as the market for "*wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location*".

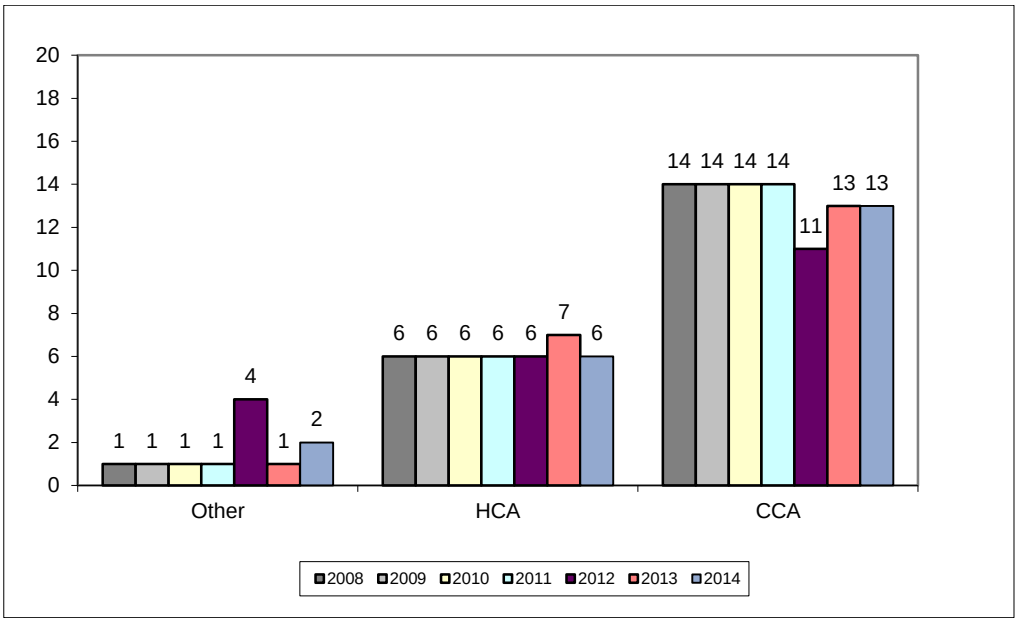
In this market all countries notified at least one operator. Typically the SMP operator is the national incumbent with the exception of two NRAs that defined sub-national geographic markets identifying the corresponding local incumbent operators as having SMP.

Trend analysis:

Cost base

CCA is the cost base declared by 20 NRAs taking part in the survey for year 2014 (see Figure 2). Unlike Figure 2, which is based on data for the countries that answered the 2014 BEREC questionnaire, the figure below gives an insight into how the choice of cost base has changed over time, taking into account only data provided by 21 NRAs each year since 2008. Figure 14 shows a quite stable and sustainable situation. In this market, CCA is by far the most commonly used cost base methodology and the number of countries using this method has remained stable since 2008, with a slight decrease in the last years. Also the number of countries using HCA has remained quite stable since 2008.[14]

Figure 14 – Cost Base for Wholesale physical network infrastructure access at a fixed location (Mkt 4)



Source: BEREC RA database 2014
Number of countries: 21

It is important to observe that the change of cost base (from HCA to CCA) is particularly relevant for this market. Unlike other markets, where a high percentage of total costs is represented by network equipment subject to technical progress, in the wholesale physical access network infrastructure at a fixed location market the highest percentage of costs is related to duct civil engineering which inherently has a very long economic life and is not subject to significant technological progress. Broadly speaking this may imply that the

[14] The change of two countries in 2012 to "other" is due to the treatment of data. In particular one country declared to use CCA to determine capital costs (depreciation and return on capital employed) and HCA for operational costs and has been treated as "other". Another country declared to use different cost base according to the different products in market 4 and has been treated as "other".
In 2014 two NRAs declared different cost base according to the different products for market 4 and their answers have been counted as "others".

expected reduction in real terms of asset values - which is normally observed in other markets when adopting a CCA approach mainly due to technical progress reducing equipment costs (e.g. routers are generally cheaper than switches)[15] - is not necessarily observed in the unbundled access market. Moreover, according to some observers, the use of CCA is likely to remain relevant in a time of roll-out of fibre access networks and could send better investment signals to promote infrastructure-based competition as well as investment in infrastructure. Finally, the effect of declining copper lines will impact on the level of costs.

It is worth noting that the 2013 Recommendation on consistent non-discrimination and costing methodologies (2013/466/EU) should further reinforce the changing from HCA to CCA for this market (except for the reusable legacy civil engineering assets which should be valued on the basis of the indexation method).

If these considerations are correct they may have an impact on all the other access services that use the same assets to provide ULL services.

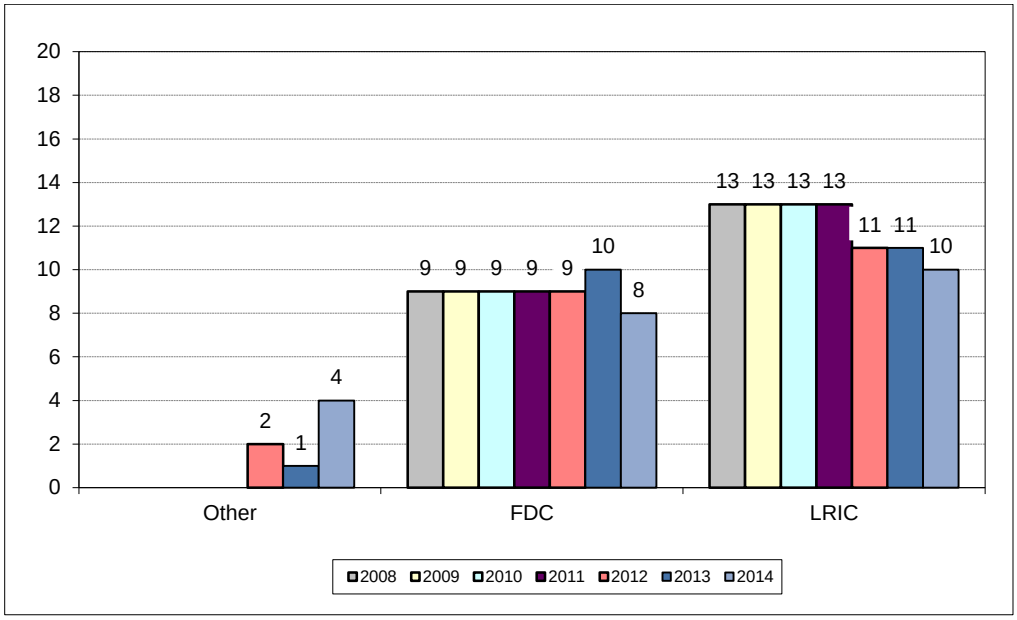
Generally speaking, countries still using HCA in this market use the same cost base for other fixed wholesale markets.

Allocation methodology

Figure 4 shows that LRIC and FDC seem to be used in similar proportions in market 4. Taking into account only those countries providing information since 2008 (which is less than the number of countries in Figure 4) an apparently stable and sustainable situation, starting from 2008, can be observed in Figure 15. It has to be noted that the number of countries using LRIC changed from 13 countries in 2011 to 11 in 2012 and the number has remained quite stable. A slight increase in the number of countries using FDC is observed in 2013, with a decrease in 2014.

[15] For the NGN core network it is generally acknowledged that NGN technology has produced cost savings to a considerable extent (cf. e.g. ERG IP-Interconnection Report 2007 and ERG Common Statement on Regulatory Principles of IP-IC/NGN Core – A work program towards a Common Position, ERG (08)26 – Oct 2008, pp. 21, pp. 82).

Figure 15 – Allocation Methodology for Wholesale physical network infrastructure access at a fixed location (Mkt 4)



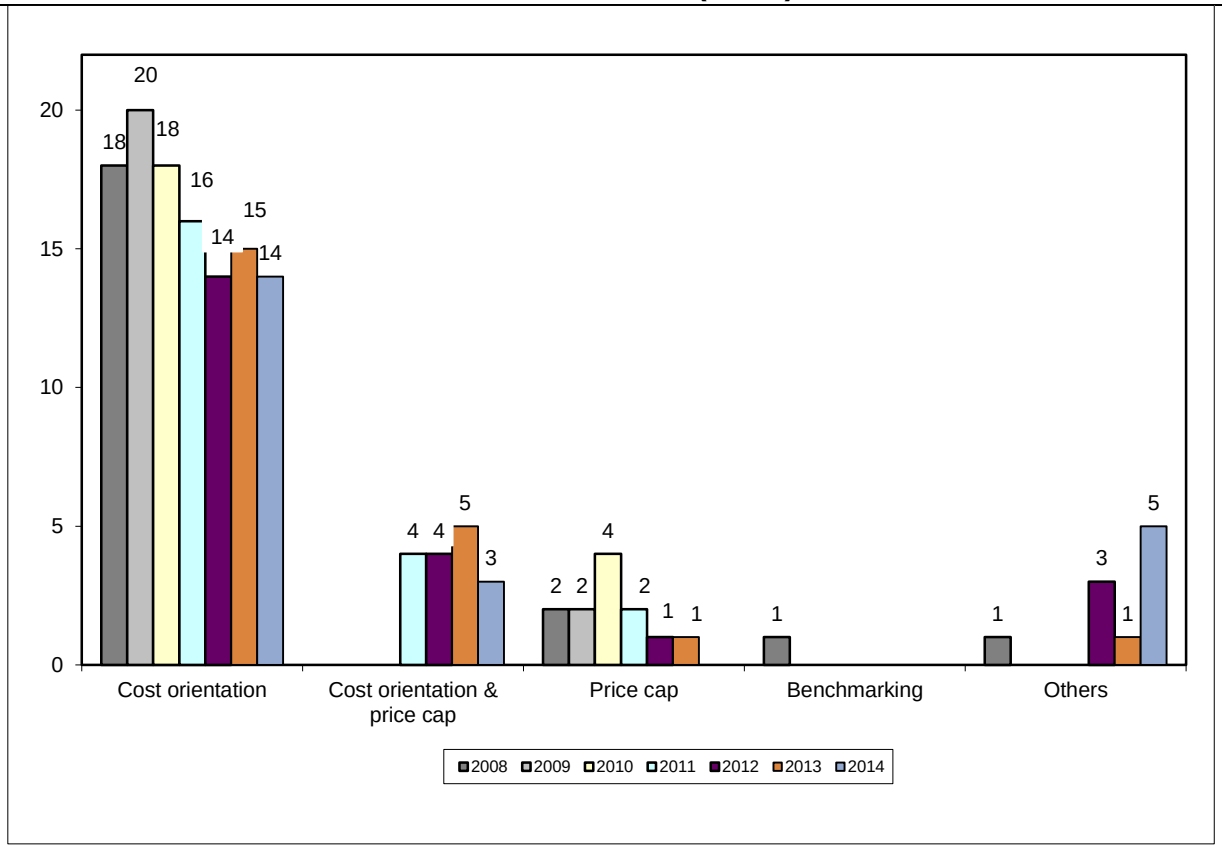
Source: BEREC RA database 2014
Number of countries: 22

Price control method

The most common price control method in 2014 in the Wholesale physical network infrastructure access at a fixed location market is by far cost orientation (Figure 1), which is declared by 24 NRAs (although for 4 NRAs it is combined with price cap).

Figure 16 provides a picture of how this method changed over time, taking into account 22 countries participating in the data collection since 2008. It can be observed that cost orientation alone or together with price cap is also the preferred price control method by NRAs over time.

Figure 16 – Price Control Method for Wholesale physical network infrastructure access at a fixed location (Mkt 4)



Source: BEREC RA database 2014
Number of countries: 22

<u>Key points for Market 4:</u> Over time CCA is the preferred cost base combined with LRIC as the allocation methodology and cost orientation as the price control method. This trend has been confirmed by the NGA Recommendation adopted in September 2010 and, in particular, the 2013 Recommendation on consistent non-discrimination and costing methodologies should reinforce this trend.

3.4.3 Wholesale broadband access (Market 5)

The 2007 EC Recommendation on relevant markets defines Market 5 as the market for *"wholesale broadband access"*.[16]

In this market all the analysed countries also notified at least one operator (typically the national incumbent) in the first and second rounds of market analysis, although in the fourth round of market analysis two NRAs defined sub-national geographic markets in which no operator had Significant Market Power.

[16]The Recommendation clarifies that "*This market comprises non-physical or virtual network access including 'bit-stream' access at a fixed location. This market is situated downstream from the physical access covered by market 4 listed above, in that wholesale broadband access can be constructed using this input combined with other elements*".

Trend analysis:

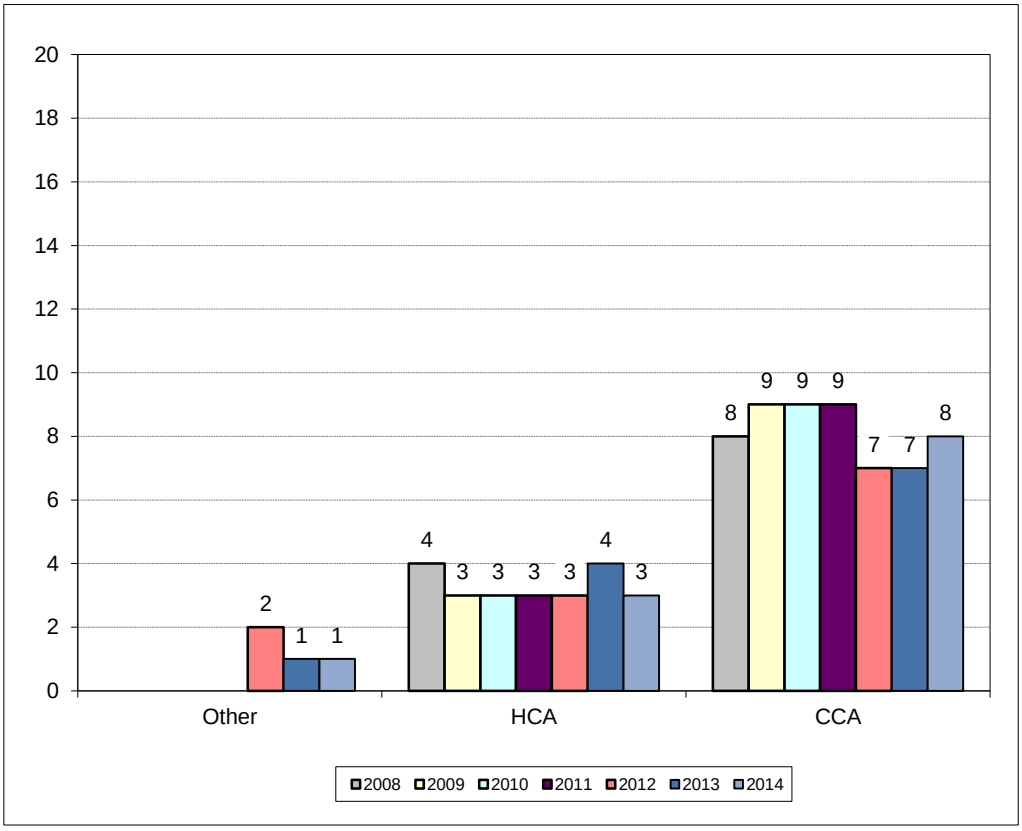
Cost base

Figure 17 shows data for 12 countries that have provided relevant information since 2008 and, as such, this is less than the number of countries in Figure 2.

The market for wholesale broadband access shows a similar trend to that of the unbundled local loop market in terms of the cost base used. Furthermore, it can be observed that CCA is by far the most commonly used cost base methodology, despite an observed decrease between 2011 and 2012. The HCA method has remained stable since 2009, with one NRA declaring to pass from CCA to HCA in 2013. However in 2014 one country passed from HCA to CCA.

This market is characterised by the prevailing use of network elements subject to rapid technological change, whose asset value in real terms can be expected to decrease over time using a CCA cost base.

