

Draft BEREC Report on access conditions to State aid funded networks



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1. Introduction

In recent years, the deployment of FTTB/FTTH networks across the European Union has been significantly supported by public funding, particularly through the Recovery and Resilience Facility. These interventions have played a key role in extending high-capacity connectivity to areas where market-driven investment alone would not have been sufficient. In this context, ensuring effective wholesale access under fair and non-discriminatory conditions for State aid-funded infrastructure has become a central element for promoting sustainable competition and efficient use of public resources. In this way, effective deployment could advance in underserved areas, moving connectivity forward, towards reaching the gigabit network coverage for all EU households by 2030.

Against this background, BEREC has launched a data collection exercise among NRAs to better understand the approaches adopted across Member States regarding wholesale access obligations and pricing conditions in FTTB/FTTH networks supported by State aid. The questionnaire gathered information on access products, pricing methodologies, implementation practices, and monitoring mechanisms.

This report presents an overview of the responses received, with the objective of sharing practices that contribute to improving future NRAs' interventions and harmonize approaches regarding wholesale access obligations and pricing for State-aid network deployments across Europe.

2. Background and relevant legal provisions

The European regulatory framework establishes clear principles regarding access obligations and pricing conditions for State-aided connectivity infrastructures. In particular, the 2023 Guidelines on State aid for broadband networks¹ (BB Guidelines thereafter) and the General Block Exemption Regulation (GBER)² require that subsidised broadband infrastructures provide wholesale access on fair and non-discriminatory conditions³. These obligations encompass both active and passive access products and include transparency requirements with respect to the publication of access conditions and prices, as well as consultation with National Regulatory Authorities (NRAs).

In this regard, according to paragraph no. 130 of the BB Guidelines, "*The State-funded network must offer effective access under fair and non-discriminatory conditions to undertakings*". In addition, according to the provisions of Article 52.8. "*Aid for broadband infrastructures*" of the GBER, "*The subsidised network shall offer wholesale access, as defined in Article 2, point (139), under fair and non-discriminatory conditions*"⁴.

¹ [Communication From The Commission Guidelines on State aid for broadband networks 2023/C 36/01](#)

² COMMISSION [REGULATION \(EU\) No 651/2014](#) of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty.

³ Paragraph 130 of the broadband State aid Guidelines and article 52.8 of the GBER.

⁴ COMMISSION [REGULATION \(EU\) No 651/2014](#) of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty.

These principles are intended to ensure that access to broadband infrastructure deployed with public support is provided on fair, reasonable and non-discriminatory terms, while preventing distortions of competition in the relevant wholesale markets.

Furthermore, pricing of wholesale access services is also addressed in the regulatory framework, which foresees that prices should be set according to appropriate benchmarks or methodologies. Currently, both the GBER⁵ and the BB Guidelines⁶ provide that wholesale access prices for networks deployed with public support must be determined on the basis of one of the following criteria:

- “(a) the average published wholesale prices that prevail in other comparable and more competitive areas of the Member State;*
- (b) the regulated prices already set or approved by the national regulatory authority for the markets and services concerned; or*
- (c) cost orientation or a methodology mandated in accordance with the sectoral regulatory framework.”*

Additionally, paragraph 131 of the BB Guidelines⁷ states that “*Member States must indicate the terms, conditions and prices for the wholesale access products in the documents of the competitive selection procedure and must publish that information on a comprehensive website, at national or regional level*”.

In accordance with paragraphs 136, 152 and section 5.2.4.6 of the 2023 BB Guidelines, Member States (MS) must consult the National Regulatory Authorities (NRAs) on wholesale access products, the conditions, and price setting.

3. Overview of State aid schemes, NRAs’ involvement and transparency

All 22 NRAs⁸ reporting involvement in State aid programme provided supporting documentation or links describing their national schemes (see Annex I).

NRAs reported information on the number of programmes, minimum speed requirements to be delivered by the funded infrastructure, as well as the year of approval of the most recent programme. While most responses refer to a single programme, some NRAs provided aggregated data covering several initiatives. An overview is provided in the table below.

⁵ According to article 52(9) of the GBER. However, these provisions may be affected by the European Commission proposed amendment to the GBER, under which the detailed criteria currently set out in Article 52(9) of the GBER would be removed from the Regulation to a separate guidance document (https://competition-policy.ec.europa.eu/public-consultations/2026-gber_en). In particular, the proposed revision of the GBER no longer requires wholesale access prices to be based on specific benchmarks (such as the above-mentioned), nor does it expressly require consultation of the national regulatory authority on wholesale access products, pricing and related disputes.

⁶ Paragraph 151 of the 2023 Broadband State Aid Guidelines.

⁷ [Communication From The Commission Guidelines on State aid for broadband networks 2023/C 36/01](#)

⁸ AT, BE, BG, CY, CZ, DE, ES, FI, FR, GR, HR, HU, IR, IT, LT, LV, NO, PL, PT, RO, SE, SI.

Table 1 - Overview of programmes related to State funded networks

COUNTRY	PROGRAMMES (Q3a – Q4)	MINIMUM SPEED IN MBPS DL/UL (Q3b)	YEAR OF APPROVAL (Q4)
AT	1	100, upgradable to 1000	2022
BE	1	1000	2023
BG	2	1000	2025
CY	1	300	2023
CZ	3	1000/200	2024
DE	3	300/150	2024
ES	1	300/300, upgradable to 1000	2019
FI	1	300/100	2022
FR	1	30	2016
GR	1	100 upgradable to 1000	2019
HR	2	100 upgradable to 1000	2021
HU	1	1000/300	2025
IE	1	500	2019
IT	1	1000/200	2022
LT	1	1000	2022
LV	1	300	2024
NO	1	1000	2025
PL	2	300/100	2022
PT	1	40	2011
RO	1	100	2024
SE	1	1000	2025
SI	3	300/100	2026

Source: BEREC

In more recent programmes, a progressive increase in the minimum speed thresholds of subsidised networks can be observed, ranging from lower targets in earlier programmes - 30Mbps download speed target in France's 2016 programme or 40Mbps in Portugal's 2011 programme - to 1Gbps in the majority of programmes approved from 2022 onwards. This reflects both the technological evolution of fixed networks from NGA to VHCN and the updated eligibility criteria set out in the 2023 BB Guidelines. With the exception of Belgium, which reports having funded HFC networks (as part of the VHCN funding programme), NRAs indicate that public investments are directed towards the rollout of FTTH/FTTB networks in market failure areas.

Additionally, the NRAs provided data on the level of public funding allocated to their most recent or most relevant programme aimed at fostering the deployment of ultrabroadband networks in market failure areas, the number of State aid beneficiaries, and the end-user premises targeted by the programme, as well as information on whether the measure had been notified to the Commission or implemented under the GBER. Table 2 below reports this information for the most recent programme, where identifiable, or otherwise for the programme for which the most complete information was available.

Table 2 – Scope of State aid measures

COUNTRY	FUNDING* (M€) (Q6)	GBER / NOTIFIED SCHEME (Q3c)	No of BENEFICIAR IES (Q5)	UNITS TO BE COVERED (Q8)	
				Population/ connections	Households/premises/ address points/ec drivers
AT	1,100	Notified	123		177,683 premises
BE	24,6	GBER	1		12,535 households
BG	200	GBER	3	350,000 people	
CY	35	GBER	1		60,000 premises
CZ	223	GBER	14		61,135 address points

DE	36,000 ⁹	Notified		4,700,000 connections	
ES	647	Notified	8		2,400,000 premises
FI	27	GBER	16		16,000 premises
FR	12,900	Notified	85		17,600,000 premises
GR	267	Notified	1		830,000 households
HR	119	Notified	51		40,000 households
HU	243	GBER	22		
IE	2,700	Notified	1		560,000 premises
IT	3,400	Notified	2		3,000,000 address points
LT	49	GBER	1		5,000 socioeconomic drivers
LV	16	GBER	2		6,200 premises
NO	413	GBER	60		100,000 premises
PT	97	Notified	2		242,000 households
RO	94	GBER	6		78,400 households
SE	68	GBER			
SI	30	Notified	3		10,719 households

Notes: * The absolute values presented cannot be considered directly comparable due to, inter alia, the cumulative effects of inflation
Source: BEREC

Depending on the amount of public funding, the schemes were either implemented under GBER — noting that the notification threshold was increased from €70 million to €100 million in 2023 by Commission Regulation (EU) 2023/1315 — or notified to the European Commission, with the corresponding approval decisions detailed in the Annex I. Overall, 11 countries implemented schemes under GBER and 10 countries notified their schemes to the Commission¹⁰,

With regard to the number of beneficiaries of public funding, a significant variation emerges, ranging from more centralised approaches involving one or two beneficiaries (as in Belgium, Cyprus, Greece, Ireland, Italy, Latvia, Lithuania, Portugal) to more local and fragmented distributions typically involving tens of beneficiaries (as in France, Croatia, Hungary and Norway), up to the Austrian case, where 123 undertakings are reported to have received public funding. These differences do not appear to be systematically linked to the number of premises covered by the measure, nor to the level of funding, but may instead reflect differences in the tendering strategies adopted by the contracting authorities in each country.

Finally, the number of premises (or other units of choice) covered by the schemes reflect by order of magnitude, in BEREC's view, on the one hand, the country size in terms of population and the need of VHCN development¹¹ at the time of the call for tenders and, on the other hand, it is influenced by specific geographical features and population distribution within each country. These factors should therefore be taken into account when comparing coverage across countries.

Considering the amount allocated per premises/unit of choice (see figure 1), the median value of slightly less than €2,000¹² divides the 19 countries that provided data in two clusters: 10 countries allocated, on average, less than €2,000 per premises/unit of choice, while the remaining 9 countries allocated, on average, more than €2,000 per premises (reaching approximately €10,000 in the case of Lithuanian socio-economic drivers). This distinction suggests differences in deployment conditions, including population density, geographic constraints and rollout costs. Another important consideration concerns the approval year of the aid scheme: the cumulative

⁹ Part of the funding is attributable to FTTC, but the overall FTTx funding could not be disaggregated.

¹⁰ One country (Poland) did not provide sufficient information.

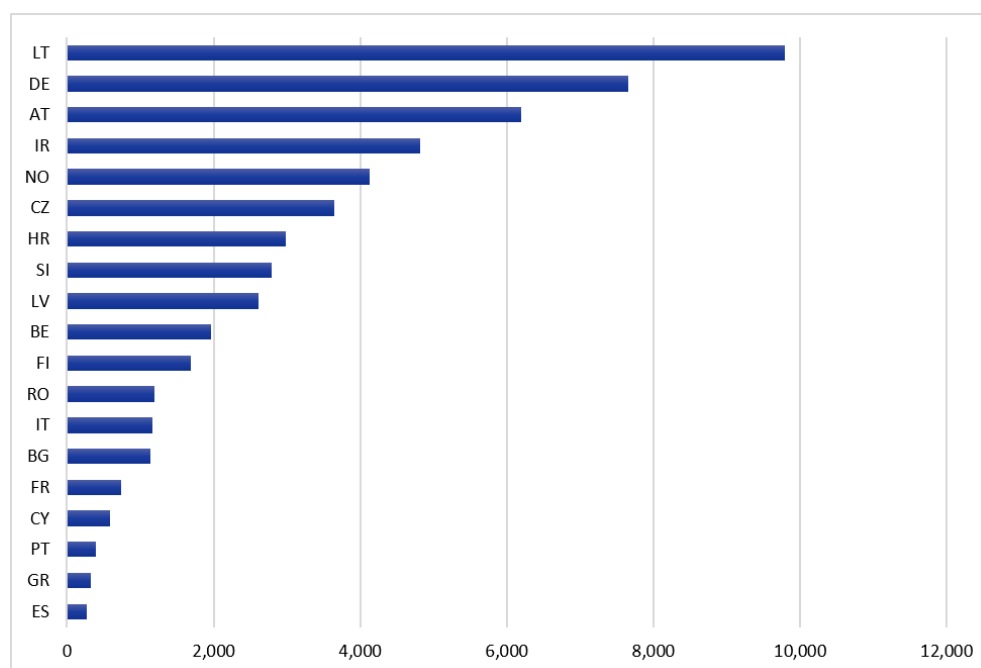
¹¹ Complementary to the areas where appropriate VHCN coverage has been achieved already through private investments.

