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BEREC BROADBAND PROMOTION REPORT

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TABLE OF CONTENTS

List of figures

List of tables

1. Executive summary

1.1 Background of the report

The economic, social and cultural benefits of broadband adoption are increasingly evident in a number of ways. These include the relevance of e-government activities, the overcoming of technological barriers to the expansion of educational services, the possibility of remote medical consultations, and safer and more inteligent transport. Other benefits are the overall reduction of energy consumption, the contribution to cost-efficiencies in social work, the growth of the entertainment and media industries and the creation of whole new businesses and companies taking advantage of the opportunities offered by increased bandwidth.

In particular, the Internet economy is increasingly important. For instance, when measured as a proportion of the overall economy, it accounted for more than 2% of Italian Gross Domestic Product (GDP) in 2010 (BCG, 2011) and more than 7% of the UK's GDP in 2009 (BCG, 2010). Furthermore, broadband development is commonly seen as an instrument to promote economic growth. According to estimates divulged by the European Commission (EC)[1], the construction of broadband networks in Germany could create almost a million jobs by 2020 and construction of Fiber To The Home (FTTH) networks in France could generate 360,000 jobs per year. It is also widely recognized that broadband is contributing to new and more productive forms of labour organisation.

These factors have contributed to the fast pace of broadband adoption in the Member States of the Body of European Regulators for Electronic Communications (BEREC). According to the most recent statistics available, fixed broadband penetration in the European Union (EU) is approximately 25 out of every 100 inhabitants (80% of which use Digital Subscriber Line (DSL) technology), whereas the penetration of mobile broadband for dedicated data services is around 6 out of every 100 inhabitants. The average download speed in fixed broadband access lines is below 10 Mbps in the majority of the EU 27 Member States and the development of Next Generation Access (NGA) networks (that will allow much greater speeds) is visible, but the number of subscribers to NGA-supported services is still not very large.

[1] http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/709.

According to EC survey data (EC, 2011a)[2], around 55% of the EU households have broadband access, representing an increase of around seven percentage points over the previous 15 months period.

Whilst broadband adoption, in general, is continuing at a fast pace (with the possible exception of NGA in a still significant number of European countries), the EC acknowledges namely the multiple advantages of broadband adoption, the benefits of a massified adoption of broadband and the role of public policy to achieve that mass adoption. In this context, it has asked Member States to elaborate national broadband strategies and to set national targets for broadband usage. At the Competitiveness Council of March 2009, the Member States agreed to a common indicative goal of 100% coverage of broadband by 2013. Furthermore, the Digital Agenda is considered a "flagship" initiative in the EU 2020 growth strategy to transform Europe into a "smart, sustainable and inclusive economy"[3].

In achieving these objectives, Member States could use a number of public policy and regulatory tools (at EU, national, regional and local level) such as loans, subsidies to public-private partnerships (PPPs)[4], fiscal incentives to subscribers (for instance, to support broadband in under-served areas), State Aid and an intelligent use of the digital dividend.

The European legal and regulatory framework is a cornerstone for the swift development of broadband, facilitating the adoption of a series of appropriate measures to that effect. This includes the measures adopted in the second half of 2010 by the EC on spectrum availability in the 900/1800 MHz bands, the extension of broadband by means of national broadband operational plans, and actions to incentivise private investment compatible with State Aid provisions. Regarding the development of NGA, the EC's attention focuses mainly on access to passive infrastructure and broadband products in Market 4 (wholesale physical network infrastructure access) and in Market 5 (wholesale broadband access).

The inclusion of broadband connectivity as part of the Universal Service remains within the remit of the Member States, while the EC, in its Communication issued on 23rd of November 2011 announced there is currently no need to change the basic concept,

[2] Fieldwork conducted in February and March 2011.

[3] http://ec.europa.eu/information_society/digital-agenda/index_en.htm.

[4] Government services or private business ventures which are funded and operated through a partnership between government and one or more private sector companies

principles or scope of EU rules on Universal Service to include mobile telecommunications services and broadband connections at EU level.

1.2 Objectives of the report

Given this broader context, the main objectives of the current document are to:

a) Analyse the role of the different public policy and regulatory mechanisms/tools at EU, national, regional and local level, as means of promoting broadband adoption;

b) Assess the interdependency between the different mechanisms/tools to promote broadband, taking into account that they are based on different frameworks and not all mechanisms fall within the remit of either BEREC or the National Regulatory Authorities (NRAs);

c) Advise public policy makers on their own role regarding the different mechanisms/tools, taking the policy objectives in Article 8 of the Framework Directive as guidance.

With these objectives in mind and following initial discussions with stakeholders[5], this public consultation document seeks more specific, detailed and updated feedback from a broader range of stakeholders on the findings regarding the promotion of broadband adoption. In particular, the BEREC seeks views on the: (a) main supply-side and demand-side obstacles; (b) strategies followed by governments, NRAs, operators and PPPs and (c) the measures which are likely to contribute more successfully to enhance broadband adoption. A list of specific questions addressing these issues is presented at the end of this document.

1.3 Structure of the report

After introducing its scope (section 2) and presenting a synthesis of the relevant European legal and regulatory framework (section 3) and a brief discussion on the current state of broadband penetration scenario in Europe (section 4), this report focuses on the

[5] BEREC has sought, from an early stage, the opinions of consumer and industry stakeholders and of the EC on the major obstacles affecting broadband promotion and on the measures that seem necessary to overcome those obstacles.

broadband promotion strategies followed by governments (section 5), NRAs (section 6), operators (section 7) and PPPs (section 8)[6].

The perception of some NRAs regarding obstacles to broadband promotion is summarised in section 9 of the current document.

Advice to policy makers and NRAs on measures regarding promotion of broadband adoption is offered in section 10. This advice covers: (i) identified obstacles to the promotion of broadband adoption; (ii) promotion of broadband adoption strategies already followed by governments, NRAs, operators and PPPs; (iii) boundaries of the European legal and regulatory framework; (iv) findings of the theoretical and empirical literature available.

Finally, the public consultation questions are presented, followed by the literature references and by a glossary.

1.4 Main findings of the report

With regard to the nationwide development of broadband, 17 NRAs[7] reported the implementation of a national broadband strategy in their countries[8]. The objectives of those strategies are mostly related to connection and coverage targets. For example, the Danish government established a broadband goal of all homes and enterprises having access to a broadband connection of at least 100 Mbps by 2020, as a result of market based growth, while Estonia's EstWin project targets at least 100 Mbps availability for the whole population by 2015). France aims for universal coverage of the national territory by 2017, and Germany planned to ensure that all German households will have access to broadband by the end of 2010 at latest, while bringing broadband access of at least 50 Mbps to 75% of the households by 2014.

[6] To collect information in these four areas, a questionnaire was sent to the NRAs participating in the BEREC. There was a very high degree of participation in the questionnaire, with responses from 31 NRAs, and the results provide a reasonable insight into the various strategies being followed. However, the results of the questionnaire do not necessarily provide an exhaustive overview of all strategies followed nor provide sufficient insight into the effectiveness of those strategies.

[7] From the Czech Republic, Estonia, France, the Former Yugoslavian Republic Of Macedonia, Germany, Greece, Italy, Lithuania, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden,Turkey and the UK.

[8] For details see also BoR (11) 06, Chapter 7 "National next generation broadband initiatives/measures" and the comprehensive Annex BoR (11) 06b.

Rural areas are a main concern when considering broadband roll-out, with 16 NRAs[9] reporting government-initiated strategies to increase broadband penetration in areas where it is unlikely that the market will generate the incentives necessary for operators to invest in new infrastructure for the provision of broadband access services in the near future (especially high-speed broadband). This was explained by factors which are critical to such investment, including population density (which determines the cost of bringing the network to households) and socio-economic factors such as age, education level and *per capita* income (which determine the potential revenue generated by the network).

Fifteen NRAs[10] noted that, in their countries, consumers benefit from strategies aimed at increasing broadband penetration. Such strategies include namely: (a) subsidies to reduce monthly subscription fees or for purchases of computers (which can be particularly relevant with regard to the educational system, where loans or subsidies are given to teachers and students) or (b) campaigns designed to raise the awareness regarding the benefits of broadband access. In most cases, those strategies are targeting vulnerable social categories like older people, low-income families or people with disabilities.

NRAs employ a variety of strategies to promote the adoption of broadband. On the supply-side these relate particularly to the deployment of NGA networks, inclusion of broadband in the scope of universal access, advising role or funding decisions related to subsidies and State Aid, and evaluation of broadband targets. On the demand-side, strategies primarily relate to providing information for educational purposes, to providing information about services and to providing tools designed to increase consumer security and confidence.

Throughout all BEREC Member States, operators have strategies to promote both fixed and mobile broadband services and to compete in the broadband markets. In general, those promotional activities developed differ broadly between operators and between countries, for instance with regard to their duration, the services encompassed, the targeted population and the proportion of discounts given. Price reductions are common and can apply to the connection fee and equipmens as well as the monthly fee. Frequently, they will last for a specified period of time, which varies reasonably, for

[9] From Bulgaria, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia, Spain, Latvia, Sweden and the UK.

[10] From Belgium, Croatia, Denmark, the Former Yugoslavian Republic of Macedonia, France, Germany, Hungary, Italy, Malta, Portugal, Romania, Spain, Sweden, Turkey and the UK.

instance, according to the specific service being offered and to the specific strategy of the operator.

Almost all NRAs reported that both fixed and mobile broadband services are commonly offered in bundles. An interesting finding is that, in many countries, bundling seems to be a key selling argument for fixed broadband services but not as much for mobile broadband services (although in a limited number of countries, bundling strategies are applied to both fixed and mobile broadband services). The reason for this differentiation between bundled services in fixed and mobile broadband services is not fully apparent. However, one possible explanation could be that fixed broadband services are better suited to bundling because the same infrastructure enables the provision of broadband, fixed voice telephony and pay TV. When it comes to mobile broadband services, bundles may not be equally proeminent because of the issues associated with including pay TV services in such a bundle.

NRAs reported that in 16 European countries[11], PPPs had some role to play in the development of broadband. Although the mechanisms of PPPs differ from country to country, the mechanisms are generally aimed at: (a) making broadband available to all the citizens in the whole or in a substantial part of the relevant territory; (b) disseminating broadband in rural areas; (c) deploying particular technologies that could stimulate broadband development (e.g. FTTH); (d) educating the population to use information technologies and encouraging the use of e-services; (e) putting in place public Internet access points.