Figure 17 – Cost Base for Wholesale Broadband Access (Mkt 5)



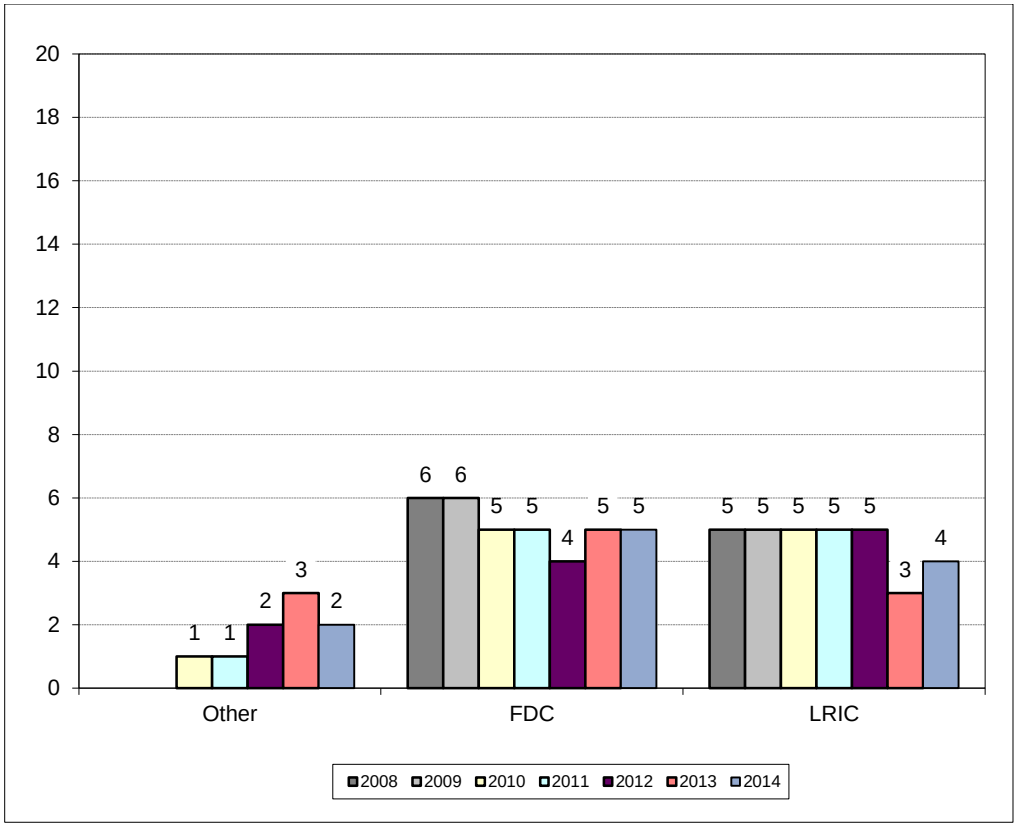
Source: BEREC RA database 2014
Number of countries: 12

Allocation methodology

Figure 18 shows the allocation methodology used in the wholesale broadband access market by 11 countries since 2008. It can be seen that the number of countries using FDC is stable

compared to last year (although it is the result of one change from “others” to “FDC” and one change from “FDC” to “LRIC”) while the number of countries using LRIC increased by one.

Figure 18 – Allocation Methodology for Wholesale Broadband Access (Mkt 5)

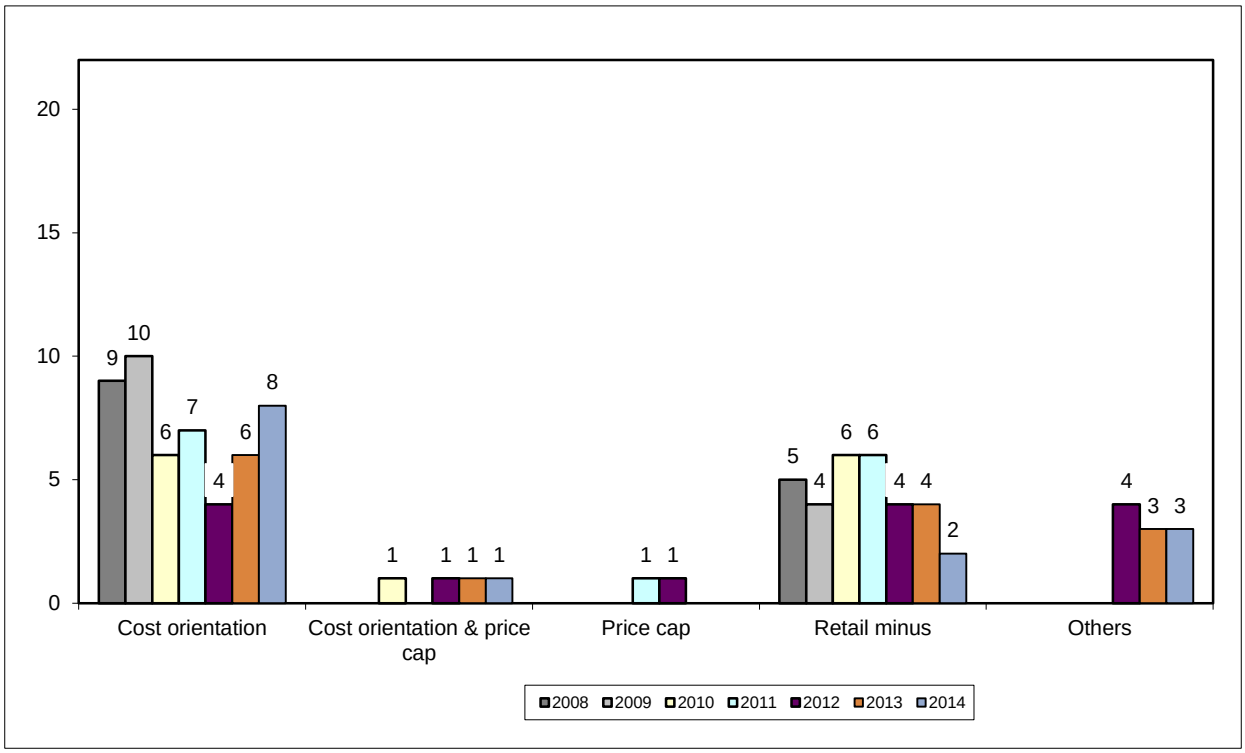


Source: BEREC RA database 2014
Number of countries: 11

Price control method

The most commonly used price control methods in 2014 in the wholesale broadband access market are cost orientation and retail minus (Figure 1), declared by 16 and 5 NRAs, respectively. However, taking into account 14 countries answering the questionnaire since 2008 (Figure 19), it becomes apparent that 2 countries changed to cost orientation in 2013 and 2 NRAs changed from retail minus to cost orientation in 2014.

Figure 19 – Price Control Method for Wholesale Broadband Access (Mkt 5)



Source: BEREC RA database 2014
Number of countries: 14. In 2010 the number of countries is 13 since for one NRA there is no price control obligation due to court ruling.

<u>Key points for Market 5:</u> CCA is, by far, the most common cost base over time. As far as the allocation methodology is concerned, the number of countries using LRIC is almost the same as those using FDC, while cost orientation is chosen as price control method.

3.4.4 Leased Lines Terminating Segment (Market 6)

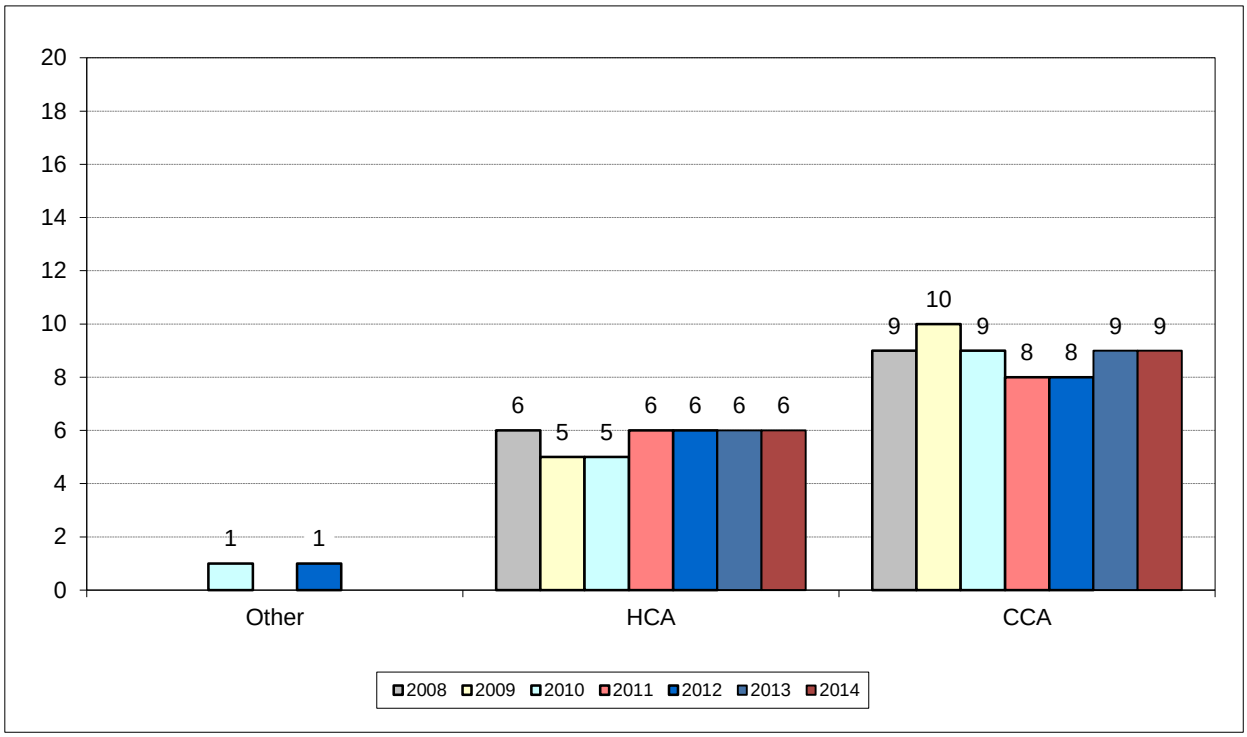
The 2007 EC Recommendation on relevant markets defines Market 6 as the market for "*Wholesale terminating segments of leased lines, irrespective of the technology used to provide leased or dedicated capacity*".

Trend analysis:

Cost base

Figure 20 shows the countries adopting CCA, HCA or a combination of other methodologies to set leased line charges for the terminating segments from 2008 to 2014. It could be said that in 2013 one NRA moved from other to CCA while the number of NRAs declaring to use HCA has remained stable over time. This picture has not changed in 2014.

Figure 20 – Cost Base for Leased Lines Terminating Segment (Mkt 6)



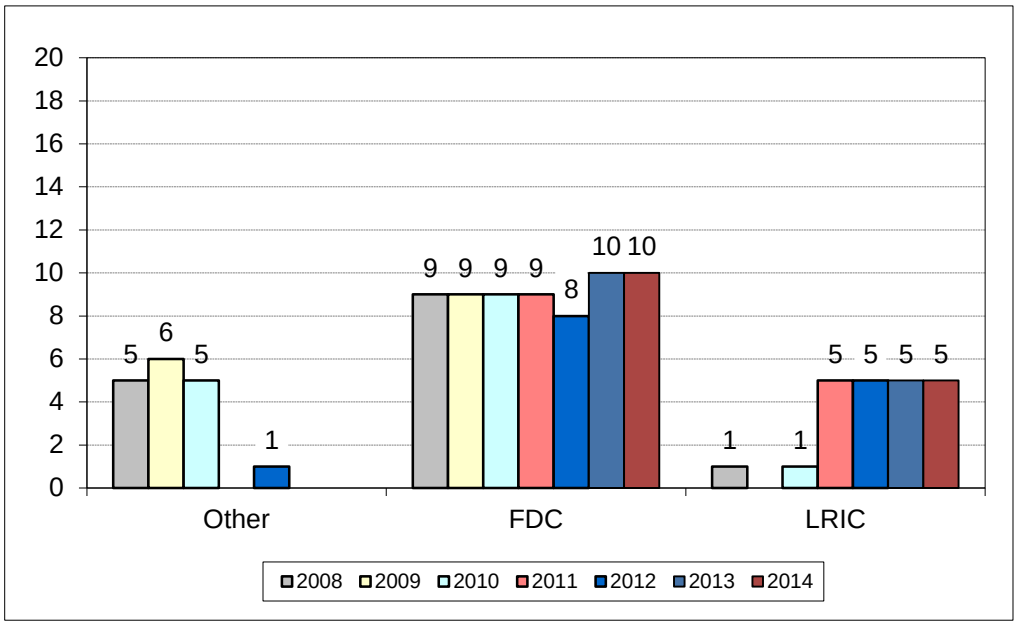
Source: BEREC RA database 2014
Number of countries: 15. One country not regulated in 2011.

Allocation methodology

Figure 21 shows the number of countries adopting LRIC, FDC or other mixed allocation methodologies in the leased line (LL) wholesale terminating segment for the seven year period under analysis.

The most common allocation methodology in the leased line wholesale terminating market for the countries observed since 2008 is FDC. At the same time, the number of countries using LRIC has remained stable since 2011.

Figure 21 – Allocation Methodology for Leased Lines Terminating Segment (Mkt 6)

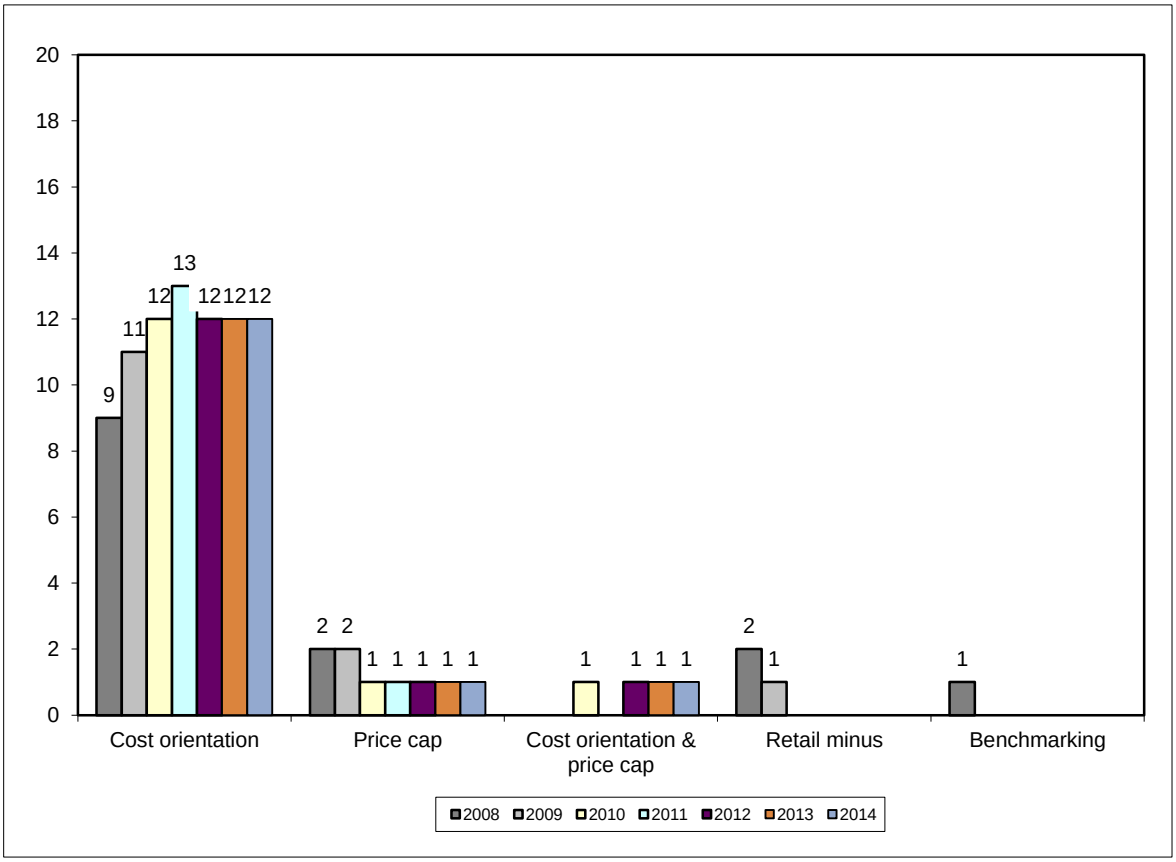


Source: BEREC RA database 2014
Number of countries: 15. One country not regulated in 2011 and another one with a draft decision in 2012.