¹² Exact value €1,963.

impact of inflation can significantly affect the value of older schemes, meaning that the reported amounts are not directly comparable across different periods.

For two countries (Czechia and Italy), which reported that coverage targets were defined at street-address level, one premises per address has been assumed, taking into account that the schemes concern white or grey areas, where population density is generally relatively low. For one country (Bulgaria), which reported the number of people covered, an average of two persons per premise has been assumed. It should also be noted that Germany reported the number of connections, while Lithuania provided data related to 5,000 socioeconomic drivers as target for its broadband programme. Given these differences in reporting units across countries, the figures presented should be interpreted as indicative and may not be fully comparable across all cases. Nevertheless, they do represent an approximation of the indicative funding per unit of choice¹³.

Figure 1 - Average funding per premises (€)



Source: BEREC

Table 3 provides an overview of the involvement of the NRAs in different stages of the implementation of the State aid programmes, across the activity categories listed below¹⁴.

¹³ Considering the aforementioned assumptions.

¹⁴ Please note that the involvement of NRAs in certain activities has also been inferred from their responses to other questions.

Table 3 - Role of the NRAs¹⁵

NRAs are involved in (Q7)	Country	Total
Design of the programme	BE, ES, NO, PL, PT, SE	6
Determination of possible areas (white/grey) for State aid purposes (mapping)	AT, BE, CZ, FI, FR, HR, HU, NO, PL, PT, RO, SE, SI	13
Selection of State aid areas	BE, PL, PT, SE, SI	5
Assignment of State aid areas to beneficiaries (competitive selection procedure)	BE, PL, SE	3
Execution of the programme	BE, FI, HR, NO, PL, PT, SE	7
Providing inputs regarding access conditions and prices	AT, BE, CY, DE, ES, FR, GR, HR, IT, NO, PL, PT, RO, SE, SI	15
Examination of access conditions and prices (after the bid)	AT, BE, CZ, DE, ES, FR, GR, HR, IT, PL, PT, RO, SE	13
Dispute resolution	AT, BE, CZ, DE, ES, FI, HU, IT, LT, NO, PL, RO, SI	14
Other	BG, ES, FI, GR, IE, LV, PT, SE	8

Source: BEREC

The responses indicate that NRAs' involvement is primarily concentrated in activities directly linked to ensuring competition safeguards, notably the determination of the targeted areas for State aid assignments, the assessment of wholesale access conditions (including in the form of providing inputs) and dispute resolution.

These activities derive directly from the BB Guidelines, which encourage Member States to systematically involve NRAs in the design, implementation and monitoring of State interventions. In particular, NRAs' involvement is recommended for tasks related to mapping and coverage, as well as for the assessment of private investment plans within the public consultation, while consultation with NRAs is instead mandatory for wholesale access conditions, including pricing and dispute resolution. By contrast, involvement in the competitive selection procedure, in programmes design and implementation appears to be limited to a smaller number of countries.

With regard to the availability of data enabling the identification of the premises targeted by the measure, 14 countries¹⁶ reported the existence of an online repository providing information on specific premises (or at least areas) already covered, or planned to be covered, by State aid-funded networks. This information is typically made available through mapping tools, although static resources (such as lists of addresses or project descriptions) are also used. The level of detail of this information varies across countries.

Despite the continued collaboration between the responsible authorities in the MS and the NRAs in the successful design, execution and monitoring of State aid programmes, the degree of NRAs involvement and the closeness of collaboration is different among MS. At the same time, the information exchanges and iterations relating to the development, implementation and assessment of the State aid schemes happen at distinct moments in time, with notable differences across the countries analysed – in some cases, the approval of the access conditions by the NRAs is done from the beginning, when the State aid programme is designed, in other cases, it is done thereafter.

¹⁵ The term "role" may, depending on the national legal framework, encompass different functions, responsibilities and levels of involvement (e.g. consultation, advisory functions or decision-making responsibilities) in relation to the State aid programme.

¹⁶ AT, BE, CY, CZ, DE, ES, FI, FR, IR, IT, LT, NO, PT, SE

For instance, with regard to the approval of the reference offers (i.e. access conditions, including pricing) for services provided through the subsidised infrastructure proposed by the beneficiaries of public funding, 9 NRAs¹⁷ reported being responsible for evaluating them, in order to ensure that such conditions comply with the minimum requirements and are consistent with the applicable regulatory framework. In some of these countries, the conditions are formally adopted through a resolution, whereas, in others, the NRAs issue opinions required by the contracting authority.

On the other end, 13 NRAs¹⁸ reported having only an advisory role, as the conditions may already be defined in national legislation, be identified in SMP regulation or in prior State aid decisions, or not being involved in the approval process at all. This highlights the diversity of institutional arrangements across countries.

Table 4 below presents information on the timing of NRA involvement in defining, or providing guidance to the competent authority on wholesale access conditions, including pricing, to be reflected in the tender documentation.

Table 4 – NRAs' involvement - timing

Timing of NRA involvement (Q11)	Country	Total
When the State aid programme was designed	AT, BE, CY, CZ, LV, NO, SI	7
Before the State aid programme was approved	ES, GR, IT, NO, RO	5
After the State aid programme was approved	DE, ES, FR, GR, HR, NO, PL, PT	8
Other	AT, BG, FI, GR, HU, IE, LT, SE	8

Source: BEREC

Four NRAs¹⁹ reported being involved at different stages of the State aid programme, whereas the majority indicated that their involvement was limited to a specific phase of the process. Without entering into further detail, the level of involvement can be seen to vary significantly across countries, ranging from NRAs that assist the contracting authority from the design phase through all stages of the programme, as in the case of Norway, to those reporting no involvement at all, such as Hungary. Overall, this illustrates that, despite the common principles established in the State aid framework, the practical role assigned to NRAs varies considerably across national frameworks.

Finally, just as national frameworks differ regarding the procedural timing of NRAs involvement, a similar variance can be noticed also related to the transparency elements relating to the wholesale access services to be supplied to the market by the State aid beneficiaries. Fourteen countries²⁰ reported having conducted a market consultation on access conditions (either by the NRA itself or by the contracting authority), while seven²¹ indicated that no such consultation had taken place, and one country did not provide information in this regard. This suggests that market consultation is widely used, but not systematically applied across all countries.

¹⁷ ES, FR, GR, HR, IT, NO, PL, RO, SE

¹⁸ AT, BE, BG, CY, CZ, DE, FI, HU, IR, LT, LV, PT, SI

¹⁹ In AT, GR, ES, NO.

²⁰ BE, BG, CY, CZ, DE, FR, GR, HR, IT, LT, LV, NO, PL, SE

²¹ AT, ES, FI, IR, PT, RO, SI

In conclusion, all these differences reflect different regulatory approaches/arrangements to ex ante control and transparency as a tool for facilitating wholesale access and promoting downstream competition.

4. Wholesale access conditions

4.1. Wholesale access products offered

4.1.1. Type of wholesale access product(s)

Most NRAs impose a broad set of wholesale access products, but the scope and intensity of obligations vary significantly across countries (see Table 5).

The most commonly required (i.e. regulated) products are access to ducts (18 authorities), bitstream (18 authorities), VULA and colocation (13 authorities each), and dark fibre (15 authorities). In contrast, obligations for physical unbundling at the central office (12 authorities) and backhaul access (10 authorities) are less consistently imposed.

Table 5: Type of wholesale access products

Regulated wholesale access products (Q14)	Country	Total
Ducts	BG, NO, ES, PL, HU, FR, GR, LV, IT, RO, SE, BE, CZ, CY, DE, HR, PT, AT	18
Poles	NO, ES, PL, HU, FR, IT, RO, SE, CZ, CY, HR, PT	12
Dark fibre	BG, NO, PL, HU, FR, GR, IT, RO, SE, CZ, CY, DE, HR, AT	14
Physical unbundling at the OLT/ headend / central Office	NO, PL, SI, FR, FI, IT, BE, CZ, DE, PT, AT	11
VULA	NO, ES, PL, SI, GR, IT, RO, SE, BE, CZ, CY, DE, HR	13
Bitstream	NO, ES, PL, SI, HU, GR, LV, FI, LT, IT, RO, SE, BE, CZ, DE, HR, PT, AT	18
Backhauling	ES, HU, GR, IT, RO, SE, CZ, CY, DE, HR	10
Colocation	ES, PL, GR, IT, RO, SE, BE, CZ, CY, DE, HR, PT, AT	13
Other ²²	BG, PL, IE, SI, FI, IT, RO, SE, BE, HR	10

Source: BERECA

Three broad groups of countries can be identified:

- **Countries requiring a very comprehensive set of wholesale products**, such as Italy, the Czech Republic, Sweden, and Poland, which mandate both passive access (ducts,

²² Other :

- IT - Fixed Wireless Access
- SI - The built infrastructure must allow for at least a doubling of the number of lines (fibre, coax, etc.) to enable future co-use by other operators without additional construction work.
- RO - Ancillary services (equipment monitoring, security, power supply).
- HR - FA-PON – In Croatia, unbundling of the local loop is possible only at the location of distribution node. Fibre networks are largely built and operated as a GPON, Point to Multipoint networks, therefore it is not possible to unbundle the local loop at OLT/ODF location. Therefore FA-PON access product (physical unbundling at first concentration or distribution point where last splitter takes place) is used.
- SE - Fixed Wireless Access

poles, dark fibre) and active access (VULA, bitstream), as well as complementary services such as backhaul and colocation.

- **Countries mainly focusing on passive infrastructure access**, such as France, which imposes access to physical infrastructure (ducts, poles, dark fibre) and physical unbundling, but does not generally require active products such as VULA or bitstream.
- **Countries with more limited obligations**, such as Lithuania, which requires only bitstream access, or Latvia, which mainly imposes duct access and bitstream.

Some authorities also provide for specific, nationally adapted obligations. For example, Croatia requires an FA-PON²³ access product instead of traditional local loop unbundling, reflecting the GPON architecture of its networks. Italy also includes Fixed Wireless Access (FWA) in their obligations, while Romania requires ancillary services such as power supply, security, and equipment monitoring. Slovenia, meanwhile, requires that subsidised infrastructure be dimensioned to allow future reuse by other operators through built-in capacity.

4.1.2. Differences in wholesale access obligations across beneficiaries

The responses indicate that wholesale access obligations are generally applied similarly across beneficiaries. Only a small number of NRAs (5) report that obligations may **vary depending on technical or implementation factors** (see Table 6 below). These cases are mainly linked to differences in network architecture, technological constraints, or the specific way the beneficiary deploys its infrastructure. In some cases, obligations are adapted to ensure technical feasibility or reflect different network models (e.g. FTTH vs alternative solutions such as FWA).

In some countries, differentiation takes the form of **conditional or alternative access obligations rather than the imposition/regulation of distinct wholesale access services from the outset**. For example, in Norway (Nkom), operators may be required to provide either VULA or physical unbundling depending on the network configuration. Similarly, in Poland (UKE), access to VULA is obligatory only if a beneficiary does not offer other wholesale access products (especially access to bitstream).

Table 6: Difference between beneficiaries

Difference among beneficiaries (Q15)	Countries	Total
YES	IT, BE, NO, SE, PL	5
NO	SI, RO, PT, FR, DE, ES, IE, CZ, GR, HU, CY, AT, LT, LV, FI, BG	16

Source: BEREC

Overall, the responses suggest that differentiated obligations remain the exception rather than the rule and that they are generally objectively grounded by technical feasibility, technological constraints or network architecture considerations, rather than by the nature of the beneficiary itself.