In terms of the supply-side obstacles to the promotion of broadband in Europe, the major factors (both for the country in general and for rural areas), from the perception of NRAs seem to relate to the low expected return on investment (due to the average revenue per unit (ARPU), the levels of demand-side take-up and the costs of network roll-out on the supply-side); and to a possible lack of access to financial resources and access to spectrum. Naturally, the relevance of those obstacles will vary from country to country, as will the appropriate measures to respond to those obstacles.

As for the demand-side obstacles to the promotion of broadband adoption, NRAs perceive the main reasons for not adopting broadband to be that people do not see a need to do so; they see it as costing too much; that NGA is still in an initial stage of its product life

[11] Estonia, France, Germany, Greece, Italy, Latvia, Lithuania, Malta, the Netherlands, Poland, Romania, Slovenia, Spain, Sweden, Switzerland and Turkey

cycle and the low level of computer adoption. In rural areas, the limited choice between different service providers is also perceived as a relevant obstacle.

Since BEREC has already published a series of reports looking at supply-side obstacles to promoting the adoption of broadband (most recently, with regard to NGA networks), this document is more focused on identifying demand-side measures that, when making part of a sound and participative strategy, contribute to the promotion of broadband adoption in Europe.

To identify those demand-side measures, BEREC drew upon the perception of the NRAs (as gathered via a BEREC questionnaire on broadband promotion), on views from stakeholders and also on a study that the Independent Regulators Group (IRG) recently commissioned from the Florence School of Regulation, Communications and Media (FSR). The study was composed of a literature review, an econometric model related to broadband adoption factors and an assessment of public policy measures taken in European countries to promote broadband adoption.

One of the key findings of the FSR study (2011), is a suggestion that the sequencing of public policy measures and regulatory actions is extremely important in determining how effective they are. Therefore, to optimise the impact of public policies on broadband promotion, the study suggests that supply-side policies should come first, followed by a focus on demand-side policies at a subsequent stage.

The FSR model also predicts that the larger is the level of broadband adoption in a given European country, the larger will be the impact arising from the application of an additional demand-side policy. In this context, since sustained competition in the broadband markets contributes to broadband diffusion, it should also be considered a major factor in promoting broadband adoption.

In this context, BEREC recognizes the relevance of demand side broadband promotion measures, in particular those summed up in Table 1 below.

Table 1 Summary of demand-side measures to be considered regarding the promotion of broadband adoption

Obstacle	Measure	Implementation
High costs of broadband adoption	Subsidies and tax incentives towards the cost to end-users of connecting to and or subscribing to broadband services, especially with	Governments and local authorities.

	regard to those with low incomes.	
	Subsidies and tax incentives to those on low incomes and or to students which purchase a computer.	Governments and local authorities.
	Demand-aggregation measures may contribute to an efficient resource allocation and to economies of scale.	Operators.
Lack of consumer confidence in contractual relationships and perceived low level of consumer safeguards	Implementation of transparency obligations at national levels either through primary law or through decisions of the NRAs.	Governments and NRAs.
	Clarification to consumers of most relevant contractual clauses.	Governments, NRAs and consumer associations.
	Promotion and monitoring of mechanisms which ensure correct billing.	Governments, NRAs, operators and equipment manufacturers.
	Improvement of the effectiveness of complaint handling procedures.	Governments, NRAs and operators.
Lack of choice between different broadband service providers.	Implementing initiatives that contribute to provision of reliable information, that increase transparency and that facilitate the comparison of essential service characteristics, such as price and quality of service.[12]	NRAs and consumer associations.
Citizen perception of lack of need to adopt broadband.	Measures to encourage the production of contents in the country's native language(s).	Governments, local authorities, operators and content suppliers.
	Promote e-government and the	Governments, local

[12] Although these measures do not address directly the lack of choice that arises from the actual absence of alternative operators in the broadband markets (which are more effectivelly dealt with by supply-side measures), they can contribute to the minimisation of instances where lack of choice derives from lack of perceived choice, either because the end-users are not aware of alternative options or because the end-users do not perceive (or are unable to compare) relevant differences among the different products being offered in the broadband markets.

	provision of on-line public services.	authorities, NRAs and operators.
	Promote electronic commerce, for instance by increasing the security of transactions.	Governments, local authorities, equipment manufacturers, NRAs, international *fora* (e.g. ITU, ETSI, ENISA).
Low rates of digital literacy.	Information and digital literacy campaigns to educate end-users on advantages of broadband adoption.	Governments, local authorities, NRAs, consumer associations and operators.
	Connection of schools to broadband at a discounted price.	Governments, local authorities, NRAs, consumer associations and operators.
	Digital literacy and broadband adoption clearinghouses.	Governments, local authorities, NRAs, consumer associations and operators.
	Support to training institutes whicheducate people with low digital literacy and trainingteachers (considering the impact this could have on students' training).	Governments, local authorities, consumer associations and operators.
Access to broadband by disabled people.	Guides / leaflets regarding concrete broadband services of particular interest to disabled citizens.	Governments, local authorities, NRAs, service providers, consumer associations, associations representing disabled citizens.
	Promoting universal design, in order to render equipments suitable for use by citizens with disabilities more accessible and more affordable.	Governments, NRAs, service providers, consumer associations, associations representing disabled citizens, equipment manufacturers, international *fora* (e.g. ITU, ETSI, etc).

2. Introduction

The economic, social and cultural benefits of broadband adoption are increasingly evident in a number of ways. These include the modernisation of public services through e-government activities, the overcoming of technological barriers to the expansion of educational services, the possibility of remote medical consultations[13], and the reduction of energy consumption arising directly from the roll-out of new broadband infrastructure and from applications supported on that infrastructure. Other benefits include safer and more intelligent transport, the contribution to cost-efficiencies in social work, the growth of the entertainment and media industries and the creation of whole new businesses and companies taking advantage of the opportunities offered by increased bandwidth.

In particular, the broadband economy is continuously increasing its relevance, namely when measured as a proportion of the overall economy and is commonly seen as driver of economic growth and of qualified job creation. Broadband is contributing to new and more productive forms of labour organisation. This is widely recognised, including namely in the recent EC proposal, of 19.10.2011, for a Regulation of the European Parliament and of the Council establishing the Connecting Europe Facility[14].

In this context, the EC asked Member States to elaborate national broadband strategies and set national targets for broadband usage, taking into account the targets set in the European Digital Agenda (e.g. basic broadband coverage for all EU citizens by 2013; broadband coverage at 30 Mbps or more for all EU citizens by 2020; and broadband coverage above 100 Mbps for half of the European households by 2020). In its Broadband Communication of 20.09.2010, the EC called on BEREC to “include measures to support broadband development as a priority in its 2011 work programme”. BEREC´s work in this area has so far focused on the main measures within its competencies which support the development of broadband on the supply-side. BEREC also acknowledges, though, that other measures can contribute to the promotion of broadband, such as the (public) funding of networks, the consideration of broadband access in the Universal Service obligation and the promotion of open access in the context of State Aid.

[13] The Digital Agenda for Europe foresees that the EC works together with Member States and Associated Countries competent authorities and all interested stakeholders in pilot actions to ensure that Europeans may have secure online access to their medical health data by 2015 and to achieve by 2020 widespread deployment of telemedicine services.

[14] http://ec.europa.eu/commission_2010-2014/president/news/speeches-statements/2011/10/20111019_speeches_1_en.htm

In this report, BEREC aims analyse the interdependency between the different mechanisms/tools – including those that do not necessarily fall within the remit of BEREC and/or the individual NRAs.

BEREC does this within the context of the ned for NRAs to take all reasonable and proportional measures aimed at achieving the policy objectives established in article 8 of the Framework Directive.

Of especial relevance in this regard are the policy objectives associated with (a) the promotion of healthy competition and innovation; (b) the guarantee of maximum benefits for all end-users, including namely specific social groups and disabled end-users (in terms of choice, price and quality); (c) the encouragement of efficient investment in infrastructure; (d) the encouragement of efficient use of spectrum and numbering resources; (e) the assurance of a high level of protection for consumers in their dealings with suppliers; (f) and the promotion of the provision of clear information, in particular requiring transparency of tariffs and conditions for using publicly available electronic communications services.

It is also clear that the recent evolution of public policy in the development of electronic communications networks is increasingly accepting that, under the appropriate conditions, public intervention might have a positive role. From a theoretical viewpoint, there are a wide number of economic and social motivations that can justify the role of public intervention in the domain of broadband development. With regard to the economic motivations, those are mostly related to market failures (e.g. externalities, imperfect information, public goods and natural monopoly) and with industrial policies or economic development objectives (e.g. to improve the industry's competitiveness and innovativeness, to promote the growth of new undertakings and to increase employment). Social motivations are concerned with distributive/equity objectives (e.g to eliminate or diminish the digital divide and to ensure universal access), with social inclusion (e.g. to provide citizens with access to new services and to increase the quality and the availability of public services) and with environmental objectives (enabling the benefits arising from "green" technologies) (FSR, 2011).

In this context, a workstream on “Measures to support broadband” was approved by the BEREC as part of its 2011 Work Programme, with the objectives of[15]:

a) Analysing the role of the different public policy and regulatory mechanisms/tools at EU, national, regional and local level, as means of promoting broadband adoption;

b) Assessing the interdependency between the different mechanisms/tools to promote broadband, recognising that they are based on different frameworks and not all mechanisms fall within the remit of either BEREC or the National Regulatory Authorities (NRAs);

c) Advising public policy makers on their own role regarding the different mechanisms/tools, taking the policy objectives in article 8 of the Framework Directive as guidance.

To this effect, this Broadband Promotion Report focuses on:

a) Debating the challenges and possibilities associated with broadband promotion, within the context of the European legal and regulatory framework;

b) Identifying the most important demand-side and supply-side obstacles to broadband promotion according to the perception of NRAs as well as the entities which can play a more significant role when addressing those obstacles;

c) Understanding the role and strategies of governments, NRAs, fixed and mobile broadband operators, public-private-partnerships and other stakeholders in the field of promotion of broadband adoption;

d) Taking into consideration the available evidence, providing advice to policy makers on specific measures that may be considered in order to enhance the broadband adoption promotion efforts developed in European countries.