Price control method

Taking into account the 14 countries whose data have been collected since 2008, it can be observed in Figure 22 that cost orientation increased in 2009 (from 9 to 11 countries) due to the change of 2 NRAs respectively from benchmarking and retail minus; therefore in 2009 retail minus disappeared from the 14 countries under observation. The trend for applying price cap has been stable since 2010. No changes in price control method are observed in 2014 for those NRAs considered.

Figure 22 – Price Control Method for Leased Lines Terminating Segment (Mkt 6)



Source: BEREC RA database 2014
Number of countries: 14

<u>Key points for Market 6:</u> FDC is the prevailing allocation methodology over time. Cost orientation is the recurrent price control methodology in this market both in the current year and over time. CCA is the preferred cost base.

3.4.5 Implementation of the EC Recommendation on non-discrimination and costing methodologies

This section gives an overview of the implementation of the "Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment (2013/466/EU)" of 11 September 2013, with regard to costing methodologies.

To this end, the data collection has included, for the first time, some questions on this topic. NRAs were asked if, in light of the Recommendation, they intend to change the adopted costing methodology in order to deal with the migration of customers from copper to NGA services. The majority of the NRAs that answered this question (in total 24) referred to markets 4 and 5, while only 5 NRAs referred also to market 6. More precisely, 2 NRAs consider their current costing methodology already in line with the Recommendation and, consequently, they

do not intend to modify the current approach. Another NRA states that the approach used (recently approved) complies with the Recommendation in the sense that, in practical terms, it gives the same or a similar result in many respects, as the Commission's Recommendation. Although this NRA has not used a BU-LRIC+ hypothetical NGA access model they have used the exception at paragraph 42, to continue with the existing methodology. One other NRA considers the adopted methodology, not based on the BU-LRIC+ approach, compliant with the objectives of the Recommendation.

It is worth noting that 4 NRAs are already developing a costing methodology that takes the Recommendation into account in their current round of market analysis. Therefore they plan either to submit a draft decision for public consultation or to approve the final decision by the end of 2014 or, at the latest, by the end of 2015.

To conclude, 8 NRAs have the intention to take the Recommendation into account in the future and, if it is the case, to introduce modifications to their current methodology. These NRAs either generally envisage to finalise the new methodology over a longer period of time (2016 or 2017) or, alternatively, have not yet planned a specific time frame for such a task.

Following Recommendation 2013/466/EU, NRAs should adopt a BU-LRIC+ costing methodology that estimates the current cost that a hypothetical efficient operator would incur to build a modern efficient network, which is an NGA network (recommend 31). When modelling an NGA network, NRAs should define a hypothetical efficient NGA network, capable of delivering the Digital Agenda for Europe (DAE) targets set out in terms of bandwidth, coverage and take-up, which consists wholly or partly of optical elements (recommend 32).

Concerning this topic, 6 NRAs report that they have developed a hybrid copper and NGA BU-LRIC model to assess costs of access services, whereas 6 further NRAs have developed distinct models for copper only or for NGA services only. Moreover, 4 NRAs consider their cost model already to be in line with recommend 32 of the Recommendation, in terms of the capability to deliver the DA targets.

As known, in compliance with recommends 33-34 of the Recommendation, all assets of the modelled network should be evaluated on the basis of replacement costs, except for reusable legacy civil engineering assets, that should be valued on the basis of the indexation method, starting from the regulatory accounting value, or/and on the basis of a benchmark of best practices in comparable Member States. Following recommend 36 of the Recommendation, the lifetime of the civil engineering assets should be set at a duration corresponding to the expected period of time during which the asset is useful to the demand profile (normally not less than 40 years in the case of ducts).

Concerning this last topic, 8 NRAs, which adopt CCA as cost base to evaluate costs of civil engineering assets, consider their approach to be in line with, at least partially, recommends

33-34 of the Recommendation – in the sense that they use information from the incumbent's Regulatory Accounting Base to valuate asset costs – and set asset's lifetimes according to paragraph 36 of the Recommendation.

In conclusion, it is worth noting that, with the exception of 4 NRAs considering their current approach already in line with the Recommendation, most of them are still developing their costing methodology and assessing the level of compliance with the Recommendation. Consequently, it is too early to draw a clear picture on the implementation of the Recommendation and a more in-depth analysis might be feasible in the next Report.

3.5 Termination Markets

3.5.1 Fixed call termination (Market 3)

The 2007 EC Recommendation on relevant markets defines market 3 as the market for "*Call termination on individual public telephone networks provided at a fixed location*" and identifies a relevant market for each operator. It is common, therefore, to see both incumbents and alternative operators having been notified as SMP operators.

However, as explained in the ERG Common Position on symmetry[17], a clear distinction can be observed between remedies imposed on incumbents on one side, and remedies imposed on other authorised operators (OAOs) on the other side. In particular, OAOs are often regulated less strictly than the incumbent and are not usually subject to accounting separation, price control and cost accounting obligations. The obligations related to tariff setting for OAOs often take the form of "fair and reasonable", "non-abusive" prices or "delayed reciprocity".

However, the data on cost base and price control evolution over time in this section refers to incumbent operators. Unlike Figures 2 and 4, which show data only for those countries participating in the 2014 survey with no missing information, the figures below show data for those NRAs that have provided the relevant information since 2008.

Trend analysis:

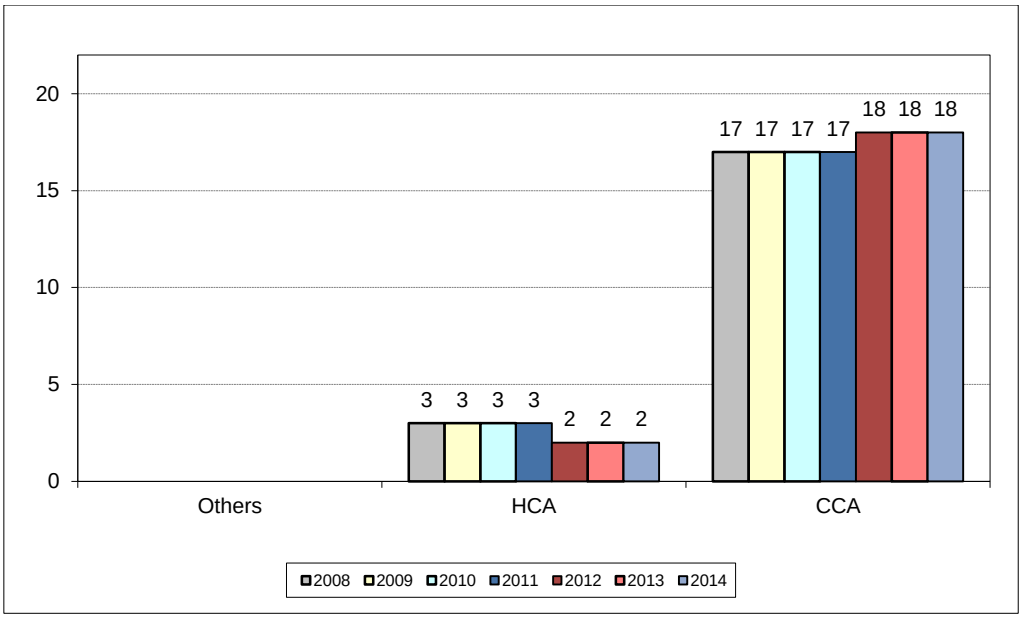
Cost base

Figure 23 shows the absolute number of countries adopting CCA or HCA to set incumbent's fixed terminating charges in the seven year period under observation.

It shows that the most common cost base for fixed networks is CCA. It has to be noted that such a result is stable over time, as in fixed networks HCA had already been replaced with CCA by the majority of Member States since 2005.

[17] ERG (07) 83 Common Position on symmetry of fixed call termination rates and symmetry of mobile call termination rates.

Figure 23 – Cost Base for Fixed Call Termination (Mkt 3)



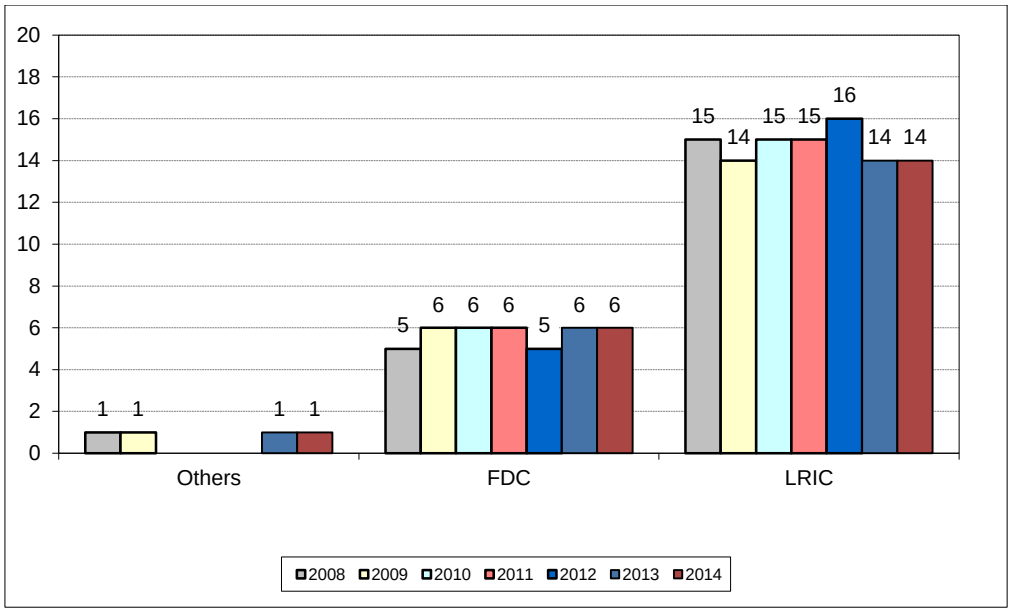
Source: BEREC RA database 2014
Number of countries: 20

Allocation methodology

Figure 24 shows the number of countries using LRIC, FDC or other mixed methodologies for fixed termination services from 2008 to 2014.

In particular it can be observed that, although in 2013 two countries declared a change in the accounting methodology respectively from LRIC to FDC and to other allocation methodologies, a significant number of countries have used LRIC for determining fixed termination tariffs since the beginning of the observation period and LRIC remains by far the most commonly used allocation methodology. The situation remains unchanged in 2014.

Figure 24 – Allocation methodologies for Fixed Call Termination (Mkt 3)



Source: BEREC RA database 2014
Number of countries: 21

<u>Key points for Market 3:</u> CCA is the preferred cost base for this market combined with LRIC as the allocation methodology. This trend is more evident now that a greater number of countries is implementing the EC Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC).

3.5.2 Mobile call termination (Market 7)

The 2007 EC Recommendation on relevant markets defines market 7 as the market for "*Voice call termination on individual mobile networks*" and identifies a relevant market for each operator. In all countries all mobile operators have been found to be SMP in the termination market and from the second round of market analysis, in some countries also MVNOs (Mobile Virtual Network Operators) have been declared SMP operators.

Unlike Figures 2 and 4, the figures below show data for those NRAs that have been providing the relevant information since 2008, therefore they show data for 17 countries.

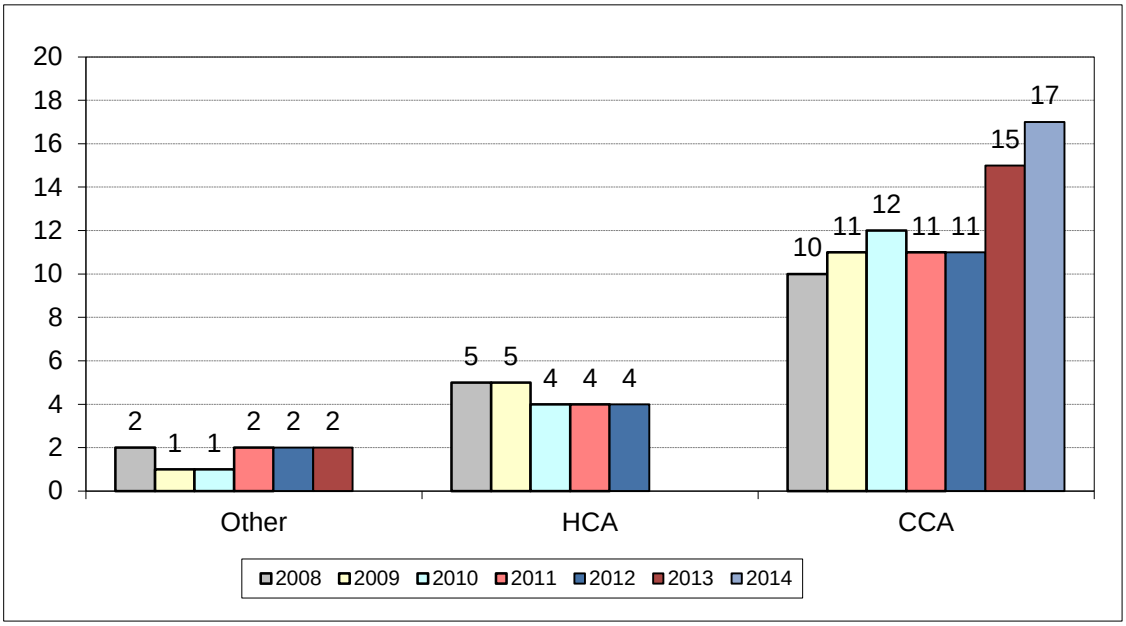
Trend analysis:

Cost base

Figure 25 shows the number of countries adopting CCA, HCA or a combination of methodologies to set mobile terminating charges from 2008 till 2014. Since 2008 the most commonly used cost base for mobile networks has been CCA. In 2013 this number has

increased from 11 to 15 NRAs out of 17. Application of HCA also remained stable till 2012. The overall trend shows a decrease in the use of HCA in favour of CCA; this trend is further confirmed by 2014 data.

Figure 25 – Cost Base for Mobile Call Termination (Mkt 7)



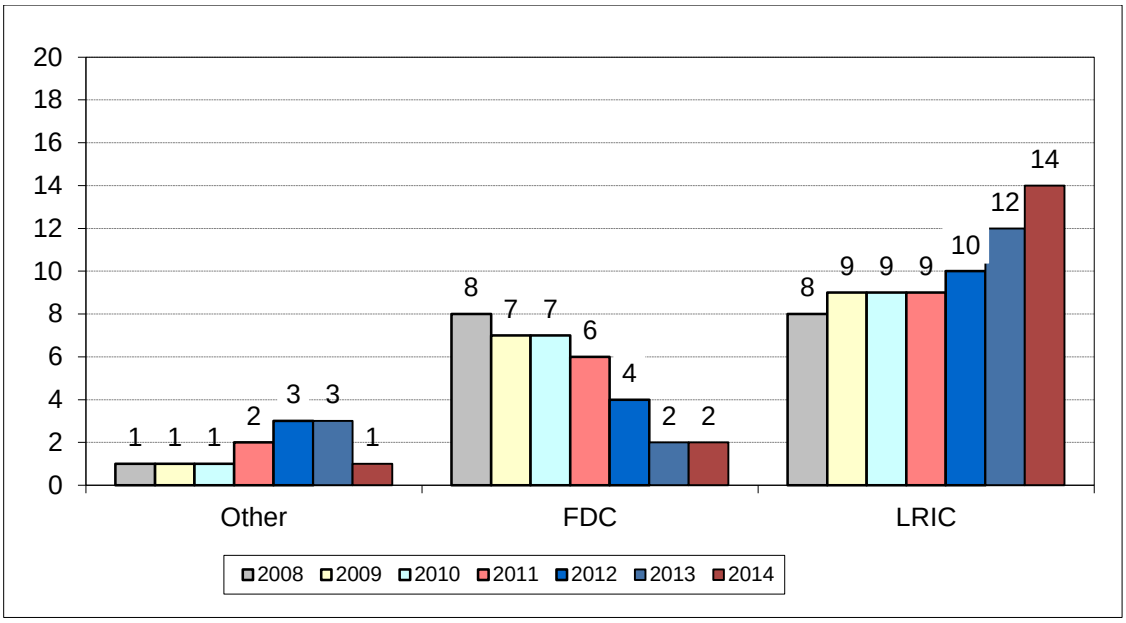
Source: BEREC RA database 2014
Number of countries: 17

Allocation methodology

Figure 26 shows the number of countries using LRIC, FDC or other mixed methodologies for call termination in mobile networks during the seven year period.