²³ Fiber Access – Passive Optical Network

4.1.3. Location of the handover point for active wholesale access products

Responses indicate that, in most countries, there are no specific regulatory requirements regarding the location of the handover point for active wholesale access products (see Table 7). In general, the location of the handover point is either defined through the reference offer, determined by the network architecture, or left to commercial arrangements between operators.

Table 7: Location of the handover point for active wholesale access products

Handover point requirements (Q29)	Countries	Total
No specific requirements	SI, RO, ES, CZ, LT, LV, BE	7
Handover location defined in the reference offer or network architecture	PT, CY, SE, IE, NO	5
Geographic-level requirements for handover	HU, AT	2
Not relevant	FR	1

Source: BEREC

A first group of countries reports that no specific requirements apply to the location of the handover point. This is the case in Slovenia, Romania, Lithuania and Latvia. Similarly, the Czech NRA indicates that no additional requirements are imposed, while Spain reports that the reference offer only needs to describe the technical conditions for connecting at the handover point.

A second group of countries relies on reference offers or network design to determine the location of the handover point. In Portugal, both central and local access points are predefined and specified in the reference offer. Sweden notes that the location of the handover point is not strictly predefined and depends on the underlying network architecture. The same goes for Norway, where the location of the handover point is generally determined by the beneficiaries. In the event of a dispute, the NRA may intervene through its dispute resolution powers.

A limited number of NRAs impose requirements regarding the geographic level at which handover must be offered. In Hungary, operators must provide handover at both a regional level and a local level. Austria requires bitstream handover to be provided at a central location that is easily accessible to multiple service providers, such as an exchange site or an Internet peering point.

Overall, responses suggest that regulatory intervention regarding the location of handover points remains limited. Most NRAs do not prescribe specific handover locations and instead rely on reference offers, network architecture or commercial arrangements. Where requirements exist, they are generally intended to ensure sufficient accessibility for access seekers, either through the provision of multiple aggregation levels or through the designation of centrally located and easily accessible handover points.

4.1.4. Technical implementation of active wholesale access products

Responses indicate significant differences among NRAs regarding the extent to which the technical implementation of active wholesale access products is predefined. Three main approaches can be identified: (i) detailed *ex ante* specification of technical characteristics, (ii)

definition of minimum technical requirements, and (iii) reliance on reference offers or commercial agreements without detailed regulatory prescription (see Table 8).

Table 8: Technical implementation of active wholesale access products

Specification of technical implementation (Q30)	Countries	Total
Technical implementation largely predefined	PT, IE, NO, LT, PL	5
Minimum technical requirements	AT, SE, HU, CY	4
Technical implementation determined by operators	IT, SI, CZ, LV, RO	5
Advance availability requirements	ES ²⁴	1
Not relevant	FR	1

Source: BEREC

The responses reveal three broad approaches to the technical implementation of active wholesale access products.

A first group of countries relies on detailed technical specifications incorporated into reference offers or State aid frameworks. For instance, Portugal reports that technical interfaces, bandwidth profiles, VLAN ranges and transparency rules are specified in the reference offer. Similarly, Ireland indicates that wholesale products are defined in the reference offers that beneficiaries of public funding are required to publish. Norway and Lithuania also report that technical specifications are included in published reference offers. In Poland, detailed technical requirements are established through State aid programmes and incorporated into funding agreements²⁵.

A second group of countries establishes minimum technical requirements while leaving specific choices to the State aid beneficiaries. Austria requires active products to be Ethernet-based, provide at least five bandwidth profiles, support a minimum of four VLANs per customer and allow traffic prioritisation across at least four classes. Sweden requires the use of commercially proven technologies capable of delivering at least 1 Gbps and mandates the publication of reference offers. In Hungary, regulatory requirements focus primarily on ensuring the availability of spare capacity for third-party service providers. Cyprus specifies only minimum service characteristics, such as speed and service-level commitments, without prescribing detailed technical implementation.

In contrast, a third group largely relies on contractual arrangements and commercial negotiations to determine technical characteristics. For example, Italy reports that, while the general framework is reflected in the SMP reference offer approved by the NRA, technical implementation is not specified in advance by the regulator. Slovenia and Czechia similarly indicate that technical conditions are determined through reference offer terms. Latvia notes that technical specifications depend on contractual arrangements between parties, while Romania reports no specific requirements.

²⁴ 6 months When the beneficiary is a vertically integrated operator, access must be granted at least six months before the start of the provision of retail services. For other cases, the wholesale offer must be available to interested third-party operators sufficiently in advance of the start of retail operation of the ultrafast fixed broadband network by the beneficiary.

²⁵ These mandate specific Bitstream access parameters (such as 300/100 Mbps for standard households, 1000/1000 Mbps for strategic points, and a minimum floor of 100/20 Mbps).

Spain follows a somewhat different approach, focusing primarily on the timing of wholesale product availability rather than on technical specifications. In particular, vertically integrated beneficiaries must make wholesale access products available at least six months before launching retail services, while third-party operators must be granted access sufficiently in advance of commercial operation.

Overall, the NRAs seek to ensure transparency and interoperability while allowing a significant degree of flexibility. Detailed technical prescription therefore appears to be the exception rather than the rule.

4.2. Pricing of wholesale access services

NRAs were first asked about the **pricing methodology** used to determine wholesale access prices in State aid funded networks. Table 9 gives an overview of the main methodologies used.²⁶ There are several cases in which more than one methodology (or a combination of methodologies) is applied for the same access product. Therefore, the number of cases per line is usually higher than the number of countries having responded to this question.

Most frequently (in 38 cases overall), the regulated prices set by the NRAs under the SMP framework are used, followed by dedicated (not under the SMP framework) cost oriented prices and benchmarking with competitive areas (29 cases each). For physical unbundling, VULA and bitstream, some countries use a dedicated economic replicability test (ERT) in addition to other approaches.

There is also a significant number of countries using other methodologies than the ones just mentioned. Sweden, for example, stated that all prices have to be fair and non-discriminatory. Norway relies on the prices determined in joint market agreements for duct and pole access. In Austria, the minimum of costs and an ERT applies to physical unbundling and bitstream access while in Hungary, the methodology still has to be determined. RO has a pricing scheme with one-off and recurrent prices and minimum gaps between retail and wholesale prices for VULA (retail price -25%) and bitstream access (retail price -20%). In the Czech Republic, the retail-minus method is applied to the basic (cheapest) retail internet access product to determine the price for VULA.

²⁶ For the countries in each category, see the corresponding table in Annex I.

Table 9: Pricing methodology

Prices determination (Q16)	Benchmarking with competitive areas	Regulated prices set by NRA under SMP framework	Dedicated (not SMP) Cost-oriented prices	Dedicated ERT*	Other	Total
Duct access	4	5	5		4	16
Pole access	4	4	3		4	12
Dark fibre access	6	3	4		2	13
Physical unbundling at central office	3	4	4	2	2	10
VULA access	2	7	2	3	3	12
Bitstream access	5	6	6	3	6	17
Access to backhauling	2	3	1		3	8
Collocation services access	3	6	4		2	11
Other service					3	3
Total	29	38	29	8	29	

*) Also referred to as margin-squeeze test or retail-minus.

Source: BERECA

Countries using “**benchmarking with competitive areas**” were asked which sources have been used to establish the benchmark. Some countries (ES, PL, DE) used dedicated data collections and analyses to establish a benchmark while other relied on information available from market analysis activities or market monitoring (RO, FR). In some cases (FI, PT), the operators/bidders themselves aligned their proposed prices with prices in competitive areas. While some countries allow a certain difference between wholesale prices in competitive areas and State aid areas (PL +17%), most other countries using this methodology did not mention such a differentiation or explicitly state that the benchmark in competitive areas has to be met (FR, RO, DE, HR).

Information on the **price structure / the main price components** can be found in Table 10.²⁷ While for duct and dark fiber access a monthly price per meter is most commonly used, a monthly price per access line prevails for physical unbundling, VULA and bitstream access. Prices for ducts may not only depend on the length but also on the diameter or the square centimeters. Pole access is most frequently priced with a fee per access line but also a fee per pole is common (most cases under pole access - “other”). While monthly access prices per line (43 cases) or per meter (23 cases) are most frequently used, there are also 12 cases where Indefeasible Rights of Use (IRUs) are used for the access to ducts, poles, dark fiber, physical unbundling or backhauling. For collocation services, usually a price per square meter is used, but prices per rack unit are also common (most cases under collocation services - “other”).

²⁷ For the countries in each category, see the corresponding table in Annex I.

Table 10: Pricing structure

Main pricing components (Q17)	IRU	Monthly price per access line	Monthly price per meter	Monthly price per square meter	Other	Total
Duct access	3	1	11	1	5	16
Pole access	3	4	2	-	4	11
Dark fibre access	4	4	7	-	3	12
Physical unbundling at central office	1	8	-	-	2	9
VULA access	-	9	-	-	2	10
Bitstream access	-	13	1	-	3	16
Access to backhauling	1	3	2	-	5	7
Collocation services access	-	-	-	6	6	10
Other services	-	1	-	-	3	5
Total	12	43	23	7	33	

Source: BEREC

The countries have also been asked whether there are any **differences** in access pricing depending on the use of **point-to-multipoint (P2MP) vs point-to-point (P2P)** infrastructure (Q18). Out of 18 respondents, 12 stated that there is no such difference. Six countries stated that there are or may be differences. In Sweden and Belgium, access prices may reflect differences in network architecture / costs. In Germany, the lease of a fiber optic line to bridge the route from the splitter closest to the customer (first concentration point) to the central office must not be more expensive than the price difference between access at the first concentration point and access at the central office, in order not to disadvantage access seekers in case of P2M infrastructure. In Italy, the maximum end-to-end price in case of P2P (primarily for business users) is set at € 43.76 per month while it is € 11.63 per month in case of P2MP (primarily for residential users). Also in Portugal, access installation and monthly recurring fee are both different between P2P and P2MP. In Croatia, most fibre networks are built as P2MP, therefore it is not possible to unbundle the local loop at the central office / ODF location.

As regards the **differences** between access prices determined for **SMP providers and access prices determined for other State aid beneficiaries** (Q19), seven out of 19 countries state that there are no differences, six say that there are differences, in four cases differences are possible and in a few cases this question is not relevant (FR, SE, CY) because either there is no SMP operator or the SMP operator has not been awarded State aid funding.

Differences apply in the following cases: In Ireland, VULA prices for the non-SMP State aid beneficiary NBI (National Broadband Ireland) are higher than the prices of the SMP operator Eircom, as NBI has less points of handover (bitstream prices, on the other hand, are the same). In Slovenia, Lithuania and Portugal, the pricing methodologies applied to the SMP operator differ from those applied to other State aid beneficiaries. In Austria, the same principles apply to both types of operators (former SMP and non-SMP), however, in the ERT, a higher minimum margin between retail and active layer applies to the former SMP operator mainly due to higher marketing and sales expenses. Differences are between SMP and non-SMP are also possible in Poland, Greece, Germany and Italy. In Poland, beneficiaries can either base their proposed price on prices benchmarked by the NRA or regulated prices set by the NRA under the SMP framework. In Greece, wholesale access prices of non-SMP operators shall not be lower than the wholesale

access prices set for SMP providers and shall not exceed by more than 15% these wholesale access prices. In Germany, the same maximum prices apply to all beneficiaries, however, bitstream access prices of the SMP operator Deutsche Telekom are also evaluated ex post with regard to their economic replicability. In Italy, State aid beneficiaries for some services can offer lower prices than those of the SMP operator, which are considered as the maximum prices allowed.