In preparing this document – in particular, its sections 5, 6, 7 and 8 dealing with the role and strategies of governments, NRAs, fixed and mobile broadband operators and PPPs - the results of the BEREC’s broadband promotion questionnaire were a major source of

[15] Following a specific request from the EC of April 2011, the issue of the inclusion of broadband in the Universal Service, as means of promoting broadband, was addressed in a separate document. In the letter of 01.07.2011 addressed to the EC by the BEREC Chairman, it was mentioned that the Board of Regulators considers that the basis for a formal Opinion from BEREC was too unclear at that moment and that the Board of Regulators, acknowledging the importance of the subject and its strong impact, would wait for a stable draft Recommendation on Universal Services before issuing such an Opinion (see the letter at http://erg.eu.int/documents/berec_docs/index_en.htm#board).

evidence[16], as well as other BEREC documents of relevance to the broadband issue. Publicly available studies, reports, and statistics, from a wide range of entities, were also considered, in particular the study developed by the FSR (2011) for the IRG.

[16] The above mentioned BEREC's broadband promotion questionnaire counted with 31 replies which were received until the 30.05.2011. Those replies were provided by the NRAs of Austria, Belgium, Bulgaria, The Czech Republic, Croatia, Cyprus, Denmark, Estonia, Finland, France, the Former Yugoslavian Republic of Macedonia, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the UK. The NRAs from Iceland and Luxembourg did not reply to the questionnaire.

3. European legal and regulatory framework

This section briefly presents the current regulatory framework and "soft law" (in particular the EC Recommendations and Communications) that are deemed to have a major impact on the promotion of broadband adoption.

3.1 Sustainable competition and market analysis

Effective competition clearly remains essential for providing increased choice and affordable prices for consumers, appropriate quality and innovation. It is also essential for promoting sustainable investment in the long term. In this context, the importance of market analysis and Significant Market Power (SMP) designation procedures developed by NRAs pursuant to the current regulatory framework continue to be of critical importance.

BEREC also notes that the amended Access Directive allows NRAs to consider functional separation as an exceptional measure (subject to the approval of the EC in specific cases) to improve competition, in cases where there has been a failure to implement effective non-discrimination measures.

3.2 Network deployment and spectrum availability to develop increased services

The EC has adopted recently several measures.with the aim: (a) to provide guidance to Member States and NRAs in connection with the deployment of NGA and regulated access to NGA networks and (b) to adopt a common policy framework on the spectrum availability in order to facilitate the provision of innovative services and wireless broadband, benefitting from the digital dividend in line with the provisions on the Digital Agenda[17].

3.2.1 EC Recommendation on NGA

[17] See Directive 2009/114/EC of the European Parliament and of the Council, OJ L- 274, page 26 and Commission Decision of 16.10.2009 on the harmonization of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community (OJ L- 274, page 32).

The EC issued, on the 20.09.2010, a Recommendation on regulated access to NGA[18]. It aims to *"foster the development of the single market by enhancing legal certainty and promoting investment, competition and innovation in the market for broadband services in particular in the transition to next generation access networks"*, while setting a common approach for a consistent implementation by NRAs of remedies with regard to NGA.

The above mentioned recommendation deals mainly with remedial measures on Markets 4 and 5 taking a consistent approach to regulatory obligations in both markets.

With regard to Market 4, the aforementioned recommendation focuses on access to "passive" access (e.g. civil engineering infrastructure or terminating segments in the case of FTTH by the SMP operator, both at cost-oriented prices, unbundling of the fibre loop applying the conditions of copper based unbundled access and of copper sub-loop unbundling where appropriate in the case of FTTN).

As for the Market 5, the EC recommends providing access to wholesale broadband products, with an advance notice period of six months, to enable replication at the retail level and in principle at cost-oriented prices. In areas where there is effective access to the unbundled fibre loop of the SMP operator, NRAs should consider removing wholesale bitstream access obligations.

Migration to NGA networks should not entail any changes in the existing SMP obligations, and should preferably be agreed between the operators. In the absence of such agreement, NRAs should ensure that an information notice period of five years should be given in connection with de-commissioning of access points and overview of the process (in particular ensuring that alternative operators obtain timely and necessary information). Furthermore, NRAs should encourage transparency in the migration process and also obtain information from SMP operator in order to assess any network modification plans that are likely to affect competition conditions[19].

3.2.2 EC draft decision establishing a Radio Spectrum Policy Program

On 20.09.2010, the EC (2010a) presented a proposal for a decision establishing the first Radio Spectrum Policy Programme. Spectrum is key to the Digital Agenda, since fasst

[18] See OJ L-251 of 25.09.2010, page 35.

[19] BEREC published a report in October 2011 (BEREC, 2011h) on the implementation of the NGA Recommendation by NRAs,.

wireless and innovative services are essential for the digital society (including *inter alia* broadband, in particular in areas where deployment of wired broadband is difficult or economically unviable).

The EC proposal (currently under discussion by the Council and the European Parliament) sets out a five-year program in order to ensure availability of sufficient spectrum. It does this in in particular by authorising by January 2012 the use by operators of all the spectrum in the bands of 900/1800 MHz, 2.5-2.69 GHz and 3.4-3.8 GHz and by completing the process in the 800 MHz band in January 2013, making it available and encouraging the latter's use in sparsely populated areas through coverage obligations.

3.2.3 EC Communication on European broadband

The EC (2010b) put forward, on the 20.09.2010, a policy proposal aimed at fostering investment and enhancing infrastructure competition. It focuses on national broadband plans, in order to contribute to achieving the EU Member States' broadband strategy plans as well as the European Digital Agenda targets.

Private investment should be encouraged and policy actions to incentivise it should be in line with the State Aid regulatory framework. Measures should use all relevant information on the location, capacity and availability of ducts and other loop facilities, in order to provide alternative operators with the possibility of deploying their fibre networks at the same time as historic operators, sharing the costs of civil engineering works. This aim could be achieved by implementing reference offers applicable to historic operators which reflect such information and also by encouraging authorities to require the disclosure to all operators of the existence and condition of relevant local access infrastructure applicable to all operators, as some Members States and NRAs have already done.

In order to stimulate investment and reduce investment costs, account should be taken of the fact that approximately 80% of the deployment costs with new infrastructure are civil engineering costs, which can be significantly reduced with proper coordination between national and local authorities.

In order to help Member States achieve the objectives set out in the Radio Spectrum Policy Program, the EC recommends that the rights of use should be awarded quickly and secondary trading should be allowed.

The EC supports the construction of broadband infrastructure and promotion of Internet take-up through rural development and structural funds, and will issue guidelines for local and regional entities. The Communication also reflects the announcement of the European Investment Bank (EIB) to create instruments for broadband financing as part of the Europe 2020 priorities.

These measures follow the EC's principles in assessing State Aid for the deployment of broadband projects and NGA, as set out in the Community Guidelines for the application of State Aid rules in relation to rapid deployment of broadband networks issued in September 2009 (EC, 2009a), henceforth "The Guidelines".

The Guidelines examine and assess the degree of public intervention that is deemed acceptable to accelerate networks' deployment (including NGA). Regarding NGA, the assessment focuses on examining the presence of private investment and the presence of other operators over a three year period. Public support would not be compatible except where necessary and justified in terms of market failure and/or social cohesion.

The Guidelines, currently under review, also suggest applying a proportionality test, listing the conditions for the granting of the aid to a deployment project. The conditions include detailed mapping and coverage analysis by the granting authority, an open tender process, preference for the most economically advantageous offer, technological neutrality, use of existing infrastructures to avoid unnecessary duplication, wholesale access obligations for a minimum duration of seven years, and a claw-back mechanism in case an excessive amount of aid is provided.

Finally, reference should be made to the recent debate on broadband connectivity inclusion within the scope of Universal Service, as detailed below.

3.3 Broadband as part of the Universal Service

The revised Universal Service Directive removes the previous limitation to the inclusion in the Universal Service scope of a single narrowband network connection, as well as reference to a data rate of 56 Kbps. Member States may define the scope of functional Internet access and include broadband connectivity as part thereof, provided that the measures adopted seek to minimise market distortion (see recital 5). In particular, factors such as the relevant geographical areas, the funding method or the enforcement principles are to be taken into consideration.

The EC (2010c) launched a public consultation in 2010 to assess the inclusion of broadband connectivity as part of the Universal Service. On 23rd of November 2011 the European Commission issued a communication announcing there is currently no need to change the basic concept, principles or scope of EU rules on Universal Service to include mobile telecommunications services and broadband connections at EU level. The Commission has come to this conclusion on the basis of a public consultation and its third periodic review of the scope of this service.

The Commission has also concluded that it would not be appropriate, at this stage, to set at EU level a single broadband connection speed under the universal service rules, given the very different stages of development of telecoms networks in the Member States and the potential costs involved. In particular, the burden on industry and the impact on consumer prices would be greatest in Member States with currently low broadband coverage and income levels.

The Commission has indicated the areas where further guidance may be needed in the future to help Member States implement the universal service rules most effectively. These include:

- criteria used when Member States decide the data rate at which internet access is to be provided under their national universal service rules;
- mechanisms for designating universal service providers;
- calculating the net cost of universal service obligations (USO);
- financing mechanisms, including possible safeguards to prevent an undue burden falling on operators;
- measures for end-users with disabilities.

3.4 Functional equivalence and increased choice of undertakings for disabled users

Improved accessibility to electronic communications services plays an important role in promoting social inclusion and the revised Directives include additional provisions in this respect.

Article 23(a)1 of the Universal Service Directive enables NRAs to set requirements to ensure (a) functional equivalence in the provision of electronic services to that enjoyed by

the majority of end-users and (b) the benefits from the choice of undertakings and services available to the majority of end-users. It also required Member States to encourage the availability of specialist terminal equipment.

Article 21.3(f) enables NRAs to oblige undertakings to regularly inform disabled subscribers of details of products and services designed for them. Article 22 further strengthens NRAs' powers to follow-up on the measures taken up by companies to ensure compliance with the functional equivalence principle.

BEREC (2011b) has collected information from the NRAs to provide a clear overview of the measures taken and foreseen to promote equivalent access and choice by disabled users regarding electronic communication services.

3.5 Affordability

Access to affordable services, in particular for those who are disabled, have low incomes, or are located in remote or geographically isolated regions, remains part of the conditions applicable to Universal Service.