In the mobile sector the most commonly used allocation methodology is LRIC. The number of countries using LRIC methodology increased from 9 countries in 2008 to 10 countries in 2009 and has remained stable since 2011, showing an increase in the last three years. Over the same period, the number of countries using FDC has been decreasing. For 2 NRAs a change from other accounting methodologies to LRIC/pure LRIC can be observed.

Figure 26 – Accounting methodology for Mobile Call Termination (Mkt 7)



Source: BEREC RA database 2014
Number of countries: 17

In conclusion, the analysis of the mobile termination market shows a stabilisation at a high level in the use of both CCA and LRIC.

<u>Key points for Market 7:</u> CCA is the preferred cost base for this market combined with LRIC or LR(A)IC variant as the main allocation methodology. The trend analysis suggests that the development of costing tools is still relatively new, but is in the process of being reinforced with the ongoing implementation of the EC Recommendation on the Regulatory Treatment of Fixed and Mobile Terminations Rates in the EU (2009/396/EC) where CCA and LR(A)IC (and more specifically BU-LRIC) is foreseen as a first option.

3.6 Implementation of the Termination Rate Recommendation of 7 May 2009

This paragraph provides an overview of the level of implementation of the Commission Recommendation on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU, using data collected by the Berec Benchmarking EWG for the Fixed Termination Rates (FTR) and Mobile Termination Rates (MTR) benchmark.[18]

Data shows that, for the fixed termination market, 26 countries out of 31 providing data declared that symmetry in rates has already been reached. In one case there is no symmetry in fixed termination rates, while 4 NRAs declared that symmetry is partially applied.

[18] Request for information sent to all NRAs refers, in general, to data as of 1st January 2014. Thirty four (34) NRAs provided data.

As far as the model used by NRAs is concerned, 13 countries out of 31 with a valid answer have declared that a pure BU-LRIC model has been implemented (however, in 2 of these countries target rates have not been achieved yet); 4 out of 31 countries use benchmarking. In a few cases the BU-LRIC rate will enter in force in the near future.

One of the effects of the implementation of the TR Recommendation is that from 2012 to 2014 the simple EU average of TRs in the incumbent's fixed network at the three fixed interconnection layers decreased on average by 24 per cent: the highest reduction can be observed for layer 2 (-28 per cent).

For mobile termination market the analysis shows that in almost all the countries (30 out of 34 providing data) symmetry has already been reached.

As far as the model used by the NRAs is concerned, it can be observed that 16 countries out of 34 have declared that a pure BU-LRIC model has been implemented, while 7 countries declared to use benchmarking.

From 1st January 2012 to 1st January 2014 the simple EU average of MTRs decreased by 52 per cent. Also for mobile termination, this result can be considered as one of the effects of the implementation of the TR Recommendation.

3.7 Combination of cost base and allocation methodology – all markets

Figure 27 shows the combinations of cost base and accounting methodologies applied by NRAs.[19] There are four main combinations:

- CCA and pure LRIC[20];
- CCA and (FL)-LR(A)IC[21];
- CCA/FDC;
- HCA/FDC.

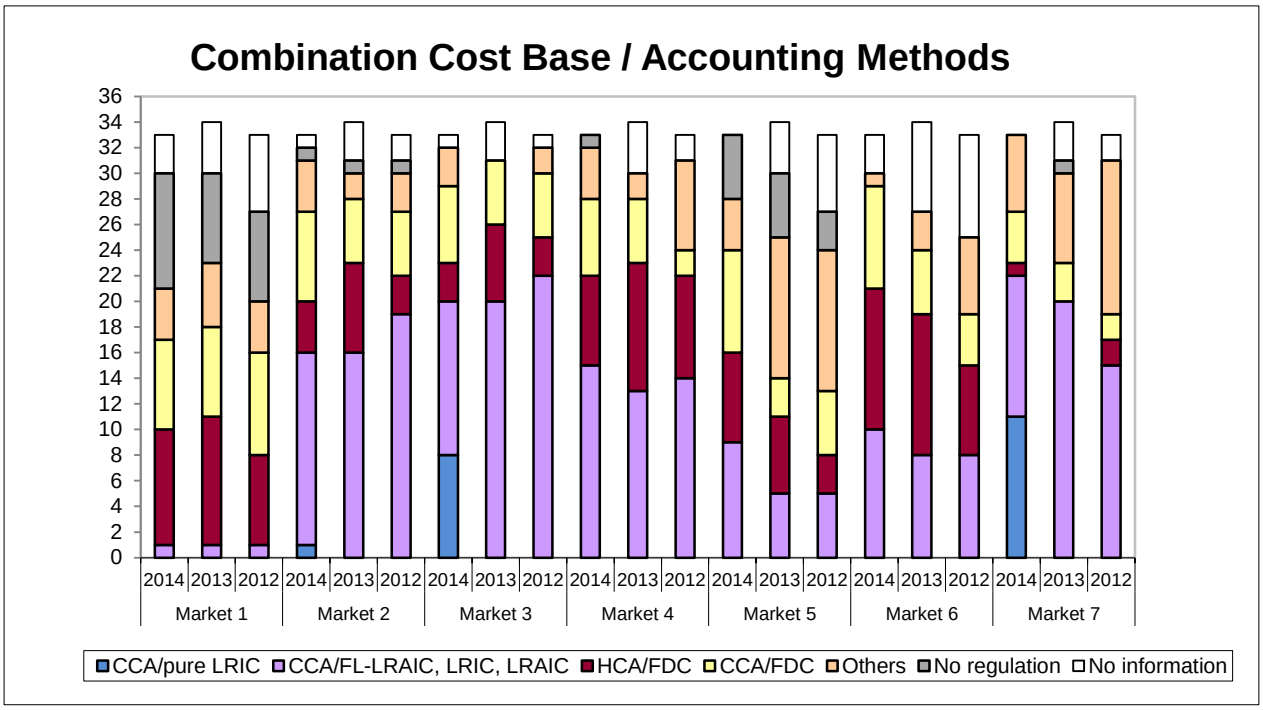
The following can be observed in 2014 in comparison to the two previous years:

- Market 1: In this market which is not (or ex-post) regulated in 9 countries (7 in 2013 and 2012), the most utilised approach by 9 NRAs (43 per cent[22]) remains HCA/FDC (10 NRAs in 2013 and 7 in 2012), followed by 7 NRAs (33 per cent) using CCA/FDC (7 NRAs in 2013, 8 in 2012); only one NRA uses CCA/LR(A)IC (in 2014, 2013 and 2012). 3 of the 4 countries applying "other" methods have a price cap in this market.

[19] This paragraph uses again data collected by the RA EWG updated to April 2014. Possible inconsistencies with data in the previous paragraph arise from the different time periods used for collecting data.
[20] The combination CCA/pure LRIC has been added as a separate category to the 2014 Report since several NRAs have adopted a pure BU-LRIC approach in line with the Recommendation 2009/396/EC on Termination Rates in markets 3 and 7.
[21] Referred to as CCA/LR(A)IC from hereon the "FL" will be omitted.
[22] Always calculated from a total excluding "not regulated" and "no information".

- Market 2: The predominant combination in market 2 in 2014 (15 NRAs) is CCA/LR(A)IC (48 per cent). This was similar in 2013 (16 NRAs) and 2012 (19 NRAs). The second most popular combination CCA/FDC (23 per cent) is applied in 2014 by 7 NRAs in comparison to 5 NRAs in 2013 and 2012. 2 of the 4 NRAs with an “others” answer apply “price cap” or “RPI plus/minus”. One NRA applies benchmarking.
- Market 3: As of April 2014 CCA/pure LRIC is applied by 8 NRAs (25 per cent) and CCA/LR(A)IC by a further 12 NRAs (38 per cent). In 2013 and 2012 the option “pure LRIC” was not available, a majority of NRAs applied CCA/LR(A)IC (20 in 2013 and 22 in 2012). Benchmarking is applied by 2 of the 3 NRAs who responded with “other” in 2014.
- Market 4: A majority of 15 NRAs (63 per cent) apply CCA/LR(A)IC in 2014, similar to previous years (13 in 2013 and 14 in 2012).
- Market 5: In 2014 the method CCA/LR(A)IC is applied by 9 NRAs (29 per cent), HCA/FDC by 7 NRAs (23 per cent) and CCA/FDC by 8 NRAs (26 per cent).
- Market 6: In 2014 the methods CCA/LR(A)IC (applied by 10 NRAs), HCA/FDC (applied by 11 NRAs) and CCA/FDC (applied by 8 NRAs) are relatively evenly spread.
- Market 7: As of April 2014 11 NRAs apply CCA/LR(A)IC (33 per cent) while CCA/pure LRIC is also applied by 11 NRAs; 4 of the 6 NRAs responding with “other” apply benchmarking based on countries who have adopted a pure BU-LRIC methodology.

Figure 27 – Combination Cost Base / Accounting Methods



Source: BEREC RA database 2012, 2013 and 2014
Please note that the number of responses recorded varies within the years: 33 in 2014, 34 in 2013 and 33 in 2012.

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 regulation strategy and therefore the choice of price control method.

However, it should be pointed out that there are a number of other important factors influencing NRAs regulation strategy.

Data collected from NRAs are the following:

Table 1 - Structural Data Information collected from NRAs

1	Market situation
1.1	% of cable subscriptions per total broadband lines = market share of cable subscriptions
1.2	% of fixed broadband lines per household or inhabitants = fixed broadband penetration: copper, fibre
1.3	% of mobile broadband lines per household or inhabitants = mobile broadband penetration[23]
1.3a	Mobile broadband penetration of all active users
1.4	% of SIM cards per total population = mobile penetration
2	Population and surface area per country[24]
2.1	number of inhabitants
2.2	number of inhabitants biggest city
2.3	% of total population (main metropolis population density)
2.4	number of inhabitants three biggest cities
2.5	% of total population (metro population density)
2.6	country area in sqkm
2.7	number of inhabitants per sqkm
3	Subscriber lines[25]
3.1	total number of active physical lines
3.2	ITU fixed telephone lines (active) 2012[26]
3.3	ITU fixed telephone lines per 100 inhabitants 2012[27]
4	MDF
	total number
5	Street cabinets
	total number
6	Local loop (MDF to customer site)
6.1	total average length in m (total copper pair m per active access)
6.2	average trench m per active subscriber line (total length of cable conduit + buried cable / active physical lines)
7	Distribution cable (street cabinet to customer site)
	total average length in m (total copper pair m per active access)
8	Civil engineering
8.1	% of feeder cable (MDF to street cabinet): cable conduit / buried cable[28]
8.2	% of distribution cable (street cabinet to customer site): cable conduit / buried cable[29]
8.3	% feeder / distribution cable (proportion of copper pair m) [30]
9	Duct / infrastructure sharing
9.1	% of duct sharing with other services
9.2	% of duct sharing per feeder / distribution cable
9.3	average cost saving (estimate)

[23] Measured by dedicated data services: cards, modems, keys.
[24] Data source: Fischer Weltalmanach 2014 (same for all countries).
[25] The publicly available ITU information serves as a reality check on 3.1.
[26] Source: International Telecommunication Union (ITU), 2012 data. Definition: number of active (registered activity in the last 3 months) lines connecting the subscriber's terminal equipment to the PSTN.
Statistics provided by the International Telecommunication Union (ITU), 2012 data.
[27] Source: International Telecommunication Union (ITU), 2012 data.
[28]Within the feeder cable: the relation of cable conduit in a cable canal/cable duct to cable conduit in the ground without a cable canal (i.e. 40% of cable is in a cable canal, 60% is not in a cable canal).
[29] Within the distribution cable: the relation of cable conduit in a cable canal/cable duct to cable conduit in the ground without a cable canal (i.e. 40% of cable is in a cable canal, 60% is not in a cable canal).
[30] Calculated as follows: (1) Length of the local sub-loop/length local loop = percentage of the distribution-part of the local loop (local sub-loop) (2) Percentage of the feeder-part of the local loop = 1 – the percentage of the distribution-part of the local loop.

A total of 33 countries have provided information on structural data.

All population and country size data stem from the latest available data (July 2013) derived from a single data source.[31] This data is shown for each individual country, since it is publicly available information.

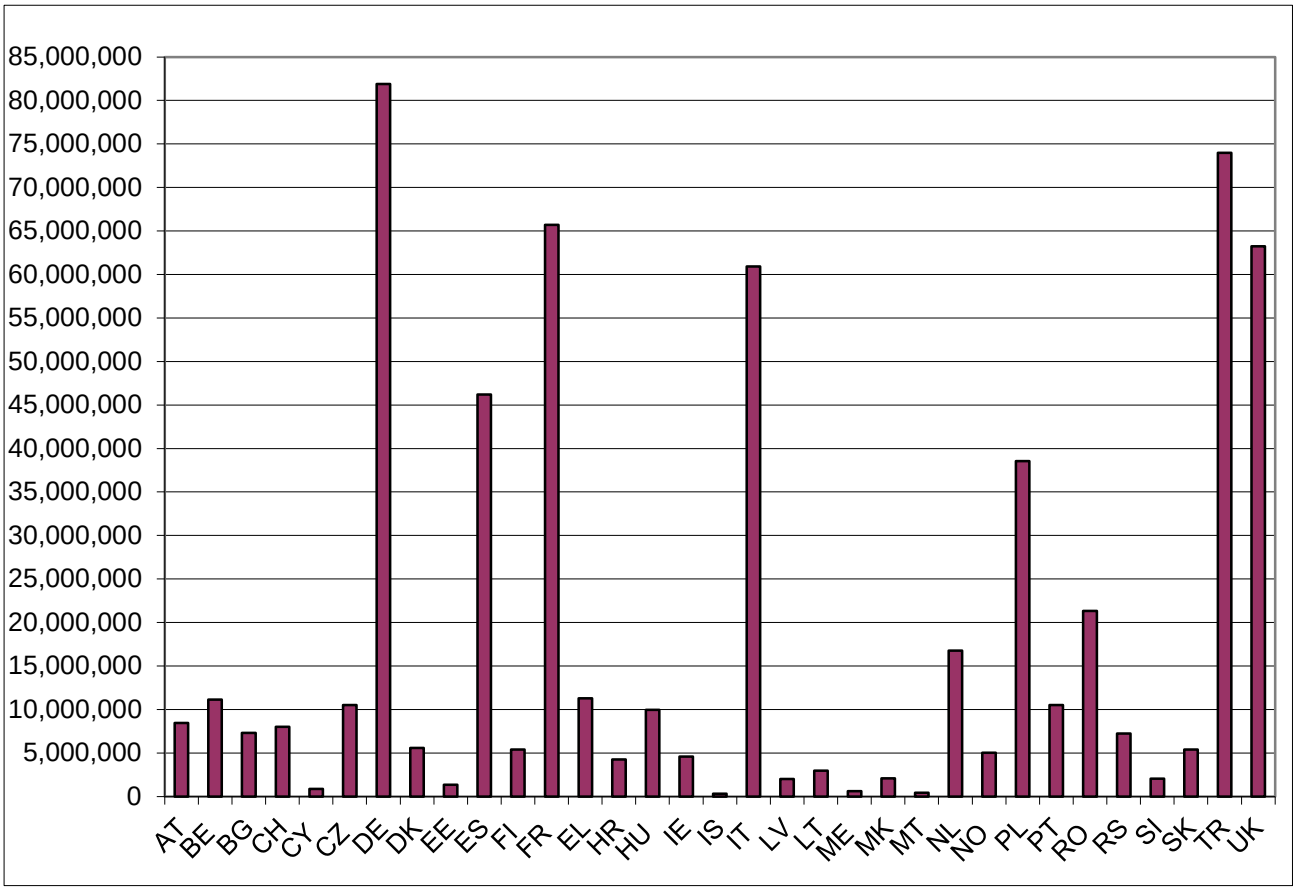
All other data are the latest available data from NRAs and will be presented anonymised. In some cases countries have not been able to provide updates on 2013 figures; whenever this occurs it will be mentioned in a footnote.