Several questions were also asked about the application of an **economic replicability test** (ERT, also referred to as margin-squeeze test or retail-minus) in the State-aid context. Out of 21 countries, five say explicitly that they apply an ERT (see Table 11). In several of the countries which say that they do not apply an ERT, the replicability is ensured by other means. Some countries (ES, GR, IT, PT) mention that the prices are based on those of the SMP regime which usually also controls for replicability or retail products. In the case of Ireland, a margin squeeze test between VULA and bitstream is not applied by the NRA but by another entity (the Department of Culture, Communications and Sport). In Slovenia, wholesale prices of beneficiaries with a retail arm are subject to a price-cutting ban which is imposed with the aim of ensuring a sufficient difference between retail and wholesale prices. In Romania, replicability is ensured through retail-minus pricing for some access products (VULA, bitstream), maximum price caps, non-discrimination obligation and accounting separation requirements. Also in the Czech Republic retail-minus is applied in case of VULA for vertically integrated beneficiaries. Sweden mentions non-discrimination requirements and competition principles to ensure replicability. In Germany, although an ERT has not yet been applied, there are general principles stating that an access seeker must be able to replicate the beneficiaries' retail offers technically and economically. In Lithuania, margin squeeze is not an issue since the only entity operating a State aid funded network is a wholesale-only operator.

Table 11: Economic Replicability Test

ERT (Q21)	Countries	Total
Yes	NO, PL, FR, CY, AT	5
No	ES, IE, SI, HU, GR, LV, FI, LT, IT, RO, SE, BE, CZ, DE, HR, PT	16

Source: BEREC

Where an ERT is applied, 2 countries (AT, PL) determined/applied minimum gaps between different levels of the value chain while 3 countries did not (NO, FR, CY).

Finally, information was sought in relation to **cost oriented prices** (Q23). First, BEREC asked whether the NRA provides a scheme or calculation sheet to determine the costs (see Table 12). Poland, Cyprus and the Czech Republic provided documents with principles that have to be followed when calculating the prices. Austria provided an Excel sheet where the costs have to be filled in and prices for duct, dark fiber and physical unbundling are calculated automatically.

Table 12: NRA providing a scheme / calculation sheet to determine costs

Predefined template for cost calculation (Q23a)	Countries	Total
Yes	PL, CZ, CY, AT	4
No	ES, IE, SI, HU, FR, LT, IT, SE, DE	9

Source: BEREC

The cost oriented prices in five countries are calculated by the beneficiaries, in two by the NRAs and in four by other institutions (see Table 13). In Ireland, the other institution is the Department of Culture, Communications and Sport (DCCS) who have responsibility for the National Broadband Plan in Ireland. In Germany, prices for access to physical unbundling were calculated by a research institute on behalf of the Member State.

Table 13: Entity that calculates the cost-oriented prices

Price is computed by (Q23b)	Countries	Total
The beneficiary	PL, LT, IT, CZ, AT	5
The NRA	HU, CY	2
Other	IE, SI, SE, DE	3

Source: BEREC

If the cost-oriented price is not calculated by the NRA (but by the beneficiary or another institution), the NRA reviews the calculation in five cases, while it does not do so also in other five (see Table 14).

Table 14: NRAs reviewing the cost-oriented prices calculation

Review by NRAs (Q23c)	Countries	Total
Yes	PL, IT, SE, AT	4
No	IE, SI, LT, CZ, DE	5

Source: BEREC

Finally, BEREC has also collected information on actual prices effectively used, which can be found in the tables of Annex I.

4.3. Wholesale access Reference Offers

The BB Guidelines establish a clear regulatory requirement for MS to define and ensure the publication of wholesale access conditions—including prices and terms—through transparent mechanisms, typically in the form of reference offers. This implies that beneficiaries of State aid are expected to provide standardized reference offers covering the relevant access products, as a key tool to guarantee transparency and non-discriminatory access.

Based on the timeline of the publication of the reference offer for wholesale access products to be offered by the beneficiary of the public funding to the market, table 15 below provides relevant information.

Table 15 - Reference offer timing

Timing of the publication of reference offer (Q10)	Country	Total
Before the State aid funded network starts/started operations*	CZ(6), DE(6), ES(6), GR, HR(6), LV, NO, PL(1), RO, SI(1)	10
After the State aid funded network starts/started operations	AT, BG, CY, FI, FR, HU, IR, IT, PT	9
Other	BE, LT, SE	3

*(The figure in brackets indicates the number of months in advance)

Source: BEREC

The responses reveal two broad approaches regarding transparency obligations. Eleven countries require beneficiaries to publish a reference offer for wholesale access products prior to the commencement of operations of the subsidised network, in some cases (Czechia, Germany, Hungary, Spain) up to six months in advance. By contrast, in nine countries the reference offer is required to be made available to the market only upon, or shortly after, the start of network operations, while in a further three countries the approach varies, ranging from the absence of any obligation to publish a reference offer to cases where publication is contingent upon a request from an access seeker.

Most NRAs require the publication of a combination of passive and active wholesale reference offers, but the scope of these obligations varies significantly across countries. While the obligation to provide wholesale access is broadly implemented, the scope and depth of the reference offer requirement vary significantly across countries. Twenty one NRAs²⁸ provided information about the reference offers in a State aid context in total, which is further discussed. The overview by the specific wholesale service considered is provided in the table below.

Table 16: Reference Offers by country

Reference Offer (Q24)	Country	Total
Duct access	AT, BG, CZ, ES, FR, GR, HR, HU, IE, IT, LV, PL, PT, RO	14
Pole access	CZ, ES, FR, HR, HU, IE, IT, PL, PT	9
Dark fibre	AT, BG, CY, CZ, FR, GR, HR, HU, IT, NO, PL, RO	12
Physical unbundling (OLT/CO)	AT, CZ, DE, FR, IT, NO, PL, PT, SI	9
VULA	CY, CZ, ES, GR, HR, IE, IT, NO, PL, RO, SI	11
Bitstream	AT, CZ, DE, ES, FI, GR, HR, HU, IE, IT, LV, NO, PL, PT, RO, SI	16
Backhaul	CY, CZ, DE, ES, GR, HR, HU, IT, RO	9
Other	BG, HR, IE, IT, PL, PT, RO	7

Source: BEREC

A first group of countries imposes the obligation to publish a reference offer by the beneficiaries for a wide range of passive and active inputs across the value chain, as showed in table 16. This includes infrastructure access (ducts and poles), dark fibre, physical unbundling at the OLT or central office, and active services such as VULA and bitstream, often complemented by backhaul access. Countries such as Poland, Italy, Czech Republic fall within this category, indicating a strong alignment with the Guidelines' objective of promoting effective downstream competition through multi-layer access.

²⁸ AT, BE, BG, CY, CZ, DE, ES, FI, FR, GR, HR, HU, IR, IT, LV, NO, PL, PT, RO, SE, SI

By contrast, a second group of countries requires reference offers for a limited subset of access products. In these cases, obligations tend to prioritise either passive inputs (e.g. ducts or dark fibre) or specific active products (typically VULA and/or bitstream). This pattern is observed, for example, in Spain, France, Greece or Portugal, where the regulatory design appears to balance access obligations with proportionality considerations, potentially reflecting national market structures or the specific design of State aid schemes.

Finally, a third group of countries reports more limited or less formalised requirements regarding the publication of reference offers across the access products considered, despite the presence of State aid-funded FTTB/FTTH networks. This approach may reflect alternative regulatory designs, where transparency and wholesale access conditions are primarily embedded in tender specifications or contractual arrangements, rather than being systematically structured through standardised reference offers. Countries such as Sweden and Belgium can be broadly associated with this category. In these cases, the design of access obligations appears to rely on more flexible implementation mechanisms, highlighting the diversity of national approaches to ensuring transparency and wholesale access conditions under State aid frameworks.

Furthermore, it may be noted that some countries, such as Italy and Poland, foresee that under certain conditions beneficiary operators must provide multiple layers of wholesale access, including both physical unbundling and virtual unbundling (VULA), thereby ensuring a broader degree of service replicability. By contrast, in other cases such as Norway, the obligation is not cumulative but alternative, meaning that the provision of wholesale access—whether physical or virtual—depends on the network architecture deployed by the beneficiary operator and on the technical feasibility of each access modality.

4.3.1. Examination of Reference Offers

The responses reveal three broad approaches to the examination of reference offers by NRAs in order to ensure compliance with wholesale access obligations. In some countries, NRAs review reference offers before the State aid-funded network becomes operational, while others rely on ex post oversight once services have been launched. A third group does not foresee a direct NRA review and instead relies on alternative arrangements.

Seven NRAs examine reference offers before the State aid-funded network becomes operational, whereas four NRAs intervene after the network has started. Examples of the first approach include Poland, Greece, Italy, Cyprus, Croatia and Portugal, and Spain, France, Romania and Sweden illustrate the second. The third approach is observed in a number of countries such as Finland, Ireland, Norway and Slovenia, where compliance is ensured through mechanisms such as existing SMP reference offers, granting authority oversight, tender conditions or broader monitoring arrangements.

Overall, the responses suggest that Member States follow different institutional models for ensuring compliance with State aid wholesale access obligations. While some assign a direct supervisory role to the NRA, others place greater reliance on ex post intervention or alternative oversight arrangements.

Table 17: Reference Offers review by NRAs

Reference Offer review (Q25(a))	Country	Total
Before operation	AT, CY, GR, HR, IT, PL, PT	7
After operation	ES, FR, RO, SE	4
Other mechanisms	BG, CZ, DE, FI, IE, HU, LV, NO, SI	9

Source: BEREC

4.3.2. Content of the Reference Offers

The requirements that Reference Offers need to fulfill vary greatly from one respondent to another. In the case of some countries, NRAs did not report any *a priori* established requirements/minimum specifications. For instance, since Sweden and Belgium do not require publication of reference offers, there is no need to be specific about the Reference Offer. Additionally, five more respondents (BG, DE, FI, LV, RO) do not establish the actual content, although they require publication of reference offers.

On the other hand, some NRAs set specifications for a wide range of wholesale products, with Poland having the most comprehensive approach. UKE pointed out that they use model reference offers set by the NRA which cannot be altered by the beneficiary in the first year of operation. It is interesting to note that, in their experience, this approach makes it easier for the beneficiaries to enter into operation, especially the smaller ones with less experience in wholesale access. Also Italy and Czech Republic prescribe content for all types of wholesale products, although they do not pre-specify a full contract, but list requirements instead.

In general, most countries choose either to put forward a list of requirements applicable to the relevant wholesale products or to pre-specify a full contract. Only Austria and Norway choose to combine these two approaches, depending on the type of product concerned. Four countries²⁹ pre-specifying full contracts for the selected relevant wholesale products, while seven countries³⁰ provides a list of requirements. Spain provides a list of specifications that should be included, but has not made it mandatory to include all specifications from the list in reference offers.

The involvement of the NRAs also varies. In approximately 50% of the countries, it is the NRA who provides the specification for the Reference Offers, while, in the other half of the countries, the NRA is not the authority that provide such specifications.

Table 18: Specification of Reference Offers by NRAs

NRAs specification of the RO (Q27)	Country	Total
Provided by NRA	AT, CY, CZ, FR, HR, IT, PL, PT, RO	9
Not provided by NRA	BG, ES, FI, GR, HU, IE, LV, NO, SE, SI	10
Other	BE, DE	2

Source: BEREC

²⁹ GR, IR, PL, SI

³⁰ CY, CZ, FR, HR, HU, IT, PT

When asked about the specific content of the reference offers, there is clearly some consistency among the respondents. All countries that request Reference Offers replied that it should include service level agreements (SLAs). Except for Ireland, in all the countries the Reference Offers should include service level guarantee (SLGs) as well. Several respondents also pointed out that the provisions should include measures to ensure fair and non-discriminatory conditions³¹. Countries like Spain, Romania, Croatia and Norway also responded that the reference offers should include technical specifications while France includes information about quality of service (QoS).

4.4. Monitoring of wholesale access conditions

Monitoring the application of the wholesale access conditions and prices approved under the State aid programme is of utmost importance to ensure compliance with the approved aid scheme, prevent distortions of competition, and safeguard the effective use of public funds. It enables the relevant authorities to verify that wholesale access is provided on fair, transparent, and non-discriminatory terms, thereby supporting the State aid objectives of promoting competition, investment, and consumer benefits.

Across the different countries, responsibility for monitoring compliance with the access conditions is generally assigned in one of two ways. The monitoring function is either entrusted to the NRA or performed by the granting authority, typically the relevant ministry or a comparable governmental body.