Affordability *vis-à-vis* end-users with disabilities includes special tariff packages different to those provided under normal commercial conditions and results in discounts in relation to the monthly subscription.

The possibility of including broadband connectivity is deemed to be linked to the affordability of these services to all citizens. More generally, promoting competition constitutes another means to improve the affordability of electronic communication services, and periodic review of competition conditions by NRAs in the context of market definition and assessing *ex-ante* obligations is also of relevance.

3.6 Quality of service

Article 22 of the Universal Service Directive enables NRAs to set out minimum quality requirements in order to prevent the degradation of service and the hindering or slowing down of traffic over networks and to require additional transparency on the quality of services by end-users.

3.7 Transparency and consumer protection

Increased transparency mechanisms and information obligations[20] are provided for in the Universal Service Directive (see articles 20.1.b), 21.3 c) and d)) as means to enforce consumer protection.

Information obligations covers any change in conditions limiting access to and/or use of services and applications as well as any measures taken by service provider's to measure and shape traffic so as to avoid filling or overfilling a network link as well as information on how those procedures could impact on service quality.

Also included are provisions to facilitate the comparison of offers and make available helpful information (e.g. on an website) and to facilitate the process of switching. These are perceived as useful ways to help consumers take full advantage of the competitive environment. BEREC (2010b) has analysed these issues in its 2010 report on best practices to facilitate consumer switching.

Switching appears to be particularly relevant in connection with, among others, (i) the migration to NGA given that managing customer switching on fibre-based networks may require a model more complex than for copper-based migrations using current technology; and (ii) vulnerable groups facing more difficulties in switching.

The revised directives include users' ability to withdraw from contracts in particular in the event that contractual conditions are modified. Withdrawal does not entail any penalty for the end-user (article 20.2 of the Universal Service Directive).

In the area of consumer protection, the EC recently proposed to improve the collection of data provided by consumer authorities, consumer organisations and regulators in order to enable proper and regular comparison. In particular, the EC proposes to provide uniform data in connection with consumer complaints, in order to establish a uniform EU wide database of consumer complaints, as part of its priorities in better monitoring consumer markets and policies[21].

[20] See recital 32 of the revised Universal Service Directive and article 21 thereof.

[21] Such data include the country of the consumer and trader, the name of the complaint handling body, the reason for contacting the handling body, the date of complaint, the selling method and the sector information.

4. The broadband penetration scenario in Europe

This section intends to provide a general overview of the main penetration statistics relating to different segments of broadband, in particular taking as a reference EU 27 and OECD countries' data available from public sources[22].

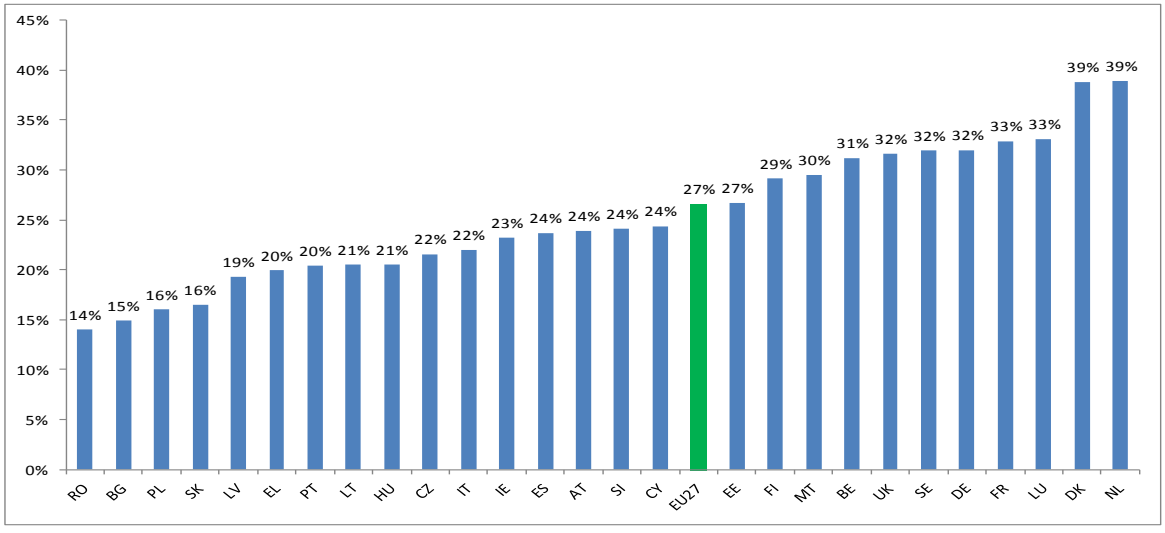
When looking at the different evolutions of the fixed broadband and mobile broadband markets, it is useful to acknowledge that, as stressed by the EC (2011b), the fixed-to-mobile substitution is an important aspect, since countries with the lowest numbers of fixed net additions reported in parallel the highest rates of mobile broadband penetration.

It is also worth mentioning that the EC is currently developing a study to monitor the progress on the broadband coverage objectives of the Digital Agenda, in particular concerning the household coverage with both fixed and mobile broadband technologies with a special focus on NGA.

4.1 Fixed broadband

The most recent data available for the level of fixed broadband penetration in the EU 27 Member States is shown in Figure 1, with the EU 27 average nearing 27%.

Figure 1 Fixed broadband penetration EU 27 in January 2011



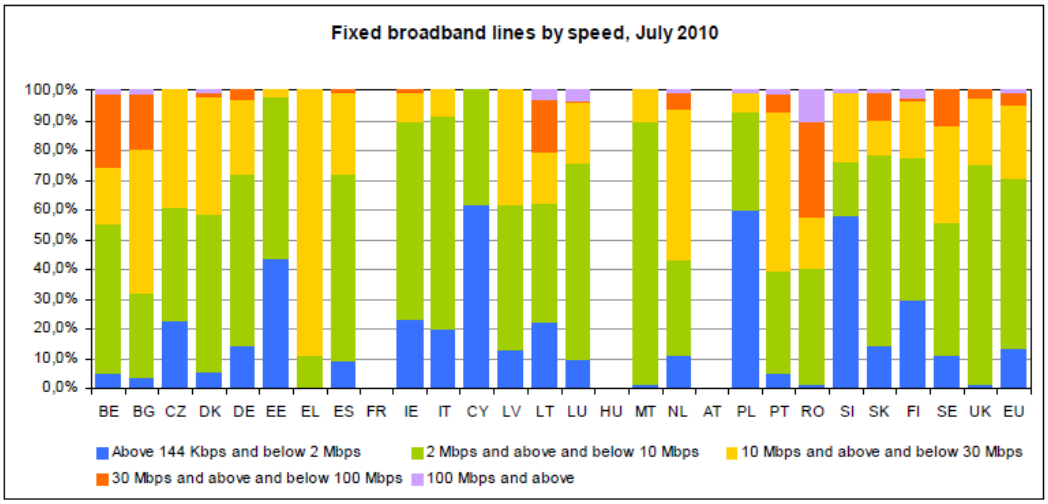
Source: Digital Agenda Scoreboard 2011.

[22] EU figures are available at: http://ec.europa.eu/information_society/policy/ecomm/library/communications_reports/annualreports/15th/index_en.htm and OECD figures are available at http://www.oecd.org/document/54/0,3343,en_2649_34225_38690102_1_1_1_1,00.html

According to the most recent data available, overall DSL was the predominant technology both in the EU 27 and in the OECD, accounting in January 2011 for 77% of the fixed broadband subscriptions in the EU 27, according to the Digital Agenda Scoreboard. Cable modem and other technologies, represented respectively circa 16% and 7% of the fixed broadband subscriptions of the EU 27 countries in January 2011. Comparing 2010 with the 2008-2009 period, most EU 27 Member States figures show a slight decrease in the use of DSL technology.

The different speeds offered as of July 2010 in the EU 27 can be observed in Figure 2[23]. It is clear that, with a few exceptions, the average speed in the vast majority of EU Member States is up to10 Mbps.

Figure 2 EU 27 retail fixed broadband lines by speed (July 2010)



Source: COCOM (2010).

4.2 Mobile broadband

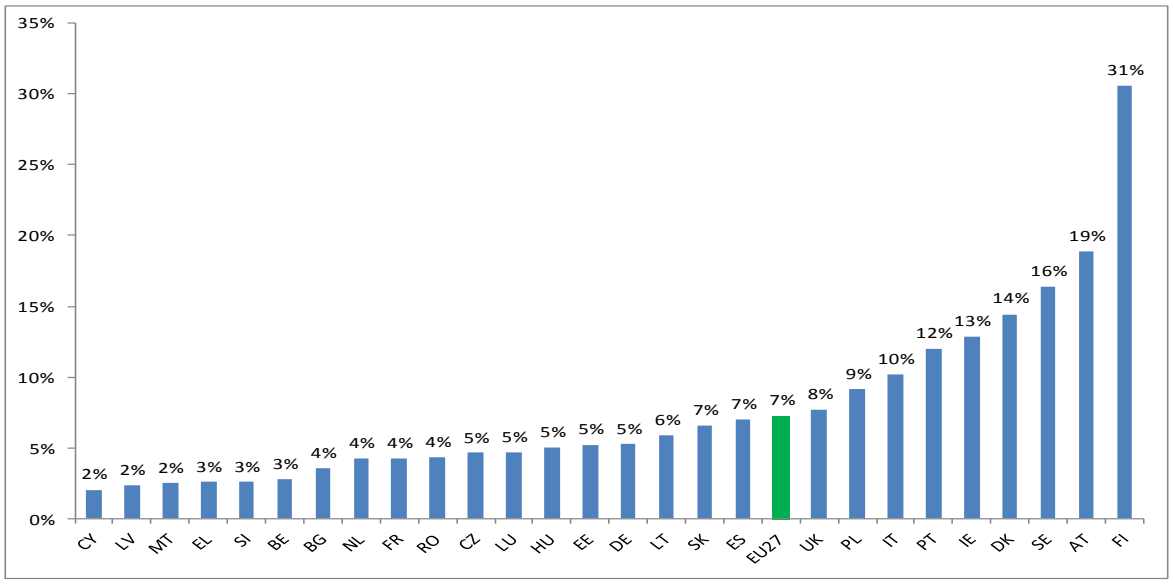
The mobile broadband penetration rate in the EU 27, in January 2010, was nearing 6%, showing a steady increase in relation to January 2009. However, but only in few countries was the penetration rate was above 10%.