Population and country size

Naturally this data has remained largely unchanged in comparison to last year's data.
When looking at total population data (i.e. the total number of inhabitants per country): 24 countries have less than or around 10 million inhabitants (AT, BE, BG, CH, CY, CZ, DK, EE, FI, EL, HR, HU, IE, IS, LV, LT, ME, MK, MT, NO, PT, RS, SI, SK), 3 countries have between 15 and 40 million inhabitants (NL, PL, RO) and 6 have more than 45 million inhabitants (DE, ES, FR, IT, TR, UK).

[31] Fischer Weltalmanach 2014.

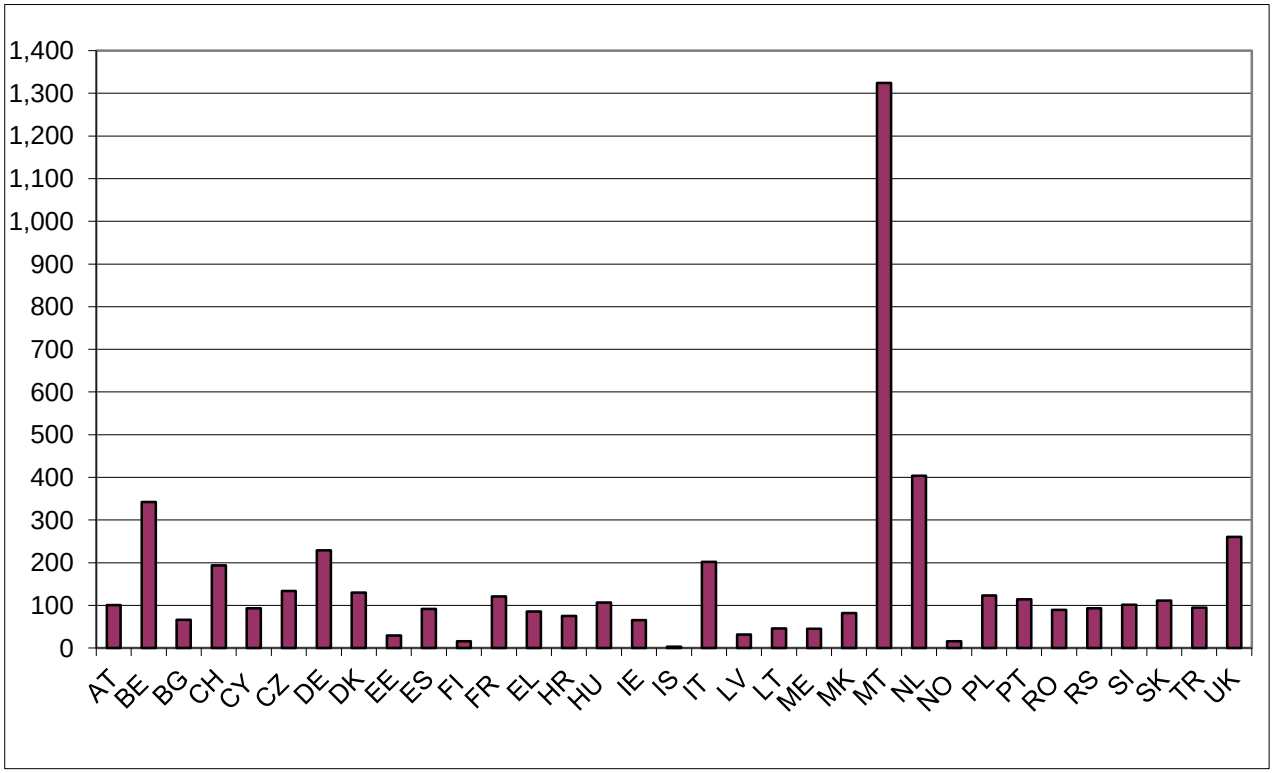
Figure 28 - Total Population



Source: Fischer Weltalmanach 2014

In terms of population density (i. e. the percentage of inhabitants per square kilometre), 17 countries have less than 100 people per square km (BG, CY, EE, ES, FI, EL, HR, IE, IS, LV, LT, ME, MK, NO, RO, RS, TR), 10 countries have 100 to 200 people per square km (AT, CH, CZ, DK, FR, HU, PL, PT, SI, SK) and 6 countries more than 200 people per square km (BE, DE, IT, MT, NL, UK).

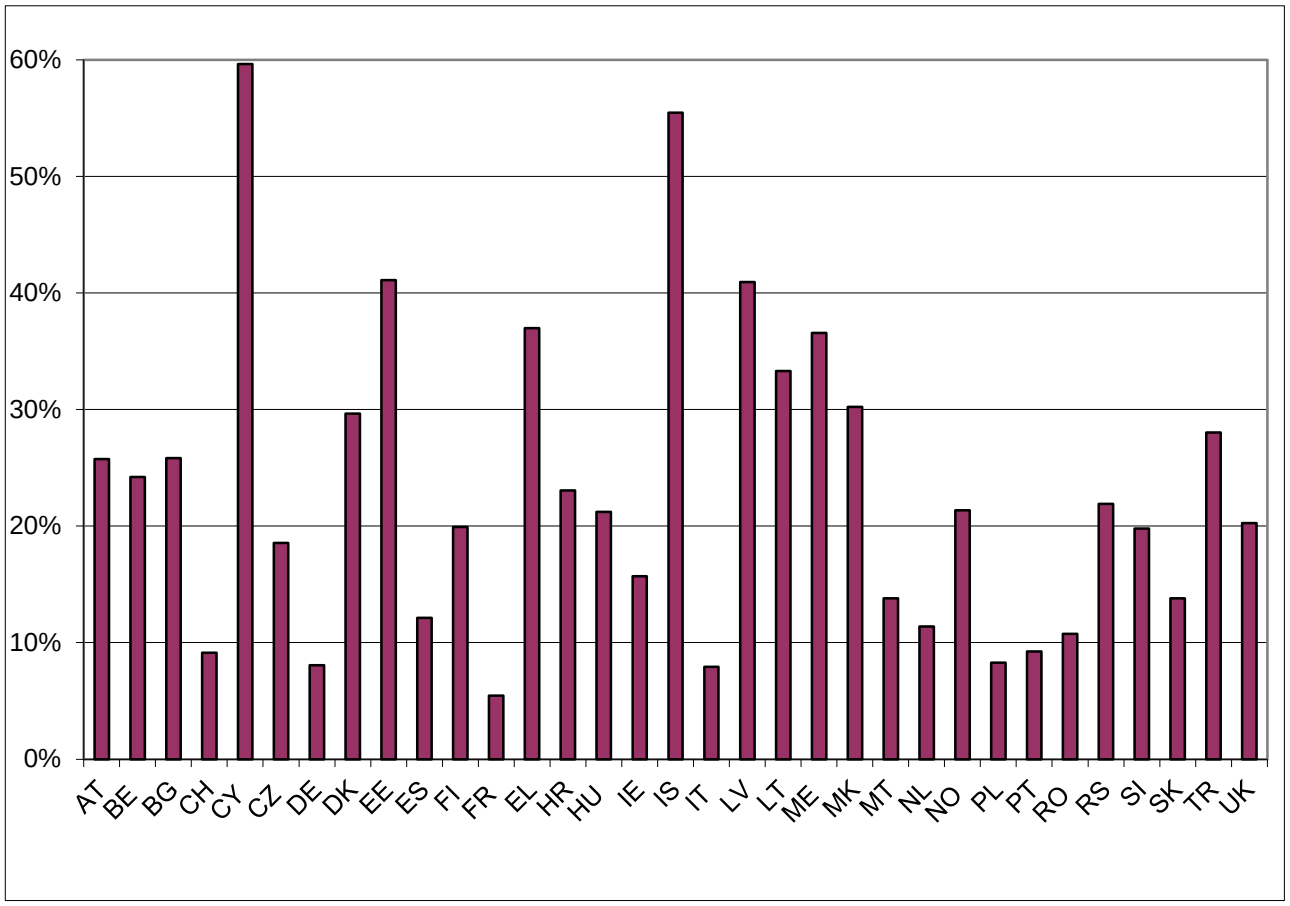
Figure 29 - Population Density



Source: Fischer Weltalmanach 2014

Looking at the population density of the main metropolitan areas (i.e. the number of inhabitants in the three biggest cities) as a percentage of the total population it is interesting to note that Icelandic, Baltic and South-Eastern European countries have the highest metro population density while in many of the larger countries like Germany, Spain, France, Poland and the United Kingdom this measure is rather low. 15 countries have a metro population density of less than or just on 20 per cent (CH, CZ, DE, ES, FI, FR, IE, IT, MT, NL, PL, PT, RO, SI, SK), 10 countries between 20 and 30 per cent (AT, BE, BG, DK, HR, HU, NO, RS, TR, UK) and 8 countries above 30 per cent (CY, EE, EL, IS, LV, LT, ME, MK).

Figure 30 - Metro Population Density



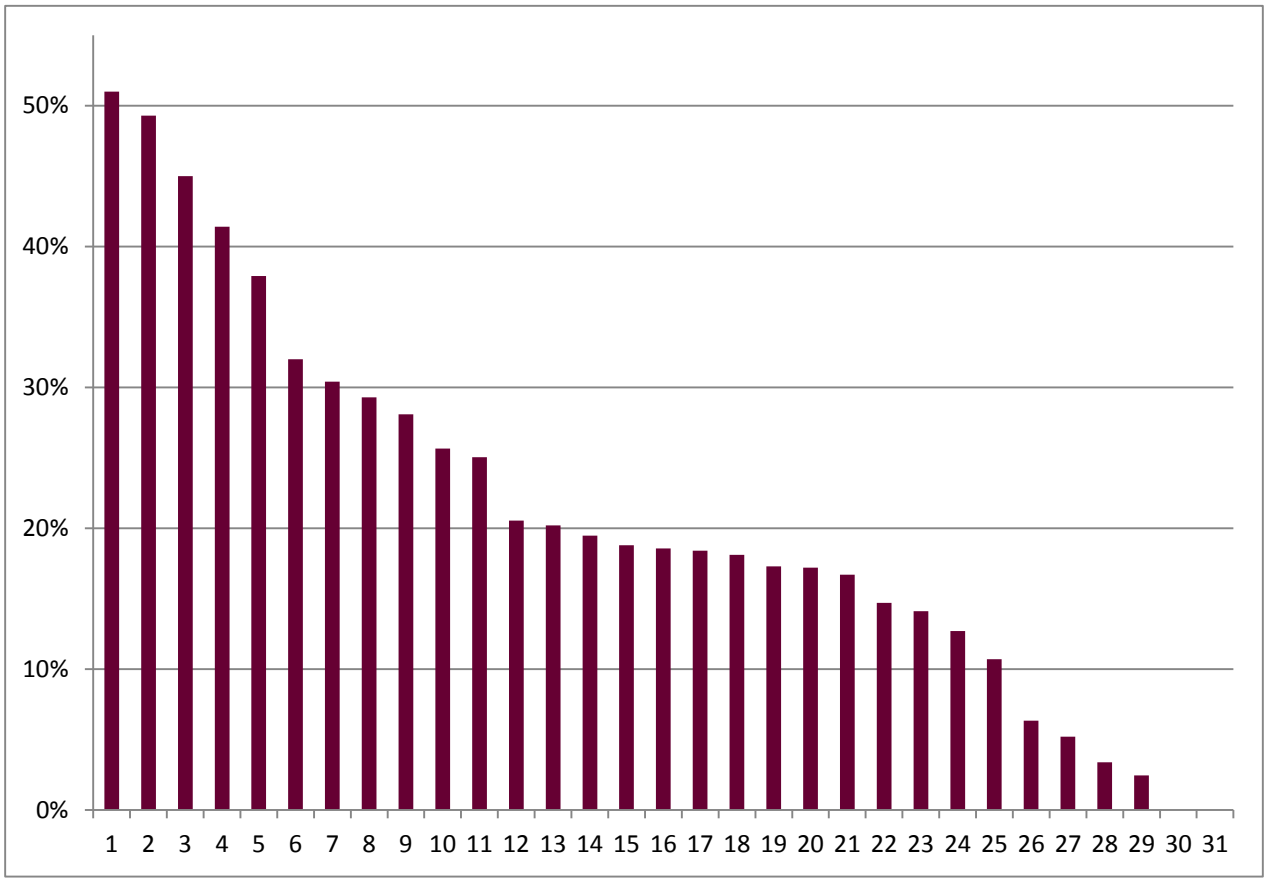
Source: Fischer Weltalmanach 2014

Market and competitive situation

The market and competitive situation within the different countries shows considerable disparity.

The percentage of cable subscriptions per total broadband lines[32], representing the market share of cable subscriptions, varies between 0 per cent (2 countries) to 51 per cent. 7 countries have a penetration rate of above 30 per cent.

Figure 31 - Market Share Cable Subscriptions

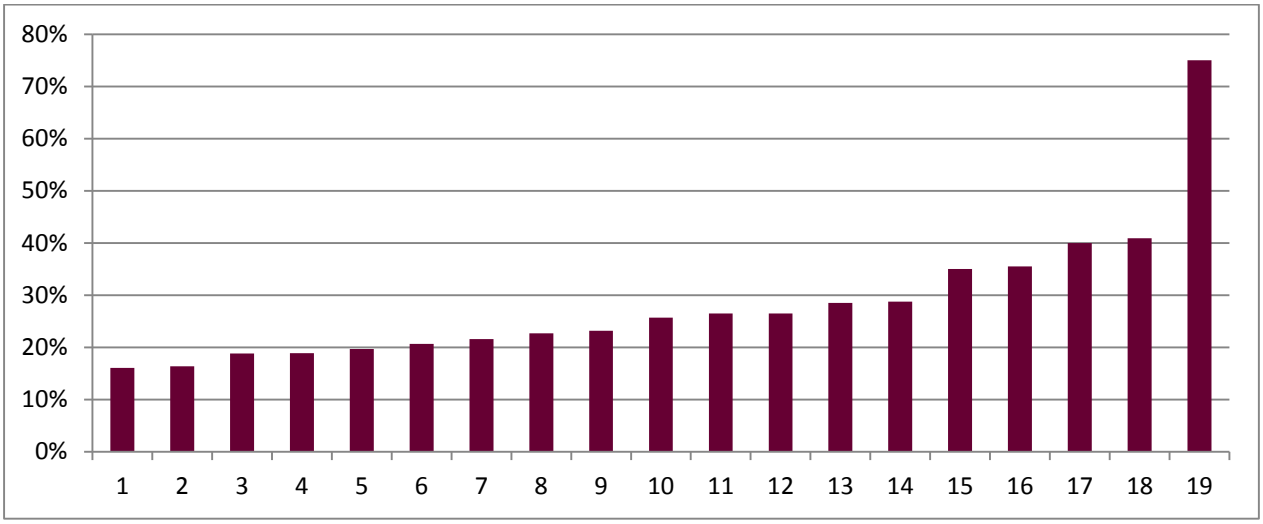


Source: BEREC RA database 2014

[32] 2 NRAs did not provide information, 2 NRA's data are from the 2013 database.

The percentage of fixed broadband lines per inhabitant[33], representing fixed broadband penetration, ranges from 16.1 per cent to 75 per cent. 3 of the 19 countries have a fixed broadband penetration of above 40 per cent.