4.4.1. Further monitoring after first approval

Although a review of the Reference Offers is typically carried out during the initial deployment phase of the State-aided network, there may be a need to monitor the access conditions subsequently since the State-aided network is required to provide active wholesale access products for a minimum period of ten years and passive wholesale access products for the lifetime of the network.

The telecommunications market is inherently dynamic, and both prices and access conditions may need to be adjusted over time to reflect changing market circumstances, evolving regulatory requirements, and other developments affecting the provision of wholesale access throughout the relevant period. BEREC has therefore examined the extent to which wholesale access prices and Reference Offers are monitored, and potentially reviewed, in the years after the network enters into operation.

Among the 22 respondents, three main approaches for monitoring access conditions can be identified. By contrast, some countries have adopted an approach that does not provide for any formal monitoring. This is the case, for example, in Sweden, where there is no requirement to publish reference offers. The overview is provided in Table 19.

³¹ AT, FR, HR, HU, LV, NO, PL, PT

Table 19: Monitoring of access conditions after first approval

Access conditions monitored (Q32)	Country	Total
Access prices and reference offers	AT, CY, CZ, ES, FR, GR, HR, LV, PL, RO, SI	11
Access prices	BE, LT, NO, PT	4
Reference offers	IT	1
Not required/Other	BG, DE, FI, HU, IE, SE	6

Source: BEREC

Other countries have chosen an approach under which wholesale access prices are monitored, while Reference Offers are not. This approach likely reflects the fact that prices are generally the component most frequently subject to change and may require adjustment due to factors such as inflation and increasing operating costs. At the same time, competitive pressures and expected efficiency gains may also contribute to price reductions. By contrast, Reference Offers tend to be more stable in nature and may therefore require less monitoring.

The most comprehensive approach consists of monitoring both wholesale access prices and Reference Offers. Approximately half of the respondents have adopted this approach.

Finally, Italy represents a distinct case, as it reviews Reference Offers whenever a beneficiary wants to introduce a new/modified service offered through the funded network but does not monitor wholesale access prices provided that the price caps established in the tender documentation are respected.

4.4.2. Monitoring and updating of wholesale access conditions

The information provided by the NRAs shows that the monitoring and updating of Reference Offers after initial approval is generally limited and predominantly reactive. In many cases, intervention is performed only when specific events occur, typically linked to changes introduced by market players. For instance, in France it is required that every modification must be notified to the NRA, while in Czechia, Greece, Austria and Cyprus the Reference Offers are reviewed only when the beneficiary indicates changes or complaints. Similarly, Slovenia and Finland link updates to dispute situations, and in Italy revisions are triggered when new or modified services are introduced. These approaches reflect an event-driven model, where Reference Offers evolve in response to specific operational or commercial developments rather than through systematic reassessment.

At the same time, a smaller group of countries relies on more structured or broader mechanisms that go beyond purely reactive approaches. Some introduce non-event-based triggers, such as in Romania, which refers to significant changes in market conditions. Or one combine multiple triggers, as in the case with Spain, where reviews can take place within market regulation procedures, upon request from the beneficiary or following dispute resolution. In addition, a limited number of countries incorporate periodic elements, including Latvia and Germany - every three years, Croatia - annual reviews and Portugal - possibility of review every five years. Cyprus foresees reassessment when changes occur combined with ex post monitoring once the network is operational. Overall, these examples show that, where more elaborate mechanisms exist, they

tend to combine regulatory cycles with event-based triggers, although no common or harmonised approach emerges across the different countries analysed.

4.4.3. Monitoring and updating of wholesale access prices

BEREC observes a great disparity in the approach when it comes to the updating of wholesale access prices. Four of the respondents have not given any information about processes for updating wholesale access prices. On the other hand, five respondents inform that they update the prices on a regular basis. Norway updates it every 6 months as part of the SMP regulation. Also, Croatia, Lithuania and Sweden perform the update annually, while Latvia performs the update every 3 years.

The majority of the respondents update the prices, but not on a regular basis. The updates are triggered by change or otherwise on an ad-hoc basis. Conditions that may result in an examination and possible update of the wholesale access prices may be if the beneficiary alter prices, if there are disputes, or if there is changes in the marked conditions.

4.4.4. Prices for wholesale access in State-aided networks established in accordance with pricing obligations in ex ante regulated markets

Current regulatory practice shows a clear tendency to deregulate wholesale markets previously regulated on an ex ante basis once effective competition is established, leading to the relaxation of strict pricing obligations such as cost orientation. In this context, BEREC was interested to learn more about the interlink between ex ante pricing regulation and State aid pricing regulation, when the latter was set initially in relation to the former.

In that context, some NRAs have expressed concerns regarding the situation that will arise once the ex ante pricing regulation will either be lifted or relaxed, while others have put forward solutions they have developed. The responses provided by NRAs targeted at State aided networks indicate that deregulation does not result in an abrupt removal of pricing constraints, but rather in the adoption of transitional mechanisms or alternative benchmarks to ensure continuity and avoid market disruption.

For instance, in Poland, following the deregulation decision of January 2026, SMP operators are prevented from modifying Reference Offer prices for a two-year period (until January 2028), allowing beneficiaries to continue relying on previously regulated prices. Similarly, in Ireland, after the deregulation of bitstream, wholesale prices continue to be benchmarked against the previously regulated prices of Eircom, while in Norway further work is ongoing to define a new pricing approach in anticipation of such scenarios.

In other cases, NRAs rely on more flexible or principle-based approaches once strict regulation is lifted. In Romania, adjustments are driven by significant changes in market conditions, whereas in Cyprus it is allowed that wholesale prices evolve by taking into account previously regulated benchmarks or existing commercial agreements when cost orientation no longer applies. In addition, some responses indicate that existing access conditions remain in force until formally revised (e.g. Bulgaria), while others point to the continued application of general regulatory

principles such as those set out in Article 52 of the GBER. Overall, these approaches suggest that deregulation is typically accompanied by mechanisms aimed at preserving price stability and ensuring alignment with competitive conditions, rather than introducing full pricing freedom for wholesale access to State aid funded networks immediately.

5. Market developments due to State aid

BEREC was also interested in finding out about developments which have taken place due to State aid and, in that vein, enquired about the practical use of the wholesale access services which obligations have been established to, as well as the effective reporting mechanisms that are used in order to monitor the results in the market. As already explained at length in the previous chapters, State aid measures are an opportunity to even out connectivity divides across a country's territory, particularly in the areas which are economically not feasible for broadband deployment. However, the effectiveness of access to State aid-funded networks is the element that ultimately matters the most in reaching the expected targets. In other words, if operators do not buy wholesale access to these networks in order to supply retail services to the end users, this likely proves problematic and warrants further investigations as to which are the reasons behind.

Furthermore, from the wide array of access services to a State-aided fixed network or supporting elements thereof which are prescribed in the BB Guidelines (bitstream access, physical unbundling, VULA, access to dark fiber, access to newly-built physical infrastructure, depending on the funded network), the wholesale use proved significantly different by category. In other words, depending on the specific national circumstances, it does not seem worthwhile to attach access obligations to all the array of aforementioned services, as they embed regulatory costs and they are not always needed, being dependent on the network architectures and topologies in different countries, the potential access seekers preferences, the granularity of the area determination, the number of (expected) beneficiaries and alike.

Overall, from the 22 NRAs that have reported on the type of wholesale access products that the State aid beneficiary is supposed to offer, 9 have reported also on the actual use of these products. It is noteworthy that information about the effective use may be incomplete, as it is not always available at hand to the NRAs (in most of the cases, there are other competent authorities – Ministries, State Agencies etc. – responsible for permanent oversight of the funds-generated advances in connectivity) or it may be dependent on the service itself, meaning that, even when an NRA has usage data for a given wholesale access service, this does not automatically mean that use-related information for all the services that the beneficiaries are required to offer to the market is readily available.

At the same time, BEREC notes that the degree of monitoring seems to differ significantly from one country to the other and, in particular, the higher the amount of financial support, the greater

the interest in following closely these developments. Particularly, 5 NRAs³² have reported dedicated monitoring mechanisms to assess the impact.

An overview by the observed take-up degree and the corresponding service that it refers to is provided in the table below. BEREC also underlines that these networks may support the provision of other wholesale access services than the ones explicitly mentioned, such as, for instance, symmetric ethernet services at local level, backhauling or collocation.

Table 20. Overview of wholesale access products used in practice

Degree of take-up (Q35)	No take-up	Low take-up	Significant take-up	Total
Duct access	IE, AT	PT, CY, NO	FR	6
Pole access	IE, CY	PT, NO	FR	5
Dark fiber access	AT	CY, NO	FR	4
Physical unbundling	NO	-	SI, PT, FR, AT	5
VULA	FR	-	SI, IE, CY, NO	5
Bitstream	-	PT, FR, ES, NO	SI, IE, LT, AT	8

Source: BEREC

In terms of take-up, as expected, the operators preferred buying active services at wholesale level despite the perceived lack of flexibility in terms of services provision. Furthermore, duct and pole access is, of course, dependent on the availability of physical infrastructure. Besides France, where this type of access has been put at extensive use in State-aided areas, in the other countries either no take-up or a low take-up have been reported. Concerning bitstream, quite surprising since this is the type of active access service that requires the lowest amount of investments on the side of the access seekers, half of the NRAs that responded reported a low take-up.

In the overall picture, although the data may not illustrate a full-fledged situation, BEREC highlights that, by and large, the information collected may point to an imbalance between the aim of developing services provision in remote areas and the results achieved so far. However, BEREC notes the above as a wide indication, but considers important that this analysis is conducted in correlation with the timespan of the investment, which is an element that was not taken into account in the evaluation presented above. For instance, if the State aid funded network is newly built, it may last for a while until the access seekers would effectively start using the network. Furthermore, the take-up level is a dynamic element and may be improved along the lifetime of the networks investment by adjusting the initial access conditions in order to incentivize wholesale demand, for instance. There are several elements bearing on the specific circumstances that need to be accounted for and, therefore, a case-by-case analysis is needed in order to better explain the gaps.

In light of the above, the NRAs have reported a wide array of aspects that have a direct impact on the effectiveness of State aid measures, from the design phase to the implementation. Several NRAs³³ mentioned the consideration/delineation of the areas susceptible to State aid funding and the corresponding clusters and, in strict correspondence, the number of State aid beneficiaries.

³² ARCEP (FR), CNMC (ES), ComReg (IE), RTR (AT) and UKE (PL).

³³ NKOM (NO), RTR (AT)

The smaller the areas/the more granular the identification, the higher the number of potential beneficiaries and, as a consequence, the less of a 'business case' for an access seeker. Furthermore, it is increasingly difficult for the access seeker to reach the point of handover if the areas are small³⁴. This means that the effectiveness of State aid measures is diminished when the designation of areas is very granular.

The abovementioned challenges are inherently linked to the fact that, for successful implementation, a sufficient degree of interest for the beneficiaries of the schemes needs to be ensured, with areas where deployment is complex and costly being 'compensated' with areas where networks rollout do not seem so difficult, being expected to yield comparatively higher returns, albeit both categories of areas being of market failure³⁵.

Other important difficulties leading potentially to inefficient results regard the pricing of the access services. Striking the right balance between the wholesale and retail pricing did not prove an easy task, with different methods of verification³⁶. Particularly, the control through margin squeeze tests proved resource intensive, especially for new or inexperienced beneficiaries³⁷. Additionally, for vertically integrated operators, the establishment of a minimum gap between the wholesale and retail service was pinpointed as a practical complexity to ensuring wholesale access is undertaken³⁸.

Finally, compliance monitoring with the wholesale access obligations and ensuring effective non-discrimination have been mentioned as challenges related more to the implementation and exploitation of the State aid-funded networks³⁹.