In order to measure mobile broadband access penetration, reference is made to EU 27 Member State broadband penetration rates with regard to specific mobile broadband dedicated data services cards/modems/keys only, as of July 2010 (see Figure 3).

[23] Data for France, Hungary, the Netherlands and Austria are not available. Data are only partially available for the Czech Republic and correspond to 2009.

On this measure, the average penetration is growing rapidly, reaching circa 7% in January 2011 (comparing with 5.2% in January 2010 and 2.8% in January 2009) according to EC data.

Figure 3 Mobile broadband penetration EU 27: dedicated data service cards/modems/keys only January 2011



Source: Digital Agenda Scoreboard 2011.

4.3 NGA

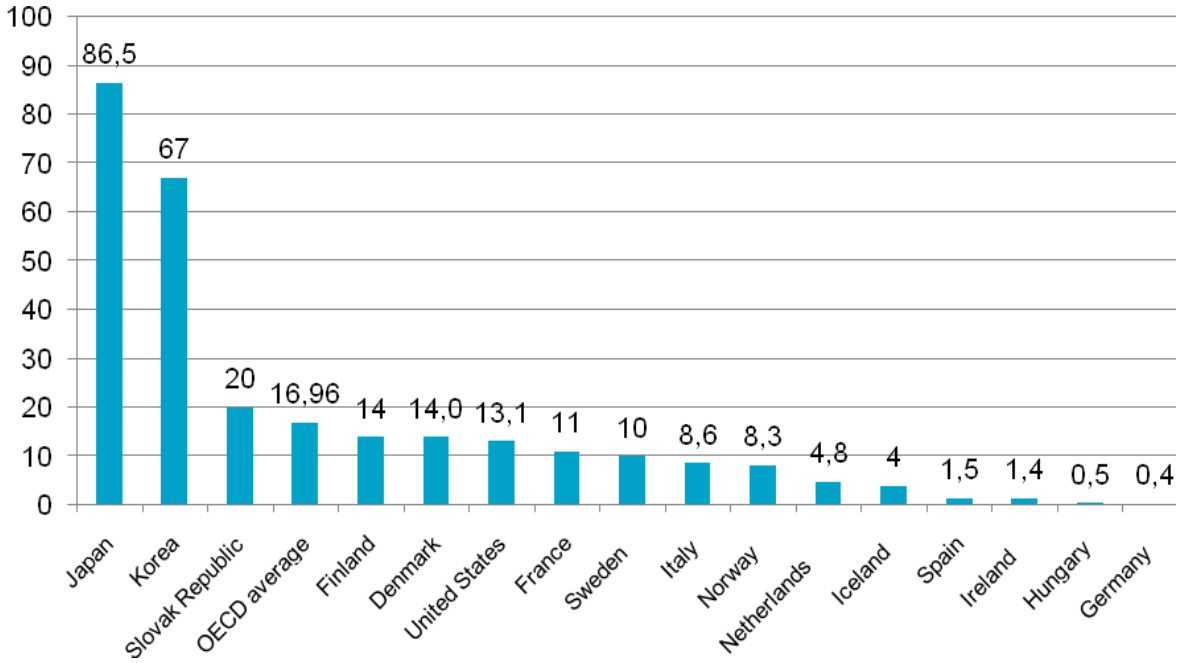
To measure NGA penetration, reference is made to two different figures, passed and connected households. The former, measuring the current state of deployment, may be sometimes difficult to assess, since electronic communication operators do not always make their deployments public.

According to IDATE (2011) data regarding FTTH/B rollouts in Europe by the end of 2010, the majority (10 out of 14) of the countries include projects involving historic operators. In most of these countries (8 out of 10) no companies other than the historic operator are deploying FTTH/B infrastructure. It is also interesting to note that in some countries projects are only undertaken by operators which are present as power utilities.

Notwithstanding this, publicly available information (ANACOM, 2011) shows that, in a significant number of Member States, alternative operators are very active with regard to NGA rollouts and, in some cases, the investments made by the historic operators seem to be a reaction to the alternative operators' initiatives.

The FTTH/B household penetration data provided in Figure 4 measures the number of households which subscribe to FTTH/B-supported services divided by the total number of households. It can be seen that there are six EU Member States in the top 10 OECD countries, although they are still far from the leaders in household penetration (Japan and South Korea).

Figure 4 FTTH/B Household availability (Up to 2009)



Source: OECD Broadband Portal[24]

With the exception of a few countries, the proportion of FTTH lines in the overall broadband lines in the EU27 seemed to be fairly limited, with the average penetration rate reaching 1.8% at the end of 2010, well below the world leaders in this respect (again Japan and South Korea).

It should also be mentioned that, besides FTTH/FTTB, other technological platforms are also playing a major role in the implementation of NGA networks in Europe. That is the case of EuroDOCSIS 3.0 (for instance in Belgium, Denmark, Finland, Germany, Ireland, the Netherlands, Portugal, Spain, Sweden, Switzerland and the UK) and of VDSL2 (for instance in Germany, Greece, Norway and the UK). LTE, meanwhile, is still at an initial implementation phase (Cullen International, 2011).

[24] Some country figures (including Australia, Austria, Belgium, Canada, the Czech Republic, Greece, Luxembourg, Mexico, Poland, Portugal, Switzerland, Turkey and the UK) are not available.

5. Governments' role and strategy to promote broadband

As mentioned *ab initio*, the EC asked Member States to elaborate national broadband strategies and set national targets for broadband usage. In the Competitiveness Council of March 2009, the Member States agreed to "a common indicative goal being 100% coverage of broadband between 2010 and 2013".

In achieving this objective, Member States could use a number of public policy and regulatory tools (at EU, national, regional and local level) such as loans, subsidies to PPPs, fiscal incentives to subscribers (for instance, to support broadband in under-served areas), State Aid and an intelligent use of the digital dividend.

The EC noted that, in particular, the EU structural and rural development funds are available to bring broadband to sparsely populated rural and remote areas, where the market is failing to invest in adequate infrastructure. However, the schemes must be justified and proportionate to remedy a well-defined market failure, as well as to meet cohesion objectives, and be in compliance with requirements for open access and technological neutrality and with competition rules, including State Aid rules.

5.1 Broadband promotion Strategies targeted at rural and peripheral areas

Sixteen NRAs[25] out of the 31 responding to the questionnaire declared that, in their countries, governments initiated strategies to increase the broadband penetration in the rural and peripheral areas. These are areas where it is considered unlikely that, in the near future, the market will generate the incentives necessary for operators to invest in new infrastructure for the provision of broadband access services (especially high-speed). This could be due to factors critical to such investment, such as population density (which determines the cost of bringing the network to households) and socio-economic factors such as age, education level and *per capita* income (which determine the potential revenue generated by the network). Also, the Czech Republic specified that their national broadband strategy includes elements targeted to the broadband adoption in the rural areas.

[25] From Bulgaria, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia, Spain, Sweden and the UK.

The objectives of such strategies relate mainly to reducing the digital gap between urban and rural areas as it is the case in Bulgaria, the Czech Republic, France, Germany, Hungary, Ireland, Latvia, Poland, Portugal, Romania, Slovenia and Spain.

There are also a number of countries which are planning the implementation of high-speed broadband capacities in the rural areas.

For example, in Portugal five contracts were signed with the Government following five public tenders for the installation and operation of "High-Speed Networks in Rural Areas", covering 140 municipalities. Winning entities must also operate the high-speed networks as an open network and to provide a wholesale offer for a period of 20 years in order to ensure non-discriminatory access to the network for all operators and providers of electronic communications services interested in using them to provide services to end-users.

In France, long term loans will be available to operators on market terms (market economy investor principle) to leverage FTTH investments in less densely populated areas.

In Lithuania, a public company "Plačiajuostis Internetas" was established with the goal of implementing the project “Rural Area Information Technology Broadband Network - RAIN” project which established Lithuania's broadband infrastructure development strategy for 2005-2010. The first part of the RAIN project was developed between 2005 and 2008, while RAIN 2 started in 2009 and will end in 2013.

One of the most important components of these strategies refers to funding, which is mostly ensured from the State budget and EU funds in the case of 11 countries[26].

There is a large variation in the download speeds of the broadband connections foreseen in these projects, ranging from 256 Kbps to 100 Mbps. Most of the projects are technologically neutral, the only limitation coming from the speeds that are to be ensured for the broadband connections, where, in some cases, optical fiber seems to be the only alternative.

A summary of the governments’ strategies targeted at rural and peripheral areas can be found in Table 2 in annex.

[26] Bulgaria, Finland, Germany, Greece, Hungary, Ireland, Latvia, Portugal, Romania, Slovenia and Sweden.

5.2 Broadband promotion strategies with national scope

The EC asked Member States to elaborate national broadband strategies and to set national targets for broadband usage. In the European Digital Agenda, the EC set the following broadband targets:

a) Basic broadband for all by 2013 - basic broadband coverage for 100% of EU Citizens;

b) Fast broadband by 2020 - broadband coverage at 30 Mbps or more for 100% of EU Citizens;

c) Ultra-fast broadband by 2020 - 50% of European households should have subscriptions above 100 Mbps.

Of the 31 NRAs responding to the BEREC questionnaire, 17[27] mentioned that in their countries a national broadband strategy was implemented. In Denmark, the government, municipalities and regions have launched a joint public digital strategy for 2011-2015 which was expected to be finalised in spring 2011. In addition, the Slovenian government is preparing a revised strategy which will include NGA development measures. Activities to update the broadband strategy were initiated also in Poland, where an interinstitutional team was appointed to draft the National Broadband Plan in response to the European Digital Agenda.

Most of the objectives of these strategies are related to connection and coverage targets. For example, the Danish government established a broadband goal according to which all homes and enterprises should be able to access at least 100 Mbps by 2020, as a result of market-based growth, while Estonia's targets of the EstWin project seem more ambitious (at least 100 Mbps broadband connection availability for everyone everywhere until 2015). France is planning an exhaustive coverage of the national territory by 2017 and Germany planned to ensure that all German households will have access to broadband Internet by the end of 2010 at latest, while aiming to bring broadband access of or above 50 Mbps to 75% of the households by 2014.