Figure 32 - Fixed Broadband Penetration

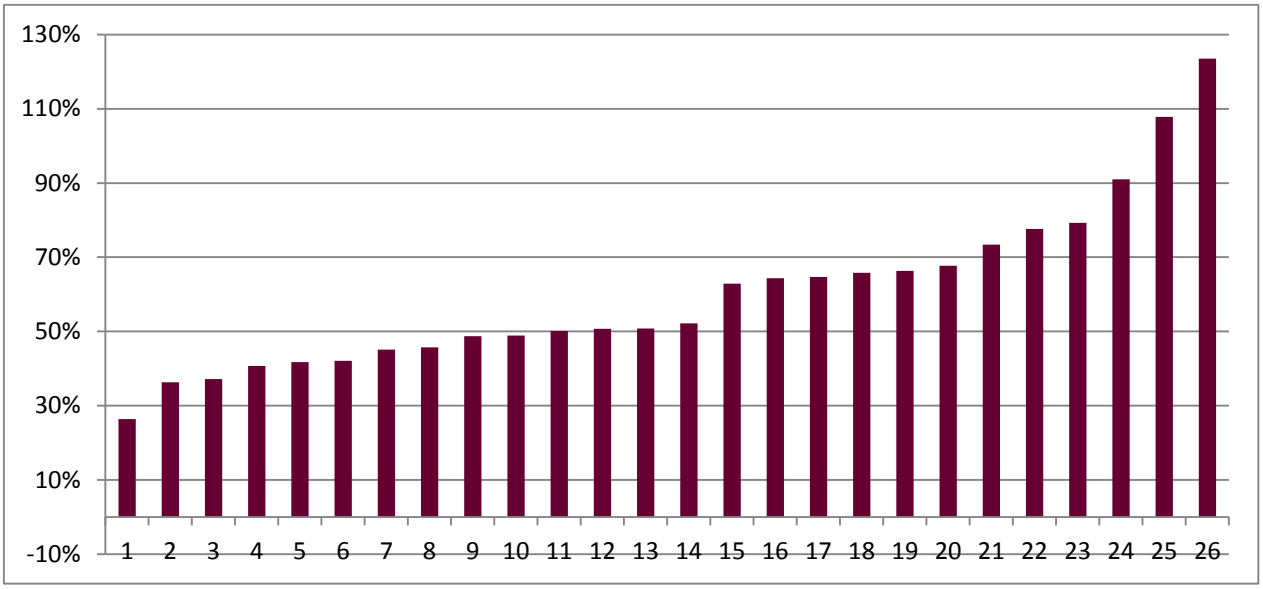


Source: BEREC RA database 2014

[33] 4 NRAs have provided a penetration rate per household and 10 NRAs did not specify if the figure provided is per household or per inhabitant or did not provide information at all. Therefore only data of the fixed broadband penetration per inhabitant is shown for 19 NRAs. 2 NRA's data stem from the 2013 database. 2 NRA's data are estimates.

The 2014 mobile broadband penetration rate has been taken from the 2014 Commission Staff Working Document[34] and shows the percentage of mobile broadband lines of all active users. Mobile broadband penetration ranges from 25 per cent to 112 per cent. 4 of the 26 countries have a penetration rate of above 80 per cent.

Figure 33 - Mobile Broadband Penetration



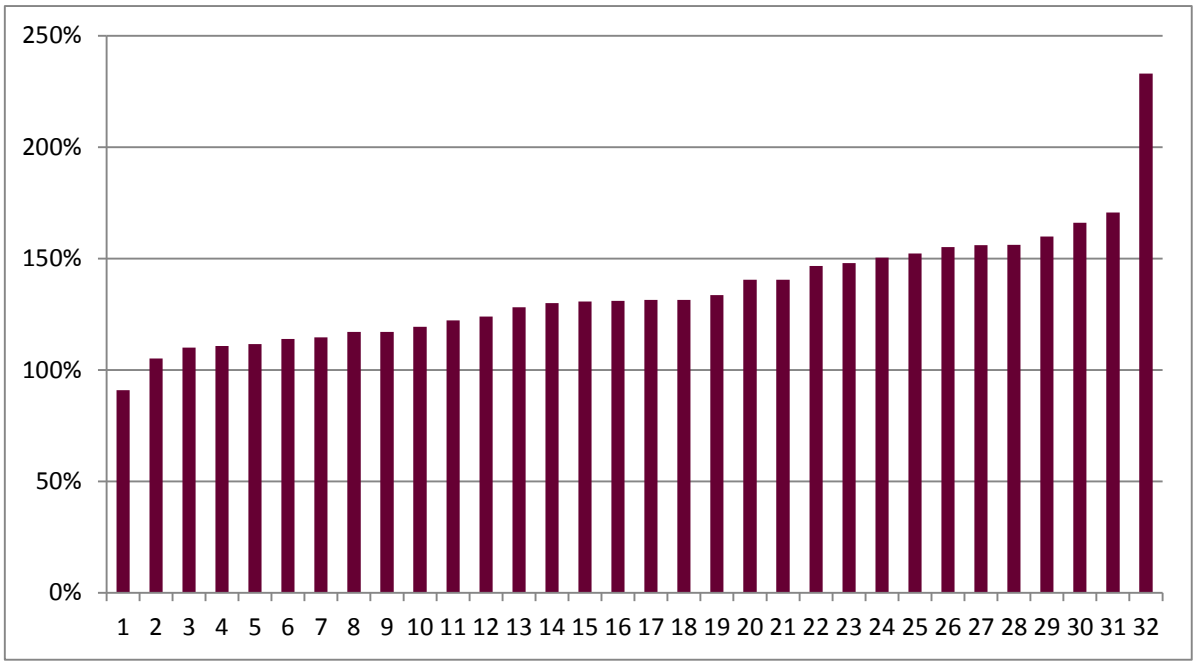
Source: Commission Staff Working Document 2014

It should be pointed out that, while the fixed and mobile broadband penetration continues to increase, this is not necessarily associated with increasing average revenues.

[34] Commission Staff Working Document " Implementation of the EU regulatory framework for electronic communications – 2014" (includes EU member countries).

In all but 1 of the 32 countries[35] the percentage of SIM cards per total population, representing mobile penetration, is greater than 100 per cent. In 9 countries it is even greater than 150 per cent.

Figure 34 - Mobile Penetration

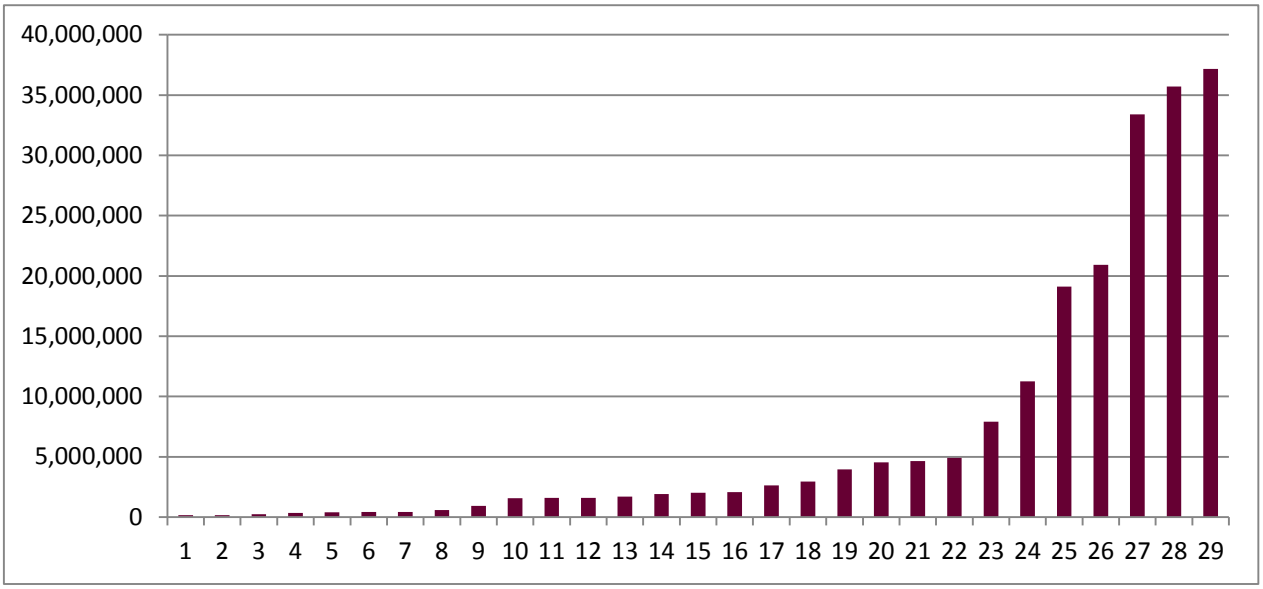


Source: BEREC RA database 2014

[35] 1 NRA did not provide information, 1 NRA's figure is an estimate. 4 NRA's data are from 2013.

The total number of active physical subscriber lines[36] ranges from 155.105 to more than 37 million active physical lines (usually in correlation with the size of the country).

Figure 35 - Active Physical Lines



Source: BEREC RA database 2014

Network infrastructure

Not all NRAs have provided information on their country's network infrastructure, i.e. the numbers of MDF, street cabinets, length of local loop, feeder or distribution cable. This data is highly dependent on:

- the size and shape of the country,
- the number and density of its inhabitants,
- the infrastructure in use.

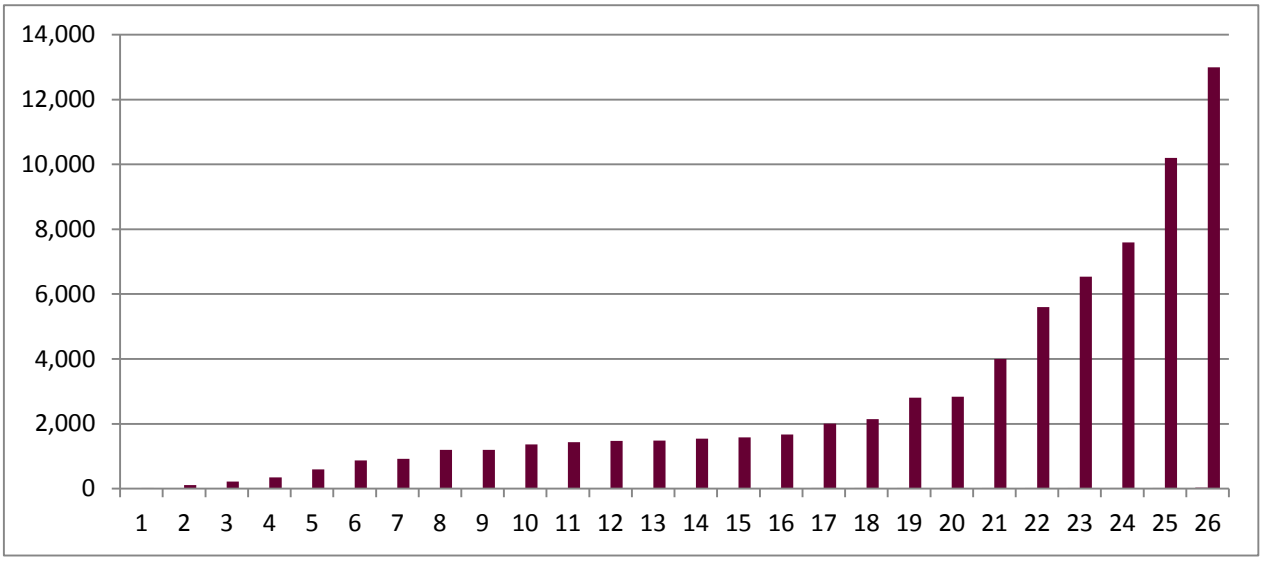
Many countries also have a proportion of poles in their access networks which are not recorded in this survey.

Large variations are observed between countries. The data does not show much change from last year's data; a change will naturally only be observed if significant changes in the access infrastructure occur (i.e. All-IP network rollout).

[36] 5 countries' data are 2013 data, 3 countries' data are from the 2012 data base. 4 countries have not provided information.

The total number of MDF[37] ranges from a minimum of 21 to a maximum of 13.000 MDF nationwide.

Figure 36 - Number of MDF

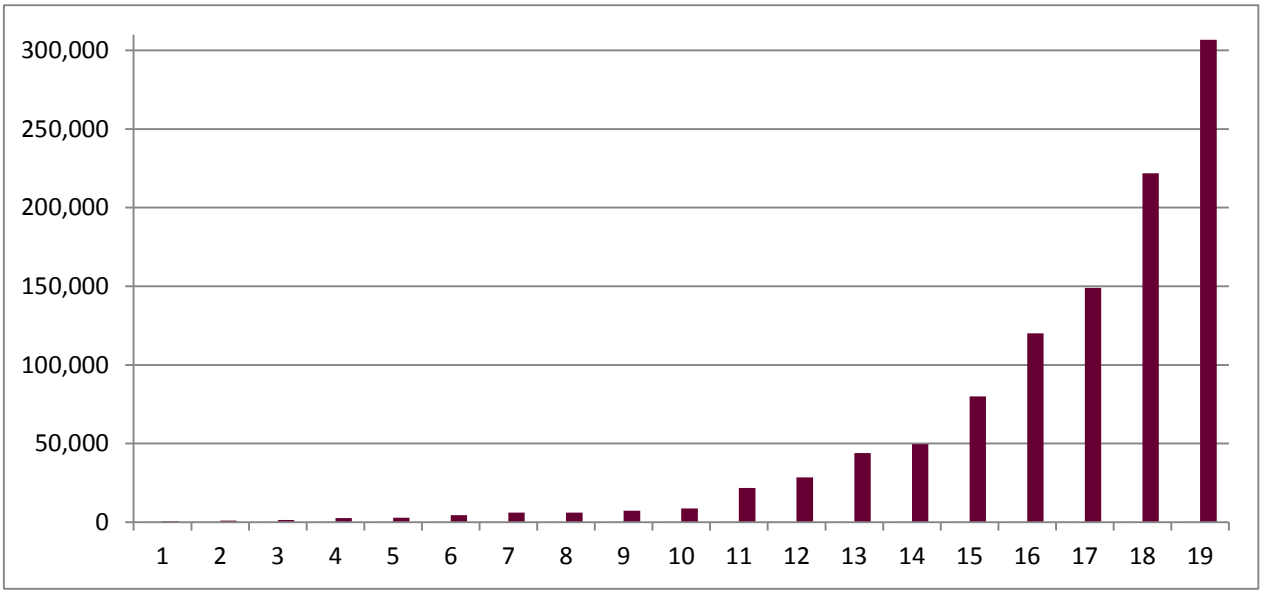


Source: BEREC RA database 2014

[37] 7 countries have not provided information. 2 countries' data are from 2013, one country's data from 2010. 2 countries have provided estimates only.

The number of street cabinets[38] range from a minimum of 600 to a maximum of more than 300.000 cabinets nationwide.

Figure 37 - Number of Street Cabinets

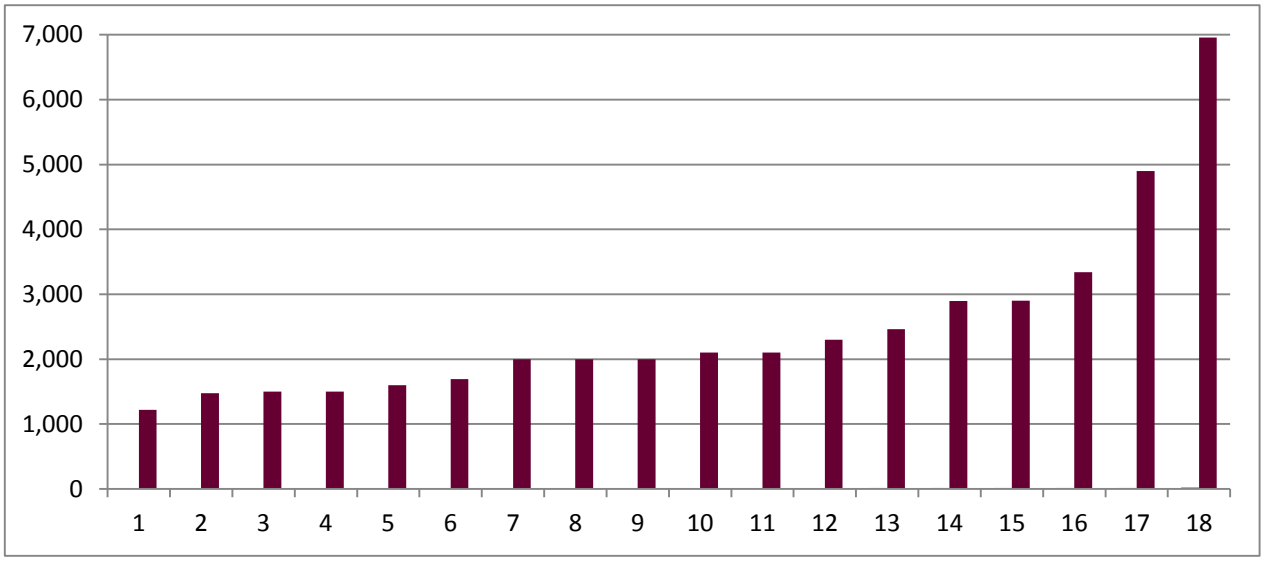


Source: BEREC RA database 2014

[38] 14 NRAs have not provided information on the number of street cabinets. For 2 NRAs 2010/2013 data has been used. 1 NRA has provided an estimate only.