5.1. Reporting on the effectiveness of State aid

As mentioned above, 5 NRAs⁴⁰ actively monitor the effectiveness of State aid schemes in order to improve the results and intervene in the process when needed. This also creates a solid base of knowledge when establishing new State aid schemes. BEREC has researched their reports and studies and considers such monitoring as a good practice, encouraging this approach. Publishing reports and studies about State aid schemes effectiveness benefit not only the regulators and other competent authorities involved, but a wider array of stakeholders, including the market as a whole via enhanced transparency.

The monitoring practices vary from country to country, with no identified pattern by BEREC, neither in the form of output (report, study, recurrent communication), nor in the parameters that are particularly under scrutiny or approaches to this evaluation. Therefore, BEREC develops briefly below on the experiences that the 5 countries reported.

³⁴ AKOS (SI)

³⁵ PTS (SE), BIPT (BE), ARCEP (FR), RTR (AT)

³⁶ ANACOM (PT), UKE (PT), RTR (AT)

³⁷ UKE (PL)

³⁸ RTR (AT)

³⁹ UKE (PL), RTR (AT)

⁴⁰ ARCEP (FR), CNMC (ES), ComReg (IE), RTR (AT) and UKE (PL).

In Spain, in 2022, the CNMC conducted a rigorous before-and-after analysis comparing municipalities in Spain that received broadband subsidies with similar municipalities that did not⁴¹. The conclusion was clear: by 2020, municipalities benefiting from State aid exhibited fibre penetration rates approximately 10 percentage points higher than those of comparable non-aided municipalities. The study also documents a pro-competitive effect in aided areas, attributable in part to the wholesale access obligations imposed on the beneficiaries of the subsidised infrastructure. As a result, in aided municipalities, the leading operator's market share was 7% lower than in comparable non-aided areas, with the gap reaching 8–10% in towns with between 1,000 and 10,000 inhabitants. Thus, in this case, one could consider that the aid has been effective regarding its main aim of increasing the use of broadband.

For Poland, there is a dedicated section in the periodical statistical data reports that portray the overall situation of the electronic communications sector and the developments in the most recent reporting period. Alongside information on the overall status of the market, coverage and penetration rates, services performance and financially-related indicators, data on publicly co-financed investments is showcased. Besides the supply-side, UKE presents the number and percentage of connections underlying the main State aid scheme (POPC). For instance, for 2025, they report 52.5% of the addresses under the State aid scheme as unconnected (No retail service provided in households covered by POPC), with the rest being connected – 32.5% based on co-founded infrastructure (Retail services provided in households covered by POPC using infrastructure co-financed under POPC) and 15.0% based on other infrastructure (Retail services provided in households covered by POPC on infrastructure other than co-financed)⁴². BEREC considers that the ratio of connected addresses/premises/households (depending on the unit of choice for the design of the State aid schemes) to the total funded units is a highly relevant indicator concerning the use effectiveness and, should it be available in several countries, it could enhance the possibility of cross-country comparisons.

In the case of Ireland, there is a State aid dedicated report that is published on annual basis, in consideration of the specific set-up of the State aid scheme, with National Broadband Ireland Infrastructure as the sole beneficiary. ComReg is analysing a wide array of indicators, some of which concern (i) the length of the newly installed cables, (ii) the number of newly installed poles, (iii) the newly prepared premises that could be connected immediately, (iv) the newly passed premises, (v) the number of wholesale access contracts signed, (vi) the number of newly deployed broadband connection points (which need to be distributed in a certain way) or (vii) the number of strategic connection points (such as primary schools), for the reported period, which is typically of one year⁴³. This approach allows to easily track the evolution year-on-year. As a conclusion of the recent 2025 evolutions, BEREC could underline that “across all counties, the level of take-up varies from 23% to 47%, with the average take-up now standing at 34%, up some 2% over the previous year” in Ireland.

For France, the approach is fairly different, as there are several State aid schemes followed under the so called Very High Capacity French Plan (Plan France Très Haut Débit), depending on the

⁴¹ https://www.cnmc.es/sites/default/files/4813108_0.pdf

⁴² <https://www.uke.gov.pl/akt/raport-o-stanie-rynku-komunikacji-elektronicznej-w-2025-roku.670.html> – report, page 108.

⁴³ https://assets.gov.ie/static/documents/2b18ad1c/Fifth_Year_State_Aid_Report_2024_-_2025.pdf

identified areas by population density. The most recent evaluation report of 2023⁴⁴ entails a great degree of comprehensiveness and level of detail, but such an exercise is not conducted on an annual basis. Particularly, there is a targeted dedicated chapter that discusses the proportionality and effectiveness of the plan for the State aid, illustrating the investments by specific components, detailed analysis of the funding sources, of the modelled and average costs underlying the deployments (established ex post), the institutional setup and governance assessment, alongside obvious information such as the progress in terms of premises passed and connectable premises. The public-private partnerships in France are portrayed as key elements that have yielded the satisfactory results portrayed in the report, and progress over time was registered regarding the main clauses, with reduction of the community risk-taking.

Finally, in Austria, several 'evaluation reports' with regard to the broadband State aid schemes have been commissioned by the Ministry or prepared by the Ministry itself.⁴⁵ The latest and most comprehensive study by WIK-Consult and EcoAustria was published in 31 December 2025,⁴⁶ using expert interviews, descriptive and econometric analyses, and case studies. The report finds that subsidies are efficient with strong multiplier effects for the economy. Still, FTTP coverage (44.8% in 2025) is below EU averages and the rollout is slow. The report estimates that at least €800m more public funding is needed to meet 2030 targets and recommends extending the State aid programmes. To improve effectiveness, it urges procedural and design changes e.g. incentivise faster completion, municipal-level planning and funding, limits per recipient/connection, stronger enforcement of non-discriminatory wholesale access and functional separation, and adjusted cost parameters.

6. Conclusions

In recent years, the deployment of FTTB/FTTH networks across the EU has been significantly supported by public funding, particularly through the Recovery and Resilience Facility. The starting point of this data collection exercise among NRAs was to better understand the approaches adopted across MS regarding wholesale access obligations and pricing conditions in networks supported by State aid. In this context, ensuring effective wholesale access under fair and non-discriminatory conditions represents an important element for promoting sustainable competition and the efficient use of public resources, especially in market failure areas.

On the one hand, the European regulatory framework establishes clear principles requiring subsidised broadband infrastructures to provide wholesale access under fair and non-discriminatory conditions pursuant to the 2023 BB Guidelines and the GBER. On the other hand, the practical implementation of these principles varies considerably across Member States. This diversity can be observed in the wholesale access products made available, the pricing

⁴⁴ <https://www.strategie-plan.gouv.fr/files/files/Publications/Rapport/fs-2023-rapport-thd-janvier.pdf>

⁴⁵ See https://www.bmwkms.gv.at/themen/telekommunikation-post/breitband/publikationen_breitband.html, links under "Breitbandevaluierungen".

⁴⁶ https://data.breitbandbuero.gv.at/Publikationen/WIK-Consult_EcoAustria_Zwischenevaluierung-der-Initiative-Breitband-Austria-2030.pdf

methodologies applied, the transparency obligations imposed on beneficiaries, as well as the monitoring mechanisms established after the subsidised networks become operational.

The responses further indicate that NRAs play an important role in activities directly linked to competition safeguards, notably the determination of targeted areas, the assessment of wholesale access conditions and prices, and dispute resolution. However, the degree and timing of NRA involvement differ significantly across national frameworks, ranging from close assistance throughout the design and implementation of State aid programmes to more limited advisory roles or situations where no direct involvement exists in the formal approval process.

BEREC also observes that the picture is more nuanced regarding the actual use of wholesale access products. While most NRAs require a broad range of wholesale access obligations encompassing both passive and active products, the effective use of these products differs significantly across countries. Where usage data are available, active access services generally appear to attract greater commercial interest, whereas passive infrastructure inputs such as duct and pole access experience minimal or low take-up in most countries that reported usage data, albeit with some notable exceptions. The responses suggest that usage patterns may depend on factors such as network topology, access conditions, pricing arrangements, access seeker preferences and the characteristics of the State aid schemes concerned.

Similar differences can be observed with respect to the determination of wholesale access prices. While regulated prices established under the SMP framework represent the most common approach, countries also rely on benchmarking against competitive areas, dedicated cost-oriented methodologies, economic replicability tests, or combinations thereof. As in other areas of wholesale regulation, national circumstances play an important role in pricing practices, creating clear comparison difficulties across countries. The responses also indicate that the monitoring and updating of wholesale access prices and conditions remain important, continuing long after a network enters operation.

As regards transparency, the responses reveal different approaches concerning the publication, review and monitoring of Reference Offers. Market consultations and ex ante publication requirements are widely used, although not systematically applied across all countries. The timing of publication likewise varies, ranging from several months before the launch of retail services to publication only once network operations have commenced. BEREC notes that these differences reflect different regulatory approaches to ex ante transparency as a tool for facilitating wholesale access and promoting downstream competition.

The evidence collected further suggests that the effectiveness of State aid measures depends on several factors, including market structure, network architecture and the granularity of the areas targeted by public interventions. Highly fragmented geographic targeting may increase operational complexity and reduce the commercial attractiveness of wholesale access opportunities. In addition, in the context of changing market circumstances, where some traditional wholesale markets have recently been deregulated, the responses indicate that pricing constraints are generally not removed abruptly. Instead, countries tend to adopt transitional mechanisms aimed at preserving stability and preventing market disruption.

Overall, the findings show that, despite the existence of a common European framework governing State aid-funded broadband networks, the implementation of wholesale access

obligations remains diverse across countries. In BEREC's view, these differences provide useful insights into the practical application of the Broadband Guidelines and the GBER. Furthermore, the systematic monitoring of outcomes and the publication of evaluation reports and studies represent practices that can contribute to increasing transparency and improving the understanding of the effectiveness of State aid interventions. The evolving landscape of publicly funded network deployments will require continued attention from regulators and competent authorities to ensure that wholesale access conditions remain capable of supporting effective competition, efficient use of public resources and the supporting progress towards the Union's connectivity targets.

Annex I – Additional tables and information

Q3(a) link to the documents describing the State aid programme

AT: <https://breitbandfoerderung.gv.at>

BE: <https://economie.fgov.be/fr/themes/line/telecommunications/appel-projets/zones-blanches/appel-projets-2023-zones>

BG: <https://www.mtc.government.bg/bg/category/334/predvaritelni-dokumenti-vv-vrzka-s-notificiraneto-za-drzhavna-na-pomosch-na-investicii-ot-npvu>

CY: <https://www.eprocurement.gov.cy/epps/cft/prepareViewCfTWS.do?resourceId=6558529>

CZ: <https://www.mpo.gov.cz/assets/cz/podnikani/narodni-plan-obnovy/vyzvy/2022/4/Priloha-7---Pokyny-pro-vytvoreni-a-zverejneni-velkoobchodni-nabidky.pdf>

<https://optak.gov.cz/UserFiles/File/1718005002p-loha-7b-pokyny-pro-velkoobchodn-nab-dku-vhcn.pdf>

DE: <https://www.gigabitfoerderung.gov.de/>

ES: <https://www.boe.es/eli/es/o/2023/08/01/etd947>

https://avance.digital.gob.es/banda-ancha/Paginas/Programa_UNICO_Banda_Ancha.aspx

<https://portalayudas.digital.gob.es/InfraestructurasDigitales/Paginas/Index.aspx>

FI: <https://www.traficom.fi/fi/tuet-ja-avustukset/laajakaistatukiohjelman-tukee-kiinteiden-verkkojen-rakentamista-2022-alkaen>

FR: [fs-2023-rapport-thd-janvier.pdf](#)

GR: <https://www.digitaltransform.gr/proskliseis-entaxeis/proskliseis/prosklisi-08/>; <https://www.eett.gr/en/operators/electronic-communications/wholesale-services/broadband-infrastructure-rural-areas/ultra-fast-broadband-infrastructure-ufbb/>
<https://www.espa.gr/el/Pages/ProclamationsFS.aspx?item=6344>

HR: <https://mmpi.gov.hr/UserDocsImages/arhiva/VRH-ONP-objava.pdf>

HU: https://www.palyazat.gov.hu/programok/szechenyi-terv-plusz/dimop-plusz/dimop_plusz-3.1.2-25/dokumentumok