Sweden is envisaging a 90% penetration on households and businesses with broadband access at a minimum speed of 100 Mbps in 2020, while 40% should already have access to broadband at that speed by 2015. However, the Broadband Survey for 2010 conducted

[27] From the Czech Republic, Estonia, France, the Former Yugoslavian Republic of Macedonia, Italy, Germany, Greece, Lithuania, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

by PTS showed that 44% of all households and businesses in Sweden have access to at least 100 Mbps broadband. This means that one sub-objective of the government's Broadband Strategy for Sweden – 100 Mbps for 40% of households and businesses by 2015 – has been already achieved.

Lithuania and Slovakia are planning to achieve access to broadband connections at a speed faster than 30 Mbps for all their citizens by 2020.

Italy intends for at least 50% of Italians to be able to access the Internet at a speed exceeding 100 Mbps on fixed networks (FTTH) and on mobile networks (namely LTE) by 2020.

Particularly in the case of the implementation of national broadband strategies, there seems to be a growing relevance attributed to the implementation of dataset / mapping tools covering the infrastructure suitable for the installation of broadband networks. This is because it allows each service provider to know in a timely manner the location and availability of that infrastructure, thereby contributing to the rationalization of investments.

Furthermore, in some countries utilities operators are making their infrastructure available for the installation of broadband networks. That is the case of energy (for instance in Germany and Switzerland), of water distribution (in Spain), of sewerage (in Austria) and of highways and railways companies (in Portugal).

The most common technology that is mentioned in the national strategies is fiber (mostly FTTH) but also WiMAX, xDSL, HSPA, satellite and cable are reminded. A number of strategies apply the principle of technological neutrality.

A summary of the governments' strategies targeted at the whole national territory can be found in Table 3 in Annex.

5.3 Broadband promotion strategies targeted at consumers

Fourteen NRAs[28] reported that in their countries consumers benefit from different strategies targeting the raise of broadband penetration through subsidies which reduce subscription costs, support computer acquisition or raise awareness of the benefits of having broadband access.

[28] From Belgium, Croatia, Denmark, The Former Yugoslavian Republic of Macedonia, Germany, Hungary, Italy, Malta, Portugal, Romania, Spain, Sweden, Turkey and the UK.

In most cases, these strategies are targeting vulnerable social categories like older people, low-income families or people with disabilities. Beside these categories of consumers another concern relates to education where advantageous loans or subsidies are given to teachers and students for acquisition of computers or the monthly payment of broadband connections.

One of the most common forms of helping end-users to get on-line is sponsoring the purchase of a computer as an essential tool for accessing the Internet. NRAs reported that governments initiated such programs in seven countries. For example, in Malta families were supported by a grant which amounted to 16% of the total cost of the PC but not exceeding €186.40, while in Portugal subsidies are offered from the primary school to high-school and also to teachers.

A more complete overview of the governments' strategies targeted at consumers is presented in Table 4 in Annex.

6. NRAs' role and strategy to promote broadband

The following three questions were asked in the section about strategy, role and major initiatives of the NRAs: "The key five NRA decisions with major impact in order to bring broadband to all: (1) from a supply-side perspective?; (2) from a demand-side perspective? (please mention, *inter alia*, initiatives related to the provision of accurate information to end-users); (3) from a perspective that can be considered to focus in parallel both in the supply side and in the demand side"[29].

Out of the 31 NRAs that replied to the questionnaire, three NRAs did not answer the section of the questionnaire concerned with strategy, role and major initiatives of the NRA. Eleven NRAs answered all three parts of this section of the questionnaire. Nine NRAs answered only questions 1 and 2; one NRA only answered questions 2 and 3; six NRAs answered only question 1; and one NRA only answered question 3.

6.1 From a supply-side perspective

NRAs are required to analyse markets 4 and 5 and in those cases where an operator is found to have SMP, at least one remedy to the underlying competition problems must be imposed. Hence a number of NRAs has chosen to stress in their responses that they analyse these markets as well as the specific outcomes of their market analyses including namely obligations related to access (local loop and subloop unbundling; Optical Distribution Frame (ODF) unbundling; bitstream access), non-discrimination, transparency and price regulation.

In addition to the above mentioned tasks, a variety of initiatives of particular relevance to the promotion of broadband adoption have been undertaken by NRAs, related namely to the deployment of NGA networks; broadband in the scope of Universal Service; subsidisation and State Aid; and evaluation of broadband targets. These will be discussed below.

Deployment of NGA networks

[29] Responses to the third question can be regrouped as primarily a supply-side or demand-side initiative and will be discussed as such.

With regard to the deployment of NGA networks, the following activities have been undertaken by NRAs:

a) Stimulating providers to cooperate when building new infrastructure (e.g. Lithuania);

b) Organisation of a discussion platform, for instance, a workshop or formal association that brings together stakeholders to discuss how to stimulate the development of NGA networks (e.g. the Former Yugoslavian Republic of Macedonia and Germany through its “NGA forum”);

c) Development of a methodology for calculation of free ductspace to run cables (e.g. Lithuania);

d) Development of a reference offer for access to ducts which requires operators making information available about availability of ducts (e.g. Portugal and France);

e) Implementation of obligations regarding access to in-house wiring (e.g. Slovenia, Spain);

f) Implementation of obligations regarding access to manholes to be available on a mandated basis.

Universal access

At least four BEREC Member-States include or are expected to include soon broadband in their Universal Service obligations:

a) The NRA of Malta (MCA) is currently considering a decision on universal access, which might ensure universal access to a broadband connection;

b) Finland, Switzerland and Spain have included broadband connectivity in the scope of its Universal Service. The NRA of Finland (Ficora) implemented its decisions about Universal Service in 2010. Twenty six operators have been named Universal Service providers. One operator has been appointed to offer network services in specified areas.

NRAs’ initiatives related to subsidisation and State Aid

Very few NRAs stated in their responses that they are involved in making decisions regarding (strategies for) funding of broadband rollout. The NRAs of Finland, Denmark and Sweden are exceptions:

a) Ficora took decisions about State Aid for broadband rollout. The first State Aid decision in the Broadband 2015 project was taken in 2011. TeliaSonera is to receive a subsidy to build a network in one municipality. Other decisions on State Aid to broadband projects will follow;

b) The Danish NRA plans to publish an online guide in 2011 addressing whether municipalities can act as strategic buyers of infrastructure. When the municipalities establish high speed broadband to local institutions, it can create opportunities for retail broadband suppliers to offer broadband solutions based on this wholesale infrastructure to private customers in the same area. The objective is to create greater local involvement in broadband promotion;

c) PTS is co-financing a rural development program (with national and European funds) and a duct funding program (with national funds only). The purpose is to increase deployment of broadband in rural areas, where operators do not have the incentive to invest in broadband infrastructure. The Swedish NRA received, from the government, 95 million SEK (approximately 10.2 million euros) and in 2011 a supplementary amount of 20 million SEK (approximately 2.1 million euros). PTS has so far co-financed 115 broadband projects at a cost of 6.4 million euros;

d) PTS also supports regional actions relating to Information and Technology infrastructure and broadband. To this end it has developed “The PTS strategy of regional growth”. This strategy describes how PTS intends to use its ability to co-finance broadband projects to promote regional growth (e.g. supported in the increased deployment of broadband). Another effort with the goal of increasing broadband deployment is to encourage the use of structural funds for such projects, for example resourcing of information measures whose main goal is to make local and regional authorities realize the importance of broadband as a tool for regional development. PTS will also assist counties and regional associations, as well as municipalities, with data from the PTS Broadband Survey that can be used in order to map broadband coverage in their area;

e) With regard to citizens with disabilities, the NRA of Denmark has developed the “adgangforalle.dk”, a Danish language read aloud control, which is available for all on the web site of that same name and is primarily targeted at

people with dyslexia[30]. PTS is financing projects for new solutions and technologies for disabled people through a range of different development projects (an example is an innovation competition which happens twice a year, where companies may apply for financing of their new solutions - these projects run for a maximum of two years);

f) Since 2007, the Croatian NRA (HAKOM) is involved in the program “e-Islands”, together with the Ministry of Science, Education and Sports, the Central Office for e-Croatia, and CARNet. The project aimed to connect schools on the mainland with remote schools on the islands. The final outcome of the project was the provision of classroom equipment for remote teaching. Twenty one schools have been connected;

g) In Spain, the Avanza Infrastructures aid program focuses on the promotion of broadband access on a universal basis in “traditional” broadband white areas as well as in the development of superfast broadband in NGA “white” areas. Both involve a total amount of approximately 130 million euros. The granting of the aids is currently in the deployment phase and is implemented by the Spanish Ministry of Industry.

h) More generally, the Spanish NRA CMT plays an important role in the process of state aid granting in Spain. In particular, it issues a report on state aid projects before their notification to the EC assessing its impact on competition and the measures, if any, that should be imposed in order to avoid any distortion - and monitors the enforcement of any condition imposed on the subsidized network. There are also precedents of State aid Commission Decisions (e.g. Xarxa Oberta) where the NRA plays a role in implementing price and access conditions stated by the EC Decision.

Evaluation of broadband targets

[30] Furthermore, the Danish Public Welfare Technology Foundation supports a number of projects including, for instance, a “eating robot” for disabled citizens and the distribution of smartphones and personal digital assistants to a limited number of chilren and young people suffering from attention deficit hyperactivity disorder, in order to make them more independent in daily life.

Two NRAs indicated that they have been, or will be involved in the evaluation of broadband targets:

a) The Danish NRA will initiate an external evaluation initiated in 2017 to determine the status of Danish broadband deployment and expectations of reaching the 2020 target, and the socioeconomic consequences thereof;

b) PTS conducted a Broadband Survey in 2010 to assess the percentage of households and businesses connected to broadband with speeds over 100 Mbps. The Government's Broadband Strategy for Sweden is to have 100 Mbps available to 40% of households and businesses by 2015. PTS found that due to implementation of EuroDOCSIS 3.0 over cable and implementation of fibre networks this goal has already been achieved.