The total average length of the local loop[39] is between a minimum of 1.218 and a maximum of almost 7.000 metres.

Figure 38 - Local Loop: Average Length

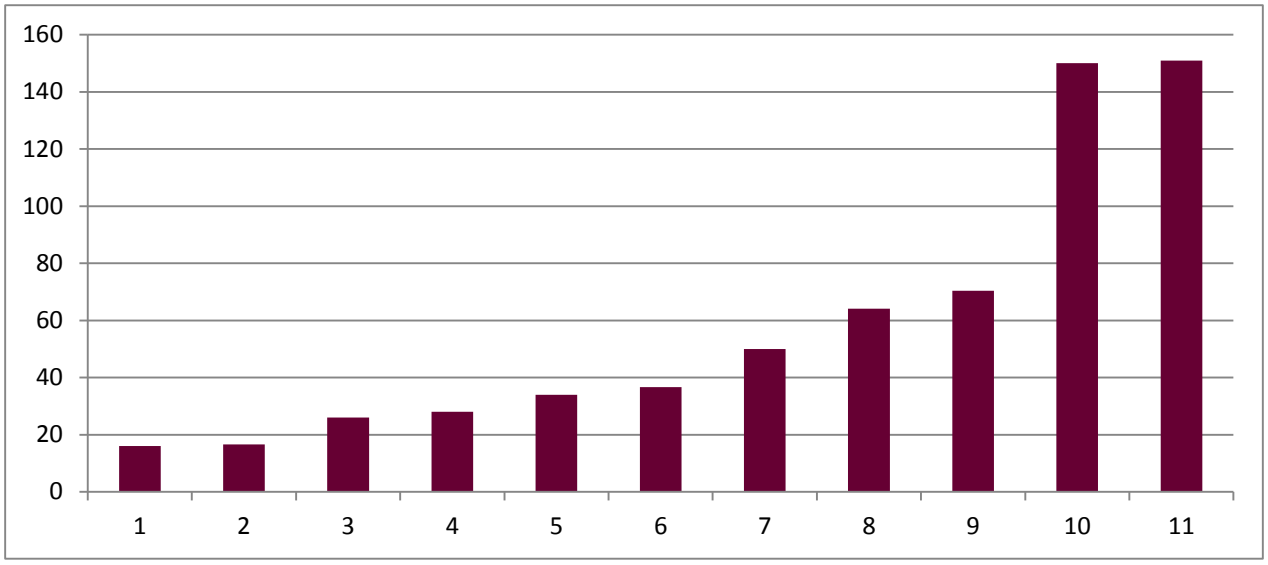


Source: BEREC RA database 2014

[39] 15 NRAs have not provided information on the length of the local loop. 3 NRAs have provided a range: the maximum has been used. 2 NRA's information is based on 2013 data, 1 NRA's on 2010 data. 1 NRA has also included a proportion of non-active access (due to limited availability of cable types).

The average trench metre per active subscriber line[40] is between a minimum of 16 and a maximum of more than 150 metres.

Figure 39 - Average Trench Metre

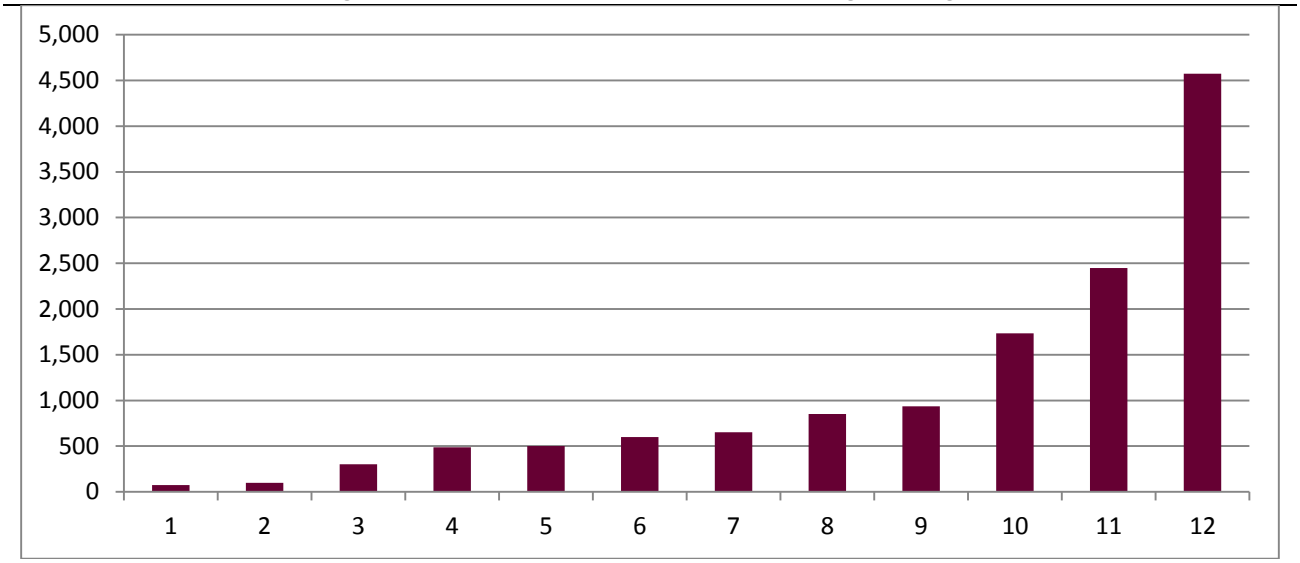


Source: BEREC RA database 2014

[40] 21 NRAs have not provided information. 1 NRA's data is from 2010. 1 NRA's data has been left out because it seems implausible.

The total average length of the distribution cable[41] is between a minimum of 75 and a maximum of around 4.500 metres.

Figure 40 - Distribution Cable: Average Length



Source: BEREC RA database 2014

Civil engineering and duct sharing

There are two important cost components within the telecommunications industry: civil engineering and duct sharing. Unfortunately only few NRAs have provided information on these topics, limiting the representativeness of the analysed values.

When looking at the proportion of cables laid in cable ducts to cables laid in the ground within the feeder cable[42] (which makes a difference in terms of cost), the percentage of cables in cable ducts ranges from 0 per cent to 100 per cent, i.e. in 2 countries all (copper) cables are buried and in another all cables are in cable ducts. 2 NRAs specified the proportion to be 25 to 75 per cent or 15 to 85 per cent. 1 NRA specified that there is a difference between copper and fibre: fibre is predominantly run in cable ducts whereas copper is predominantly buried. Another NRA specified that the proportion changes considerably depending on urban and rural areas.

The same disparity is observed when looking at the proportion of cables laid in cable ducts to cables laid in the ground within the distribution cable[43], i.e. the percentage of cables in cable ducts ranges from 0 per cent to 100 per cent. In one country the relation is 3 to 97 per cent in another 0-5 to 15-90 per cent, depending on urban or rural areas (rest are poles).

[41] 21 NRAs did not provide information on the total average length. 1 NRA provided a range: the maximum is shown.
[42] 7 NRAs replied, however only 4 answers were conclusive.
[43] 6 NRAs replied, however only 4 answers were conclusive.

The proportion of feeder to distribution cable[44] was stated by one country to be 95 to 5 per cent and by another to be around 64 to 36 per cent.

Duct sharing with other services[45] was stated to be unavailable in 3 countries. In one country it amounts to less than 10 per cent. In another it is around 19 per cent and even 50 per cent in a third. In one country the sharing rate is 22 per cent (feeder cable) and 51 per cent (distribution cable). In another it is evenly distributed (50/50) between feeder and distribution cables. In a third country it is 30 per cent (feeder cable) and 70 per cent (distribution cable).

The percentage of duct sharing per feeder and distribution cables and the average cost saving[46] of course was nil for the countries where it is not available. In one country the average cost saving for the telecommunications provider was around 10 per cent (feeder cable) and around 20 per cent (distribution cable). In a second country the average saving is 25 per cent, shared equally between utility and telecommunications provider.

[44] 6 NRAs replied, however only 2 answers were conclusive.
[45] 6 NRAs replied.
[46] 6 NRAs provided information, one answer was not conclusive.

5. The main motivation behind the choice of the costing methodology

There may of course be several objectives that an NRA has to balance in arriving at a choice of approach. For a fuller explanation of these choices and the reasons for selecting them, readers should refer to the relevant statements / publications from each NRA. However, as last year, data concerning the "main" motivation behind the choice of the costing methodology has been included in the report.[47] In practice this data was collected by adding another variable to each market sheet in the questionnaire. However, in order to make the new data useful and allow for comparisons and statistics some predefined alternatives were given from which NRAs could choose. These predefined alternatives were: "promote strict cost orientation", "promote infrastructure replicability", "avoid unit cost increase", "provide visibility", "avoid margin squeeze", "being in line with EU average" and "others" (in cases where the NRA chose this alternative, they were asked to give more detailed comments).

The analysis has been carried out on the seven markets of the 2007 Recommendation on Relevant Markets. Answers were given by 14 to 26 NRAs depending on the market in question.

As can be seen in figure 41, many NRAs (the percentage varies among 23 and 42 for all markets except market 4)[48] chose the "others" alternative as the main motivation behind the chosen costing methodology. On the basis of the detailed comments it seems that in most of these cases the motivation behind the choice of costing methodology was a combination of the given list of alternatives. For example "cost orientation" instead of "promote strict cost orientation" or some combination such as "promote efficient use of infrastructure" and "avoid price squeeze" or "promote cost orientation" and "promote infrastructure replicability" where possible. In some cases motivations outside the predefined list have been provided (i.e. "account for technological progress", "providing build or buy signals").

It is interesting to note that the objective "to promote strict cost orientation" is the main motivation for the choice of the costing methodology in almost every market (except in markets 1 and 5). To give an example, this alternative has been chosen by 13 NRAs in market 3 and 7.

On the basis of respondent's answers a strict cost orientation as an objective covers all three combinations of cost base and accounting methodology used by most NRAs (CCA and

[47] Cf. also BEREC input to the consultation on "costing methodologies", doc. BoR (11) 65.

[48] Since there are several products/services and therefore different answers for the "motivation" variable in market 4, the analysis for market 4 has been restricted to "copper access (including LLU, SA, SLU)". For one only NRA the answer is referred to the co-location service.

LR(A)IC, CCA/FDC, HCA/FDC). Generally it seems that there were multiple ways to achieve a certain regulatory objective.

Other main motivations in choosing a costing methodology especially in markets 4 and 5 are to "avoid margin squeeze"[49] and "promote infrastructure replicability".

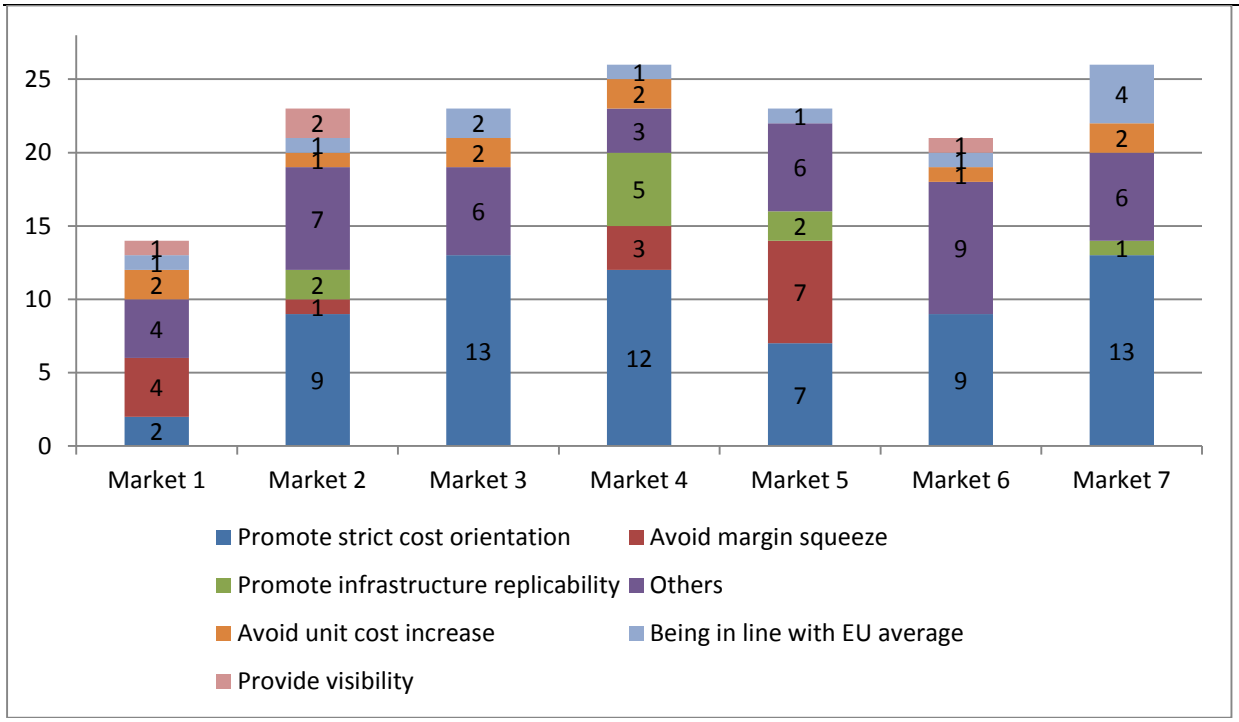
The alternative "being in line with EU average" was chosen by 4 NRAs in market 7 and 2 NRAs in market 3, when in other markets it was been selected by 1 NRA. The alternatives "avoid unit cost increase" and "provide visibility" were not so common.

It is worth to be mentioned that for some NRAs the main motivation behind the choice of the costing methodology varies according to the different products in market 4 (not shown in figure 41). As a matter of fact for duct access two NRAs declared that the main motivation was to "promote infrastructure replicability" while for one NRA it was to "promote strict cost orientation". For fibre access (LLU, VULA) two NRAs declared respectively "promote strict cost orientation" and "promote infrastructure replicability" while for one NRA the main motivation is to strike a balance between promoting competition (infrastructure replicability) and stimulate investments by the SMP provider.

Overall it can be concluded that NRAs pursue the objective of effective price control measures mainly by setting strict cost-oriented prices as this is considered to be the best way to achieve the overarching objectives of Art. 8 Framework Directive (2002/21/EC). Hardly any NRA motivated its choice of costing methodology with the option "avoid unit cost increase" which shows clearly that NRAs are not thinking from the end ("*reverse engineering*", i.e. setting a fixed price not allowing cost variations), but are rather setting prices following a cost concept they consider the best to reach the objectives of the Regulatory Framework (even if this includes allowing cost increases). Although, cost-orientation may be interpreted differently, it has to be mentioned that NRAs consider different cost concepts appropriate to achieve the objectives of the Regulatory Framework exercising their discretion in order to regulate effectively their national markets.

[49] Berec Guidance on the regulatory accounting approach to the economic replicability test (i.e. *ex-ante*/sector specific margin squeeze tests).