IR: <https://www.gov.ie/en/department-of-culture-communications-and-sport/publications/national-broadband-plan/#state-aid>
<https://nbi.ie/the-national-broadband-plan/>

IT: https://www.mimit.gov.it/images/stories/documenti/1622021525_strategia_bul.pdf

LT: <https://placiajuostis.lrv.lt/en/projects/isri-ip/>

LV: <https://likumi.lv/ta/id/348357-eiropas-savienibas-atveselosanas-un-noturibas-mehanismu-plana-2-4-reformu-un-investiciju-virziena-digitalas-infrastrukturas>; https://reforms-investments.ec.europa.eu/recovery-and-resilience-facility-1/country-pages/latvias-recovery-and-resilience-plan_en#digital-transition

NO: <https://nkom.no/fysiske-nett-og-infrastruktur/offentlig-stotte-til-bredbandsutbygging>

PL: https://rozwojcyfrowy.gov.pl/wp-content/uploads/2026/03/FERC_04032026_10032026.pdf
<https://www.kpo.gov.pl/media/109762/KPO.pdf>

PT: <https://www.anacom.pt/render.jsp?categoryId=332482&languageId=1>

RO: https://oipsi.gov.ro/wp-content/uploads/2023/09/111_C7_Ghidul-Solicitantului.pdf

SE: <https://pts.se/contentassets/14d1454e1be3485d85700d23168dcbc2/pts-villkor-for-bredbandsstod-2025.pdf>

SI: <https://www.gov.si/zbirke/javne-objave/javni-razpis-za-sofinanciranje-gradnje-odprtih-sirokopasovnih-omrezij-naslednje-generacije-goso-6/>
<https://www.gov.si/zbirke/javne-objave/javni-razpis-za-sofinanciranje-gradnje-visokozmogljivih-fiksni-sirokopasovnih-omrezij-ozroma-nadgradnjo-obstojecih-fiksni-omrezij-goso6a/>
<https://www.gov.si/zbirke/javne-objave/javno-posvetovanje-glede-predloga-javnega-razpisa-za-sofinanciranje-gradnje-odprtih-zelo-visokozmogljivih-fiksni-sirokopasovnih-omrezij-ozroma-nadgradnjo-obstojecih-fiksni-omrezij-goso7/>

Q3(d) link to the State aid EC decision

AT: https://ec.europa.eu/competition/state_aid/cases1/202213/SA_63172_9048B77F-0000-CD66-82AC-6DC76F57F1EC_87_1.pdf

DE: https://ec.europa.eu/competition/state_aid/cases1/202048/288295_2213478_121_2.pdf
https://ec.europa.eu/competition/state_aid/cases1/202433/SA_109748_93.pdf

ES: [282618_2120578_133_2.pdf](https://ec.europa.eu/competition/state_aid/cases1/202132/294532_2305605_101_2.pdf), https://ec.europa.eu/competition/state_aid/cases1/202132/294532_2305605_101_2.pdf

FR: https://ec.europa.eu/competition/state_aid/cases/260985/260985_1876109_165_2.pdf

GR: [278209_2093880_210_2.pdf](https://ec.europa.eu/competition/state_aid/cases1/202132/294532_2305605_101_2.pdf)

HR: [SA_100662_308D257E-0200-CC2B-84CF-B4E91BF66E21_60_1.pdf](https://ec.europa.eu/competition/state_aid/cases1/202208/SA_63170_90A0F77E-0000-CD6E-AB04-0DC1247F7469_100_1.pdf)

IR: [282707_2118156_159_2.pdf](https://ec.europa.eu/competition/state_aid/cases1/202208/SA_63170_90A0F77E-0000-CD6E-AB04-0DC1247F7469_100_1.pdf)

IT: https://ec.europa.eu/competition/state_aid/cases1/202208/SA_63170_90A0F77E-0000-CD6E-AB04-0DC1247F7469_100_1.pdf

PT: https://ec.europa.eu/competition/state_aid/cases/236635/236635_1199063_71_2.pdf

Table AI.1 – Pricing methodology

Prices determination (Q16)	Benchmarking with competitive areas	Regulated prices set by NRA under SMP framework	Dedicated (not under SMP framework) Cost-oriented prices	Dedicated ERT*	Other	Total
Duct access	FR, DE, HR, PT	ES, PL , GR, IT, PT	AT, CY, CZ, LV, PL		NO, HU, RO, SE	16
Pole access	FR, HR, PT, PL	ES, IT, PT, PL	CY, CZ, PL		NO, HU, RO, SE	12
Dark fibre access	FR, DE, GR, HR, PL , RO	NO, IT, PL	AT, CY, CZ, PL		HU, SE	13
Access to physical unbundling at central Office	FR, PL , PT	NO, IT, SI, PL	CZ, DE, AT, PL	AT, PL	AT , SE	10
VULA access	DE, HR	ES ⁴⁷ , NO , IT, SI, GR, CZ, CY	PL ⁴⁸ , CZ	NO, PL, CY	SE, RO, CZ	12
Bitstream access	BE, PL, DE , HR, PT	BE , ES ⁴⁹ , IT, SI, GR, PL	AT, CZ , LV, LT, NO ⁵⁰ , PL	AT, NO, PL	AT , HU, SE, RO, CZ, DE	17
Access to backhauling	ES , RO	ES , GR, IT	CZ		DE, HU, SE	8
Collocation services access	PL, DE, PT	PL , ES, IT, GR, RO, PT	PL , AT, CZ, CY		DE , SE	11
Other					IT, RO, SE	3

*) Also referred to as margin-squeeze test or retail-minus.

Bold: countries which apply more than one pricing methodology to the same access product

Source: BEREC

Table AI.2 – Pricing structure

Main pricing components (Q17)	IRU	Monthly price per access line	Monthly price per meter	Monthly price per square meter	Other
Duct access	FR, GR, IT	FR	NO, ES, PL, HU, LV, RO, CZ, CY, DE, PT, AT	PT	SE, RO, DE, HR, PT
Pole access	FR, NO, IT	FR, NO, RO, CY	ES, PT		SE, PL, HU, CZ
Dark fibre access	FR, GR, IT, NO	FR, NO, GR, IT	PL, HU, RO, CZ, DE, AT, HR		SE, RO, FR
Access to physical unbundling at the OLT/ headend / central Office	FR	NO, PL, FR, RO, CZ, DE, PT, AT			SE, DE
VULA access		NO, ES, PL, GR, IT, RO, CZ, CY, HR			SE, CZ
Bitstream access		NO, ES, PL, GR, LV, LT, RO, BE, CZ, DE, HR, PT, AT	HU		SE, IT, DE, BE
Access to backhauling	IT, GR	ES, GR, CZ	ES, HU		SE, HU, IT, RO
Collocation services access				ES, PL, IT, RO, HR, AT	SE, PL, GR, RO, CZ, PT
Other		IT			SE, IE, SI

Source: BEREC

⁴⁷ The latest State aid broadband access programme was the 2024 call (which established the wholesale access prices for subsidised network) and, therefore, the SMP deregulation of the wholesale local access and wholesale central access markets in 2025 is not showcased in this table.

⁴⁸ Access to VULA products in State aided networks is obligatory only if the concerned beneficiary does not offer access to bitstream.

⁴⁹ The latest State aid broadband access programme was the 2024 call (which established the wholesale access prices for subsidised network) and, therefore, the SMP deregulation of the wholesale local access and wholesale central access markets in 2025 is not showcased in this table.

⁵⁰ Some regulated VULA products in Norway also fulfil bitstream obligations and use SMP-regulated prices, while, for other enhanced bitstream products, cost – oriented prices are used.

Table AI.3 – Prices / Price ranges (Q20 a)

duct (monthly) in €	min	max	comments
ES	0.0041	0.1452	per m depending on diameter (40 or 63mm) or centimetres squared (within a diameter of 63 or 110 mm). Min: 1 cm2 in diameter 110; max: full diameter 63mm
PL	0.018	0.456	per m depending on diameter (min: 4 mm, max: >40mm)
HU	0.058		per m
FR	1.55	2.16	per line, case dependent
LV	0.02	0.05	per m
RO	0.0157	0.0342	per m, min: transport network, max: access network
CY	0.28		per m
DE	0.16		per m
HR	0.0119	0.0175	per m depending on diameter (min: diameter 3-16 mm; max: diameter 20-40 mm)
PT	0.0075	0.0078	per m and cm2, case dependent
AT	0.0335	0.65	per m, case dependent

pole (monthly) in €	min	max	comments
NO	0.7		per line per pole
ES	0.44	1.54	per meter, min: wood pole, max: concrete pole
PL	1.49		per pole
HU	0.22		per pole
FR	1.55	2.16	per line
RO	0.4		per line per pole
CA	19.05		per pole
PT	1.20	1.80	per pole

dark fibre (monthly) in €	min	max	comments
PL	0.01317		per m
FR	5.36	6.17	per line, concentration point to fiber distribution point, case dependent
FR	2.82	3.7	per line, final drop (distribution point to premise), case dependent
GR	553.34	1936.7	per line, min: 0-20km , max: >60km
IT	15.82	25.14	per line, min: secondary network; max: primary network
RO	0.0363		per m
DE	0.14		per m
HR	0.0113		per m
AT	0.001	0.56	per m, case dependent

pULL (monthly) in €	min	max	comments
NO	35	70	per line, case dependent (approximate values)
IT	11.63	43.76	per line, min: P2MP, max: P2P
DE	14.71	22.82	per line, min: fibre sub-loop; max: access at the ODF
PT	7.95	11.247	per line, case dependent
AT	18.19	28.8	per line, case dependent

VULA (monthly) in €	min	max	comments
NO	34.8	85.3	per line, case dependent
ES	16.68		per line
IT	13	46.61	per line: min: min consumer, max: max business
HR	9.02		per line

Bitstream (monthly) in €	min	max	comments
NO	34.8	85.3	per line, case dependent
ES	21.8		per line, basic fee + fee depending on traffic volume. Value based on average actual traffic volume (best effort).
PL	9.99	15.46	per line, min: 300 Mbps MDU, max: 1000 Mbps, SDU
HU	6		per line
GR	12.22	15.3	per line, depending on bandwidth
LV	5.2	15	per line, depending on bandwidth and case dependent
LT	6	9	per line, depending on bandwidth and case dependent
IT	14.50	48.11	per line, price of VULA + a traffic dependent fee of € 1.50, estimated based on average actual traffic volumes per line
DE	19.22	49.38	per line depending on bandwidth and Layer 2 / Layer 3
HR	11.76		per line
PT	8.76	13.39	per line for local access, case dependent
AT	23.66	33.46	per line, weighted averages across bandwidths and BUS/RES, case dependent

Source: BEREC

Annex II – The questionnaire

1. Are there any State aid funded FTTB/FTTH networks in your country? (Yes/No) [if No -> End of questionnaire]
2. Is or was the NRA directly or indirectly involved in determining or reviewing the access conditions to State-aid funded FTTB/FTTH networks? (Yes/No)

Please answer the following questions for the **most relevant State aid programme for FTTB/FTTH-networks (in case of more relevant, please use the most recent one)** where you have been involved (directly or indirectly) in determining or reviewing the access conditions to State-aid funded networks. Please refer only **to one programme** that you consider most relevant.