Other

Other supply-side initiatives related with the promotion of broadband mentioned include:

a) Participation in various industry *fora* (e.g. establishing an NGA Forum – or using other already existing industry *fora* - to promote a dialogue between the NRA, operators, manufacturers, federal states and municipalities) (e.g. France);

b) Public information provision through the development of databases or portals, for instance (i) through the creation of an information portal as an open platform for the exchange of best practice, news on the deployment technologies and legislative measures (e.g. the Czech Republic and Poland); (ii) development of a map with spatial data about infrastructure of various companies and institutions (including fiber optic lines, empty ducts, radio towers etc.) (e.g. Germany and Poland);

c) Making information available to providers about infrastructure, in order to help those seeking facility sharing (e.g. the Czech Republic and Lithuania);

d) Providing guidance to local authorities on how to promote fiber via access to the historic operator sub local loop (e.g. France);

e) Development and sponsoring of a series of seminars for village communities and municipalities on how to construct future-proof infrastructure;

f) Review of promotional offers for fixed broadband (e.g. Turkey);

g) Frequency assignments/licensing in various bands, in one case to specifically address the provision of broadband in rural areas (e.g. Ireland);

h) Monitoring / handling of complaints.

6.2 From a demand-side perspective

Many NRAs provide information to consumers, or provide a contact point for consumers to register their complaints. Information provision by NRAs can be categorised into information for educational purposes and information about services (such as pricing information). In addition, a few initiatives have been developed through the provision of security tools for consumers.

Information for educational purposes

Regarding information for educational purposes, the following examples were provided by NRAs:

a) Raising consumer awareness, for instance on end-user security through leaflets and media (e.g. Hungary and Lithuania);

b) Familiarizing the public with the benefits of broadband and reinforcing the commitment of stakeholders towards broadband development, namely with events and campaigns informing people about broadband (e.g. Denmark and Greece);

c) Producing guides with information on the different types of Internet services and characteristics that distinguish broadband from other Internet connections (e.g. Malta);

d) Providing a Charter of Rights applicable to end-users for electronic communications in general (e.g. Spain);

e) More specific information promoting video conferencing, to promote cloud computing and to promote the use of IPv6 in the public sector (e.g. Denmark);

f) The NRA of the UK (Ofcom) informs stakeholders and identifies where there are gaps and problems in relation to media literacy through ‘Media literacy audits’. These audits provide a wide range of information about the use and attitudes of adults’ and children’s towards the Internet, including those who do not go online.

Information about services

As for information about services, the following examples were provided by NRAs:

a) Price information (enabling tariff comparisons among various broadband services) (e.g. Cyprus, Denmark, Norway, Portugal, Slovenia and Spain);

b) Information on various features of services (e.g. Belgium, Greece, Lithuania, Poland and Portugal). Of particular interest seems to be the publication of an online database of the bandwidth offered by the operators or the provision of Information about the availability of services in different areas. For instance, the Polish NRA (UKE) is in the process of developing a map of broadband demand, which will identify places where there is demand for Internet services or where the service is unavailable. That tool will provide consumers with contact information about offers of electronic communications undertakings which are available in their place of residence (in parallel, it will help operators, particularly small local electronic communications undertakings, to identify regions where there is demand for broadband services);

c) Provision of a tool for calculation of actual Internet speed and also possibly for measuring other broadband characteristics (e.g. Denmark, Greece and Lithuania);

d) Creation of a consumer support center to assist, train, help, and reply to consumers' requests or difficulties with broadband (e.g. Greece).

Provision of security tools to consumers

The provision of security tools for consumers can be achieved, for instance, by means of a website which can detect botnet networks in the users' computer and of an antivirus website where end-users can freely verify suspicious files (e.g. Denmark and Lithuania).

7. Operators' role and strategy to promote broadband

This section covers the role and strategies regarding the promotion of broadband adoption by both fixed and mobile broadband operators, which, according to the NRAs replies to BEREC's broadband promotion questionnaire, are seen as the most important players in the promotion of broadband. In May 2011, BEREC adopted a report on specific aspects of broadband commercialization (henceforth, "Broadband Commercialization Report" – BEREC (2011c)). Many of the main findings of that report are also reflected in the replies to the BEREC's broadband promotion questionnaire[31].

Generally speaking, promotional offers are available in all the BEREC Member States and are used by all operators as a powerful tool to compete in the broadband market. Promotional offers differ broadly from one operator to another and from one BEREC Member State to another. Price reductions are common and can affect the connection fee, the cost of equipments the monthly fee, in general for a limited period of time. Promotional offers can be "aggressive", either by their amount or the period of validity. In order to benefit from price reductions and promotional offers, consumers often accept loyalty clauses. The length of the period that consumers are "locked-in" to one operator varies from one European country to another (BEREC, 2011c).

In addition, the Broadband Commercialization Report separates promotional offers into two groups: (i) items that all customers normally have to pay when purchasing broadband products, such as equipment and the connection fee; and (ii) discounts on the monthly fee for a limited period, with the aim of promoting certain products over others. Regarding the former, most European operators provide equipment to their customers free of charge and do not charge a connection fee. Another common promotional concept applied to new customers is a discount on the monthly rental fees for a limited period of time. This practice is common among most operators even though differences do occur between operators in a given country and between the Member States (BEREC, 2011c).

The Broadband Commercialization Report found that the most common minimum contract period for fixed services is 12 months, according to 10 out of 22 countries that answered the questionnaire. On the other hand, when it comes to mobile broadband services, 24 months seems to be the most common contract length. The length of the minimum

[31] Albeit a difference between the BEREC's broadband promotion questionnaire and the Broadband Commercialization Report is that the former separates between fixed and mobile broadband operators.

contract period does not generally depend on the operator, both historic operators and alternative operators seem to use similar lengths (BEREC, 2011c).

In this section of the report, the outcome of the replies of the BEREC's broadband promotion questionnaire regarding the role and strategy of both fixed broadband and mobile broadband operators is exposed and compared.

7.1 Fixed broadband operators

Twenty nine NRAs have answered the subsection "Fixed Broadband Operators" of the BEREC's broadband promotion questionnaire[32].

7.1.1 Fixed broadband price

Fixed broadband price differentiation depending on geographical area

Three NRAs[33] reported that operators have different retail prices for fixed broadband in urban and in rural areas. Six NRAs[34] reported that operators do not differentiate their retail prices for fixed broadband depending on geographic location.

Fixed broadband promotional prices

Twenty NRAs[35] reported that operators do have promotional prices for fixed broadband. No country reported that operators have never had promotional prices for fixed broadband.

Nine NRAs[36] reported that fixed broadband promotions are granted to those who subscribe for a minimum period of time (varying from 3 months to 24 months). Other common promotions which are reported from six NRAs[37] are free installation/activation/connection fee.

[32] From Austria, Belgium, Bulgaria, the Czech Republic, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

[33] From Austria, Latvia and Portugal.

[34] From Estonia, Hungary, Sweden, Poland, The Netherlands and Croatia.

[35] From Belgium, Bulgaria, Croatia, Cyprus, Denmark, Germany, Hungary, Ireland, Latvia, Lithuania, the Netherlands, Norway, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

[36] From Belgium, Germany, Lithuania, Portugal, Romania, Slovakia, Sweden, Turkey and the UK.

[37] From Belgium, Cyprus, Germany, Portugal, Romania and Turkey.

7.1.2 Fixed broadband quality of service

Fifteen NRAs[38] replied that the speed of the fixed broadband connection is a quality of service item that differs between service providers.

Two NRAs[39] reported improved customer service as a quality of service item for consumers. Three NRAs[40] reported that operators publicise the actual speed of Internet connection for their users. In Portugal, ANACOM publishes the results of quality of service for both mobile and fixed broadband providers. In Italy and Sweden, NRAs have been involved in setting up services that enable consumers to test their actual speed of connection. The UKE initiated a round of workshops with operators that are focused on quality of the service issues. The Greek NRA (EETT) reported that it provides a WEB 2.0 application (KOMEX/SPEBS) enabling consumers to measure their broadband connection characteristics, geo-map their measurements, view personalized statistics and understand how broadband measurements are mapped throughout the country. In addition, in Greece, the electronic communications service providers conduct measurements and publicize those measurements in their respective websites regarding downstream and upstream speeds of their xDSL access network, as dictated by relevant provisions of an EETT decision.

7.1.3 Bundling of services including *inter alia* fixed broadband

Among the 30 NRAs that replied to this section in the BEREC's broadband promotion questionnaire, 27 NRAs[41] replied that operators offer bundles (see Figure 5). The remaining three other NRAs that replied to this section of the questionnaire did not specifically report that operators do not offer bundles in the respective countries.

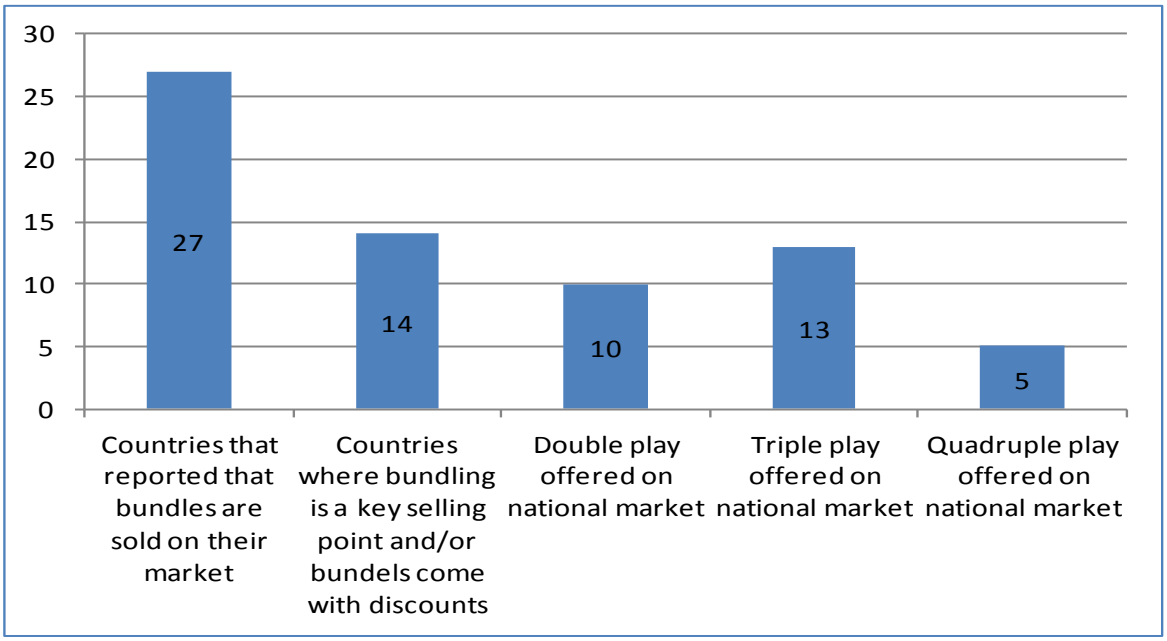
[38] From Austria, Belgium, Croatia, Denmark, Estonia, Germany, Greece, Ireland, Norway, Romania Slovakia, Spain, Sweden and the UK.