Figure 41 – The main motivation behind the choice of the costing methodology in the markets listed in Recommendation 2007/879/EC



Source: BEREC RA database 2014

Appendices

A.1 Countries participating in the 2014 survey

1.	Austria
2.	Belgium
3.	Bulgaria
4.	Croatia
5.	Cyprus
6.	Czech Republic
7.	Denmark
8.	Estonia
9.	Finland
10.	France
11.	Germany
12.	Greece
13.	Hungary
14.	Iceland
15.	Ireland
16.	Italy
17.	Latvia
18.	Lithuania
19.	Malta
20.	Montenegro
21.	Norway
22.	Poland
23.	Portugal
24.	Republic of Serbia
25.	Romania
26.	Slovakia
27.	Slovenia
28.	Spain
29.	Switzerland
30.	The Former Yugoslav Republic of Macedonia
31.	The Netherlands
32.	Turkey
33.	United Kingdom

A.2 References

- COMMISSION RECOMMENDATION of 19 September 2005 on accounting separation and cost accounting systems under the regulatory framework for electronic communications (2005/698/EC).
- COMMISSION RECOMMENDATION of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC).
- COMMISSION RECOMMENDATION of 11 September 2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment (2013/466/EU).
- ERG (05) 29 Common position on EC Recommendation on Cost accounting and accounting separation, published in September 2005, available on http://berec.europa.eu/documents/erg/index_en.htm.
- IRG (05) 24 Regulatory accounting in practice 2005, available on http://www.irg.eu/template20.jsp?categoryId=260350&contentId=543311.
- ERG (06) 23 Regulatory accounting in practice 2006.
- ERG (07) 22 Regulatory Accounting in Practice Report 2007.
- ERG (08) 47 Regulatory Accounting in Practice Report 2008.
- ERG (09) 41 Regulatory Accounting in Practice Report 2009.
- BoR (10) 48 Regulatory Accounting in Practice Report 2010.
- BoR (11) 34 Regulatory Accounting in Practice Report 2011.
- BoR (12) 78 Regulatory Accounting in Practice Report 2012.
- BoR (13) 110 Regulatory Accounting in Practice Report 2013.
- BoR (11) 65 BEREC's response to Commission public consultation on costing methodologies.
- BoR (13) 41 BEREC Opinion on the Commission draft recommendation on non-discrimination and costing methodologies.
- ERG (07) 83 ERG CP on symmetry of fixed call termination rates and on symmetry of mobile call termination rates.
- Fischer, Der neue Fischer Weltalmanach 2014, Frankfurt am Main 2013, www.weltalmanach.de.

A.3 Treatment of data

Figure 1 – Price control method used in 2014 in the markets listed in Recommendation 2007/879/EC

- One Country, declaring for market 5 “retail minus”, “cost orientation” and “others” according to monthly rental for access or dark fibre/Ethernet/other services or bundles, has been counted as “others”.

- One Country for market 5 and 6 has given different answers for “price control method” for the co-location service and markets in general. In Figure 1 only answers referred to markets 5 and 6 have been counted.

- For market 4 detailed information on some products such as copper access (including LLU, SA, SLU), fibre access (LLU, VULA), dark fibre access and duct access have been collected. When the price control method differs for the products listed above, the answer has been counted as “others”.

Figure 2 – Cost base used in 2014 in the markets listed in Recommendation 2007/879/EC

- In market 5, one NRA declaring “CCA” and “others” respectively for dark fibre/Ethernet/other services and bundles, has been counted as “others”.

- One Country for market 5 and 6 has given different answers for cost base for the co-location service and markets in general. In Figure 2 answers referred only to markets 5 and 6 have been counted.

- For market 4 detailed information on some products such as copper access (including LLU, SA, SLU), fibre access (LLU, VULA), dark fibre access and duct access have been collected. When the cost base differs for the products listed above, the answer has been counted as “others”.

Figure 3 – Annualisation methodologies used in 2014 in the markets listed in Recommendation 2007/879/EC when CCA is the cost base

- For market 4 detailed information on some products such as copper access (including LLU, SA, SLU), fibre access (LLU, VULA), dark fibre access and duct access have been collected. Where the annualisation methodologies differ for the products listed above, the answer has been counted as “others”.

Figure 4 – Allocation methodology used in 2014 in the markets listed in Recommendation 2007/879/EC

- In market 5, one NRA declaring “LRIC”, “FDC” and “others” respectively for dark fibre/Ethernet/other services and bundles, has been counted as “others”.

- One Country for market 5 and 6 has given different answers for allocation methodology for the co-location service and markets in general. In Figure 4 answers referred only to markets 5 and 6 have been counted.

Figure 5 – Price control method declared in 2014 for some products in market 4

- For one NRA the price control method declared is different for the different products of copper access therefore the answer has been counted as “others”.

Figure 7 – Allocation methodology declared in 2014 for some products in market 4

- For one NRA the Shared Access (SA) is not included in copper access therefore the answer given for copper access is referred only to LLU and SLU.

Figure 17 – Cost Base for Wholesale Broadband Access (Mkt 5)

- One NRA declaring “CCA” since 2008, had declared both “CCA” and “others” since 2012 respectively for dark fibre/Ethernet/other services and bundles, therefore has been counted as “others” in the last three years.

Figure 18 – Allocation Methodology for Wholesale Broadband Access (Mkt 5)

- One NRA declaring “FDC” since 2008, had declared “FDC”, “LRIC” and “others” since 2012 respectively for dark fibre/Ethernet/other services and bundles, therefore has been counted as “others” in the last three years.

Figure 19 – Price Control Method for Wholesale Broadband Access (Mkt 5)

- “Other” includes also “ex post price control method”.
- One Country, declaring “retail minus” until 2011, since 2012 had declared “retail minus”, “cost orientation” and “others” according monthly rental for access or dark fibre/Ethernet/other services or bundles, therefore has been counted as “others” in the last three years.

A.4 Glossary of terms

General terms

1. **Regulatory cost accounting:** Regulatory cost accounting is an accounting system with specific regulatory rules and conditions under which the costs, the revenues and the capital employed of services and activities have to be recorded. Regulatory cost accounting is often derived from the statutory accounting system of the regulated operator but includes specific regulatory rules and standards in addition to the rules and standards provided for by the Generally Accepted Accounting Principles. The regulatory cost accounting system must respect the principles of cost causality, objectivity, consistency and auditability. A regulatory cost accounting obligation may be imposed by the regulator on operators with significant market power.

2. **Accounting separation:** An accounting separation system is a comprehensive set of accounting policies, procedures and techniques that demonstrates compliance with non-discrimination obligations and the absence of anticompetitive cross-subsidies from a vertically integrated regulated operator. The outputs from such a system must be capable of independent verification (auditable) and fairly present the financial position and relationship (transfer charge arrangements) between the wholesale and retail activity of the vertically integrated operator. As the regulatory cost accounting system, the accounting separation system must respect the principles of cost causality, objectivity, consistency and auditability. An accounting separation obligation may be imposed by the regulator, together with a regulatory cost accounting obligation, on operators with significant market power.

3. **Forward looking cost:** The economic cost of an activity is the actual forward-looking cost of accomplishing that activity in the most efficient possible way, given technological, geographical, and other real world constraints that exist. In contrast to embedded costs, forward-looking costs are those associated with present and future uses of the firm's resources. Only these costs are relevant for making present and future production and investment decisions, for placing resources in alternative uses, and for setting prices for the services to be provided at current time or in the future.[50]

4. **Cost model / Costing methodology:** The cost model / costing methodology contains all the rules and guidelines on how to derive the relevant cost (cost base, depreciation methodology) for regulatory purposes and how to attribute those costs (allocation methods) to the regulated services.

[50] This definition comes directly from the ITU Regulatory Accounting Guide.

Terms related to the cost base and asset valuation methodologies

5. **Cost base:** The cost base is the relevant set of costs that can be attributed, directly or indirectly, to a given activity or to the production of a service. Two main approaches exist in terms of assessment of the cost base:

   5.1. **Top-down:** In a top-down (TD) approach, the accounted costs of the operator's regulatory accounts are used in order to assess the relevant regulatory cost base for a given activity or service or for a set of activities or services. A top-down approach usually implies that the actually incurred costs are taken into account, i.e. without efficiency adjustments.

   5.2. Bottom-up: In a bottom-up (BU) approach, an engineering model which satisfies the expected demand in terms of subscribers and/or traffic for a given service or for a set of services is used in order to assess the relevant regulatory cost base for such service or set of services. A bottom-up approach usually implies calculating the costs an efficient operator would incur.

6. **Capital expenditures (CAPEX):** Capital expenditures are investments in fixed, physical, non-consumable assets, such as infrastructures and equipment.

7. **Capital costs:** Capital costs are the annual costs originated by capital expenditures (CAPEX) and recorded in firm's accounts in the form of annuities. Annuities include two components: depreciation, which correspond to the depreciation of the value of the asset, and cost of capital employed, which corresponds to the cost of holding the capital i.e. the opportunity cost of the sum invested.

8. **Operating expenditures (OPEX):** Operating expenses or operating expenditures are the on-going costs for running a product, business, or system by the firm. In firm's accounts or in bottom-up models, those expenses are the sum of the expenses made over a period of time, generally a year.

9. **Gross replacement costs:** Gross replacement cost (GRC) are the price that would be paid on a given date for an asset bought in the past. It is calculated based on the recorded technical progress rate for such asset. The net replacement cost is equal to the gross replacement cost net of accumulated depreciation.

10. **HCA:** In an historical cost accounting (HCA) approach, the actually incurred costs recorded in the regulated operator's statutory accounts, most often annualized following a straight-line depreciation methodology, are used in order to assess the relevant regulatory cost base. As historical costs may include inefficient investments, incorporate tax optimisation and may especially lack data of the pre-liberalisation era, adjustments might be applied.

11. **CCA:** In a current cost accounting (CCA) approach, the operator's asset base is annualised based on the gross replacement cost of the assets. CCA belongs to the family of constant annualisation methodologies where the depreciation share is stable and the cost of capital share decreases over time, resulting in decreasing annuities. Nevertheless, unlike historical cost accounting, in current cost annualisation methods the amortization is

adjusted according to variations in the price of the assets being considered due to technical progress and general variations in price (inflation). Three main kinds of CCA exist:

11.1. FCM: Financial capital maintenance (FCM): CCA FCM aims to maintain the enterprise's financial capital: whatever transpires the sum of the discounted annuities must be equal to the initial investment

11.2. OCM: Operating capital maintenance (OCM): under CCA OCM it is the gross replacement value, in other words the current price of an asset with the same productive output, expressed in constant Euros, which is amortised.

11.3. MEA: Modern equivalent asset (MEA): refers to assessing costs of a network rolled-out today, i.e. reflecting modern least cost technology instead of legacy technology, as this would be the cost relevant in a competitive market.

Terms related to cost annualization methodologies

12. **Annualisation methodology:** As capital expenditures are intended to create future benefits for the firm, they are annualised in firm's accounts by means of annualisation methodologies. Annualisation methodologies spread investment costs over time based on regulatory assets lives and, for every asset, they result in a series of annualised costs (called annuities), each of which corresponds to the portion of the investment cost allocated to the year.

13. **Straight-line (linear) depreciation:** Straight line depreciation belongs to the family of constant depreciation methodologies. In these methodologies, the depreciation share is stable and the cost of capital share decreases over time which results in decreasing annuities. Constant depreciations not readjusted for price evolution are usually referred to as "linear depreciation".

14. **Annuity:** The annuity methodology calculates the charge that, after discounting, recovers the asset's purchase price and financing costs in equal annual costs. At the beginning, the payment will consist more of capital payments and less of depreciation charges, while over time it will be the opposite, resulting in an upward sloping depreciation schedule (increasing depreciation charges).

15. **Tilted annuity:** The tilted annuity methodology is an annuity methodology where the annuity value changes from year to year at the same rate as the price of the asset is expected to vary. When asset's price is expected to change over time, a tilted annuity methodology would be more appropriate than a flat annuity methodology.

16. **Economic depreciation:** The economic depreciation methodology takes into account both price changes and output changes. It becomes more appropriate when, besides asset's price changes, there is an expectation of changes in output which may affect unit costs evolution.

Terms related to cost allocation methodologies

17. **Allocation methodology:** Allocation methodologies are used to assess the cost of individual services/products in the context of a multi-product firm. The choice of a particular method depends on the objectives and the competitive environment. The implementation of one particular allocation methodology has a significant impact on the costs of a service/product and, therefore, on the regulated wholesale prices as well.

18. **Fully distributed cost (FDC) / fully allocated cost (FAC):** Using the fully distributed cost or fully allocated cost approach, the total costs of a product or service are taken into account, i.e. the costs actually incurred by the operator. These include a share of the joint and overhead costs, arrived at by applying certain allocation bases. Thus, in contrast to the marginal cost approach, fixed costs independent of output are also taken into consideration. Usually also parts of joint and common cost are included in the calculation.

19. **Long run incremental cost (LRIC):** Long run incremental cost is the cost of producing a specific additional increment of a given service in the long run (the period over which all costs are variable) assuming at least one other increment is produced. It includes all the directly assignable variable economic costs of a specific increment of service, which is usually less than the whole service. In principle, there are an infinite number of different sized increments that could be measured. However, these increments can effectively be grouped into three different categories: 1. a small change in the volume of a particular service; 2. the addition of a whole service; or 3. the addition of a whole group of services.

20. **Long run average incremental cost (LRAIC):** Long run average incremental cost is a form of LRIC where the Increment is a whole group of services. In the context of telecommunications, LRAIC has often been used to set interconnection charges with the increments usually defined as the whole group of services using the core network. These services (PSTN, leased lines, etc.) include those provided by the operator with significant market power, as well as those of interconnecting operators. The costs of the network providing this wider group of services are then divided by all traffic to produce the average incremental cost.

21. **LRIC and its several variations:** The LR(A)IC acronym is also used in conjunction with Forward-Looking (FL) and the plus sign (+). In principle this additions lead to a more specific description of all the elements which add up to the cost model as a whole. In this sense the FL would imply the bottom-up cost base according to a current cost accounting is used and the + would imply that joint and common costs are taken into account in the cost allocation process, too. Incremental costs are generally calculated for an efficient operator.

22. **Stand alone cost (SAC):** Measures the cost of providing a service provided by the operator separately from the other services of the company. SAC includes all directly attributable costs and all shared cost categories related to production of the service, thus including direct variable costs, direct fixed costs, common and joint costs. Under this allocation method, the shared costs are totally supported by the service that is to be provided in isolation.

23. **Embedded direct cost (EDC):** Considers the directly attributable and indirectly attributable volume sensitive and fixed costs as recorded in the books and records of a firm. It therefore measures the embedded cost provided by the statutory accounts and does not question the efficiency involved.

Terms related to price control methodologies

24. **Price control methodology:** The price control methodology designates the approach that regulators adopt in order to set tariffs of regulated services. The most common approaches are cost orientation, retail minus, price-cap and benchmarking.

25. **Cost orientation:** Under cost orientation, the regulated price charged for the provision of a service reflects the underlying relevant regulatory costs, as defined by the regulator.

26. **Retail minus:** Under retail minus, the wholesale price charged for a given service is set in relation to the price of the underlying retail service rather than calculating the wholesale price on the basis of the costs incurred in producing the wholesale service.

27. **Price-cap:** Under price-cap, the regulator sets a cap on the price that the regulated operator may charge for a given service or for a basket of services. The cap may be set based on a top-down or on a bottom-up approach and may evolve according to several economic factors. The basic formula employed to set price caps is CPI – X, where the expected efficiency savings X are subtracted from the rate of inflation, measured by the Consumer Price Index. This price control methodology is intended to provide incentives for efficiency savings, as any savings above the predicted rate X can be kept by the operator and passed on to shareholders. In Europe, price-caps are generally reviewed every three years, corresponding to the length of validity of market analysis.

28. **Benchmarking:** Under benchmarking, the price of a given service is set in relation to the prices of comparable services charged in other countries.

A.5 Markets identified by Recommendation 2007/879/CE

1. Access to the public telephone network at a fixed location for residential and non-residential customers.
2. Call origination on the public telephone network provided at a fixed location.
3. Call termination on individual public telephone networks provided at a fixed location.
4. Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location.
5. Wholesale broadband access.
6. Wholesale terminating segments of leased lines.
7. Voice call termination on individual mobile networks.