Section A: General information

3. Please provide:
 - a. Please provide a link to the documents describing the State aid programme where you have been involved in determining or reviewing the access conditions to State-aid funded networks and/or that was using NRAs' obligations established previously.
If available, provide the documents in English. _____
 - b. Also, please provide information on the minimum speed.
 - c. The programme is: (i) subject to GBER or (ii) notified to the Commission.
 - d. If the Commission issued a decision / comment letter in your case, please provide the link to the given decision.
4. When was this programme approved (year)?
5. How many beneficiaries were granted State aid in this programme to date? (number)
6. Which amount of public funding is/was assigned in total to FTTB/FTTH rollout (approximately)? (€/programme)
7. What is/was the role of the NRA in this State aid programme ? If yes, mark the appropriate boxes and please provide details below when needed.
 - a. Design of the programme
 - b. Determination of possible areas (white/grey) for state aid purposes (mapping)
 - c. Selection of State aid areas
 - d. Assignment of State aid areas to beneficiaries (competitive selection procedure)

- e. Execution of the programme
 - f. Providing inputs regarding access conditions and prices
 - g. Examination of access conditions and prices (after the bid)
 - h. Dispute resolution
 - i. Other (please explain) _____
8. How many premises (or similar, depending on national circumstances) the programme intends to cover? If the relevant unit is different from the premises, please specify and provide details. Information needs to be included also in the case of lower granularity (localities/population).
9. **(optional)** Is there any information on which premises (or similar) have benefitted already from any State Aid (e.g. in a map)? (Y/N)
- a. Please provide a link, where this information can be obtained.

Section B: Timing

10. When does the beneficiary/beneficiaries have to publish a reference offer for the wholesale access products? Mark the appropriate boxes where relevant.
- a. Before the State aid funded network starts/started operations
 - i. Is there any minimum period specified? If yes, how many months? (number)
 - b. When the State aid funded network starts/started operations
 - c. Other (please explain) _____
11. When was the NRA involved in determining the access conditions, including in terms of pricing? Mark the appropriate boxes where relevant.
- a. When the State aid programme was designed
 - b. Before the State aid programme was approved
 - c. After the State aid programme was approved
 - d. Other (please explain) _____
12. Have the access conditions been consulted with the market? Y/N
13. Are access conditions (reference offers and prices) formally approved by the NRA? (Y/N)
- a. If yes, please explain how the procedure works _____
 - b. If no, please explain why not and whether they are formally approved by another competent authority (which?). _____

Section C: Access products and access prices (FTTB/FTTH)

14. Which type of wholesale access product(s) does the beneficiary have to offer?
- a. Access to ducts
 - b. Access to poles

- c. Access to dark fibre
- d. Access to physical unbundling at the OLT/ headend / central Office
- e. Access to VULA
- f. Access to Bitstream
- g. Access to backhauling
- h. Collocation
- i. Other (please specify all). In case of several services under the category “others” specify all included.

15. Is it different among beneficiaries? (Y/N)

- a. If yes, please specify further.

Section C1: Pricing – details, principles, methodology, structure

Note: According to the 2023 broadband State aid Guidelines,⁵¹ paragraph 151, the wholesale prices should be based in one of the following benchmarks and pricing principles:

- (a) the average published wholesale prices that prevail in other comparable and more competitive areas of the Member State;
- (b) the regulated prices already set or approved by the NRA for the markets and services concerned;
- (c) costs orientation or a methodology mandated in accordance with the sectoral regulatory framework.

16. **Pricing methodology:** How is/was the wholesale price determined? Mark the appropriate box where relevant.

	Benchmarking with competitive areas	Regulated prices set by NRA under SMP framework	Dedicated (not under SMP framework) Cost-oriented prices	Dedicated Economic replicability test ⁵²	other
Duct access					
Pole access					
Dark fibre access					
Access to physical unbundling at the OLT/ headend / central Office					
VULA access					
Bitstream access					
Access to backhauling					
Collocation services access					
Other					

⁵¹ See [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52023XC0131\(01\)](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52023XC0131(01))

⁵² Also referred to as margin-squeeze test or retail-minus.

- a. If other, please explain _____
- b. In case of having chosen “benchmarking with competitive areas”, corresponding to criterion: “(a) the average published wholesale prices that prevail in other comparable and more competitive areas of the Member State” above, please explain in detail how wholesale prices have been benchmarked, the relevant sources you used and all the necessary details to properly understand the assessment/approach.

17. Pricing structure: Which are the main price components applicable? Mark the appropriate box where relevant.

	IRU	Monthly price per access line	Monthly price per meter	Monthly price per square meter	Other (please specify)
Duct access					
Pole access					
Dark fibre access					
Access to physical unbundling at the OLT/headend / central Office					
VULA access					
Bitstream access					
Access to backhauling					
Collocation services access					
Other					

18. Are there any differences in access prices depending on the use of Point-to-Multipoint vs Point-to-point infrastructure? (Y/N)

- a. If yes, please explain _____

19. What are the main differences between access prices determined for SMP providers and access prices determined for other State aid beneficiaries? Please explain

20. (a). Are the access prices for State aid beneficiaries determined individually for each beneficiary or are there common (maximum) prices for all beneficiaries? Please provide the monthly prices or the price ranges in the tables below, depending on the applicable. The prices shall be stated in euros.

	Price ranges		Common (maximum) monthly price set by the NRA	Unit of price (line/meter/etc)	Comments
	Minimum monthly access price determined individually	Maximum monthly access price determined individually			
Duct access					
Pole access					
Dark fibre access					
Access to physical unbundling at the OLT/headend / central Office					
VULA access					
Bitstream access					
Access to backhauling					
Collocation services access					
Other					

20(b). In the below table please indicated values in €/meter and the length of the IRU.

	IRU X Years minimum access price determined for individual beneficiary	IRU X Years maximal access price determined for individual beneficiary	(maximum) IRU X Years access price set by the NRA	Length of the IRU (number of years)	Comments
Duct access	(€/meter)	(€/meter)	(€/meter)		
Pole access	(€/meter)	(€/meter)	(€/meter)		
Dark fibre access	(€/meter)	(€/meter)	(€/meter)		
Access to backhauling					

21. Do you apply an economic replicability test? (Y/N)

- if yes, please answer Q22
- If no: How do you ensure replicability? Please explain _____

22. In case an economic replicability test is applied: Did you determine/apply minimum gaps between the different levels of the value chain? (Y/N)

- If yes, please provide the gaps (or ranges).

Minimum gap between retail and physical unbundling	(number or range)
Minimum gap between retail and VULA	(number or range)
Minimum gap between retail and bitstream access	(number or range)
Minimum gap between physical unbundling and VULA/bitstream access	(number or range)
Other	(number or range)

- b. How were the gaps determined? Please explain _____
 - c. Are gaps uniform across beneficiaries? (Y/N)
 - d. If the gaps are not uniform across beneficiaries, please explain why.

 - e. Are the gaps uniform across different State aid areas? (Y/N)
 - f. If the gaps are not uniform across areas, please explain why. _____
23. If you apply cost-oriented prices:
- a. Did the NRA provide a scheme / calculation sheet to determine costs? (Y/N)
 - i. If yes, please provide a brief description of the methodology, concerned costs, principles etc.
 - ii. If yes, please include a link to the relevant documents _____
 - b. Who calculates the price?
 - i. the beneficiary
 - ii. the NRA
 - iii. Other (please specify) _____
 - c. If the cost-oriented price is not calculated by the NRA: Does the NRA review the calculation? (Y/N)
 - i. Is it done only one time, at the beginning, or regularly?
 - d. What happens if the retail prices of vertically integrated undertakings are not replicable with a cost-oriented wholesale price? Please explain. _____

Section C2: Reference offers

24. For which access products does the beneficiary have to publish a reference offer? Mark with an X when the answer is YES.

	Reference offer necessary
Duct access	(Y/N)
Pole access	(Y/N)
Dark fiber access	(Y/N)
Access to physical unbundling at the OLT/ headend / central Office	(Y/N)
VULA access	(Y/N)
Bitstream access	(Y/N)
Access to backhauling	(Y/N)
Other	(Y/N)

25. Are the reference offers examined by the NRA? (Y/N)
- a. If yes, when (at which stage in the process)?
 - i. Before the State aid funded network starts operations (Y/N)
 - ii. After the State aid funded network starts operations (Y/N)
 - b. If not, explain why (e.g. the reference offer is the SMP regulated reference offer)

26. To which extent is the content of the reference offer prescribed? Mark with an X when the appropriate box.

	Full contract is pre-specified	List of requirements is specified	No specifications are made	Comments
Duct access				
Pole access				
Dark fiber access				
Access to physical unbundling at the OLT/ headend / central Office				
VULA access				
Bitstream access				
Access to backhauling				
Other				

27. Are the specifications of the reference offers provided by the NRA? (Y/N)

28. Do the reference offers include the following? Mark the appropriate boxes where relevant.

	SLAs	SLGs	further provisions to ensure non-discrimination (include which in the comments column)	Comments
Duct access				
Pole access				
Dark fiber access				
Access to physical unbundling at the OLT/ headend / central Office				
VULA access				
Bitstream access				
Access to backhauling				
Other				

29. Are there requirements with respect to the location of the handover point for active wholesale access products? Please explain _____

30. To which extent is the technical implementation of active wholesale access products prespecified/established in advance? Please explain _____

Section D: Monitoring of access conditions

31. Who is the authority responsible for monitoring the application of the wholesale access conditions and prices detailed approved in the State aid programme ?

- NRA (Y/N)
- Other competent authorities (state which).

32. Are the access conditions further monitored after the first approval? Please provide details if relevant.

- a. Access prices (Y/N)
- b. Reference offers (Y/N)

33. Are the access conditions updated/ examined?

- a. For access prices
 - i. No
 - ii. Whenever something is changed
 - iii. Regularly – monthly/annually/every x years (number of years) (please describe)
 - iv. Ad-hoc – please specify what triggers the update
 - v. Other – please detail
- b. For reference offers
 - i. No
 - ii. Whenever something is changed
 - iii. Regularly – monthly/annually/every x years (number of years) (please describe)
 - iv. Ad-hoc – please specify what triggers the update
 - v. Other – please detail

34. If it is relevant in your case, what happens if prices are established in regulated offers, but afterwards the NRA deregulates the market or changes from a strict pricing obligation (i.e. cost orientation) to pricing flexibility (i.e. fair and reasonable pricing)?

Section E: Experiences with wholesale access products in State aid funded networks

35. **(optional)** Which wholesale access products are used in practice? Mark when the appropriate boxes.

	No take-up	Low take-up	Significant take-up
Access to ducts			
Access to poles			
Access to dark fibre			
Access to physical unbundling at the OLT/ headend / central Office			
Access to VULA			
Access to bitstream			
Access to backhauling			
Other (please specify)			

36. **(optional)** Is there any reporting on the effectiveness of the State aid programs? (Y/N)

- a. If the answer is YES please provide the link to the document.

37. What were, in your view, the main challenges to implement effective wholesale access to State-aid funded networks? Please describe.
38. Were the competent authorities involved in dispute resolutions (in any state-aid programme) related to the access conditions, including prices, to State-aid funded networks? (Y/N)
- a. If yes, please indicate the competent authority. If the CA is not the NRA, please specify the NRAs involvement.
 - b. If yes, please describe briefly the issues concerned and the resolution, if available.
39. Please provide information you consider important concerning any other issues and/or practical experiences you made regarding access conditions to State-aid funded networks. _____

Annex III – NRAs responding to the questionnaire

Table AIII.1 – List of NRAs responding to the questionnaire

Current number	Country	Code	NRA
1	Austria	AT	RTR
2	Belgium	BE	BIPT
3	Bulgaria	BG	CRC
4	Croatia	HR	HAKOM
5	Cyprus	CY	OCECPR
6	Czechia	CZ	CTU
7	Finland	FI	TRAFICOM
8	France	FR	Arcep
9	Germany	DE	BNetzA
10	Greece	GR	EETT
11	Hungary	HU	NMHH
12	Ireland	IE	ComReg
13	Italy	IT	AGCOM
14	Latvia	LV	SPRK
15	Lithuania	LT	RRT
16	Luxembourg	LU	ILR
17	Malta	MT	MCA
18	The Netherlands	NL	ACM
19	Norway	NO	NKom
20	Poland	PL	UKE
21	Portugal	PT	ANACOM
22	Romania	RO	ANCOM
23	Slovakia	SK	RU
24	Slovenia	SI	AKOS
25	Spain	ES	CNMC
26	Serbia	RS	RATEL
27	Sweden	SE	PTS
28	Switzerland	CH	BAKOM