[39] From Finland and Sweden.

[40] From Denmark, Estonia and the UK.

[41] From Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

Figure 5 Countries with an offer of bundles including inter alia fixed broadband



Source: BEREC EWG End User Broadband Promotion Questionnaire

Also in Figure 5, it can be seen that 10 NRAs[42] reported that double play bundles are offered and 13 NRAs[43] reported that triple play bundles are offered. Five NRAs[44] reported that quadruple play bundles are offered[45].

Six NRAs[46] replied that bundling is important or even a key selling point. Eight NRAs[47] reported that bundling offers come with discounts for end-users. Assuming that discounts for end-users could be interpreted also as an important selling point, it seems that, in at least 13 countries, bundling has an important role to play in the strategies of fixed broadband operators.

This reasoning is also supported by the results of a recent EC's survey (EC, 2011), according to which 42% of the European households subscribe to a bundled service and 61% of all Internet access services are purchased as part of a bundle. In addition, 41% of these households stated that the main reason for subscribing a bundle was the

[42] From Austria, Denmark, Finland, Germany, Latvia, Norway, Portugal, Romania, Spain and Sweden.

[43] From Austria, Denmark, France, Germany, Latvia, the Netherlands, Norway, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

[44] From Austria, Germany, Latvia, Romania and Slovenia.

[45] No country has given any information on what is not offered so the answers are likely to be incomplete.

[46] From Bulgaria, Croatia, Cyprus, Denmark, Hungary and the Netherlands.

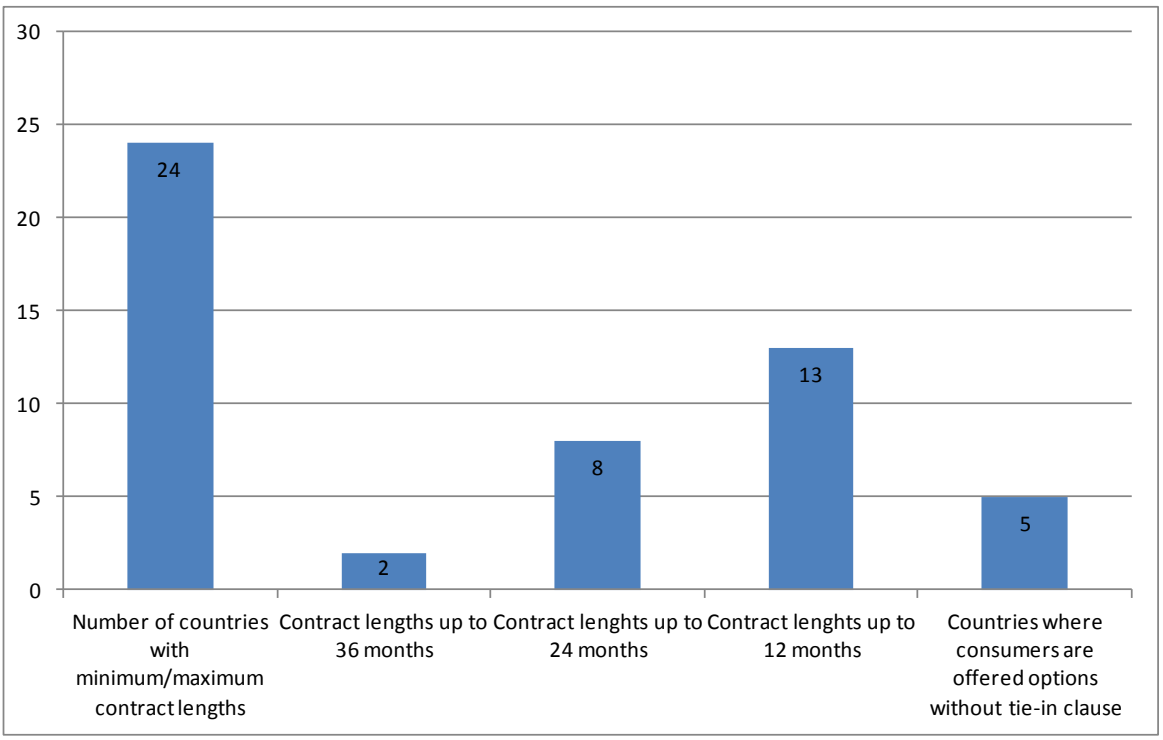
[47] From Belgium, Estonia, Ireland, Lithuania, Norway, Romania, Slovakia and the UK.

convenience of having only one service provider and 33% of households believed that subscribing to a bundle was cheaper than paying for each service separately.

7.1.4 Minimum length of contract for fixed broadband

A number of 24 NRAs[48], among the 30 NRAs that replied to this section of the BEREC's broadband promotion questionnaire, indicated that there are minimum and maximum contract lengths for fixed broadband (see Figure 6).

Figure 6 Number of countries with a given minimum contract length for fixed broadband



Source: BEREC EWG End User Broadband Promotion Questionnaire

In the same figure, it can be seen that two NRAs[49] replied that fixed broadband contract lengths up to 36 months exist. It is worth noting that Directive 2009/136/EC of 25 November 2009 amends article 30§ 5 of the Universal Service Directive, which now reads that "*Member States shall ensure that contracts concluded between consumers and undertakings providing electronic communications services do not mandate an initial*

[48] From Austria, Belgium, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Portugal, Slovakia, Spain, Turkey, the UK, Sweden, Romania, Germany and Norway.

[49] From Austria and Lithuania.

commitment period that exceeds 24 months. Member States shall also ensure that undertakings offer users the possibility to subscribe to a contract with a maximum duration of 12 months". A possible explanation for the existence of contract lengths up to 36 months could be that the Directive had not been yet implemented in those countries.

Eight NRAs[50] reported contract lengths up to 24 months and 13 NRAs[51] reported contracts of up to 12 months. Five NRAs[52] reported that consumers are offered the opportunity to sign contract without a tie in clause.

Contract lengths normally seem to be connected with lower price of service or free installation/connection upon signing a long-term contract.

7.2 Mobile broadband operators

A number of 29 NRAs[53] has answered subsection "Mobile Broadband Operators".

7.2.1 Mobile broadband price

In total, 26 NRAs[54] reported that mobile broadband operators have used price as a means to stimulate adoption by the end-users.

Six NRAs[55] did not reply to this specific question of the BEREC's broadband promotion questionnaire.

There is a large differentiation among the replies and a quite wide range of price factors has been identified as examples of how mobile broadband operators stimulate adoption by end-users. A majority of the responding NRAs reported that mobile broadband operators offer promotions, which hence may be seen as a major trend in the operators behaviour in that market.

[50] From Croatia, Finland, Germany, Portugal, Romania, Slovakia, Sweden and Turkey.

[51] From Austria, Belgium, Croatia, France, Germany, Greece, Ireland, Lithuania, Norway, Portugal, Spain, Turkey and the UK.

[52] From Denmark, France, Slovakia, Slovenia and Sweden.

[53] From Austria, Belgium, Bulgaria, the Czech Republic, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

[54] From Austria, Belgium, Bulgaria, the Czech Republic, Croatia, Cyprus, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

[55] From the Former Yugoslavian Republic of Macedonia, Iceland, Italy, Luxemburg, Malta and Switzerland.

Mobile broadband promotions

The promotions offered by mobile broadband operators include a wide range of factors, for example promotional prices, different kind of discounts, flat rates, pre-paid, etc.

The major trend is that mobile broadband is accompanied by some kind of discount or promotion.

Promotional mobile broadband prices were reported by 14 NRAs[56] and discounts on mobile broadband were reported by nine NRAs[57]. In Belgium and in Slovakia, the mobile operators offer online discounts, while there are discounts on the monthly fee in Greece, Germany and Romania. In Turkey and in the UK, mobile broadband operators offer discounts on the first month(s) of the service contract. In Germany, Romania and Slovenia discounts can also be found on equipment. In Denmark, a price subsidy is only possible with a six month contract. Five NRAs[58] reported discounts on hardware when applying a fixed term contract. In Portugal or in France, discounts can be found, for instance, on offers including smartphones.

Flat rates for mobile broadband were reported by four NRAs[59]. In Austria and in Romania, the flat rate is tempered by reduced speed once a predetermined level of data has been downloaded. Pre-paid mobile broadband promotions are reported by six NRAs[60].

No NRA specifically reported that mobile broadband operators never offer promotional prices for mobile broadband.

Other mobile broadband price factors than promotions

Besides promotions other price factors have been identified. Eight NRAs[61] reported that mobile broadband operators have national pricing (e.g. no geographical differentiation). Between the remaining NRAs that replied none reported geographically differentiated

[56] From Austria, Bulgaria, Croatia, Denmark, Finland, Germany, Hungary, Latvia, Lithuania, the Netherlands, Norway, Portugal, Romania and Slovakia.

[57] From Belgium, Denmark, Germany, Greece, Romania, Slovakia, Slovenia, Turkey and the UK.

[58] From Austria, Germany, Lithuania, Romania and the UK.

[59] From Austria, Denmark, Portugal and Romania.

[60] From Austria, Denmark, Ireland, Portugal, Romania and Slovakia.

[61] From Croatia, Denmark, Estonia, France, Hungary, the Netherlands, Poland and Sweden.

prices for mobile broadband. In Latvia better mobile broadband prices have occurred due to competition with fixed broadband operators.

7.2.2 Mobile broadband quality of service

In total, 23 NRAs[62] replied to this specific question of the BEREC's broadband promotion questionnaire.

Nineteen NRAs[63] reported examples of quality of service offered by mobile broadband operators. There is quite a large differentiation among the quality of service offered by the mobile broadband operators.

The Hungarian NRAS has reported that the mobile broadband operators do not use any quality of service factors to stimulate adoption by the end-user. The Netherlands' NRA reported that quality of service for the consumer market does not get much attention. The German and the Croatian NRAs noted that there are no specific products that provide guaranteed quality but there are best effort products.

Mobile broadband speed

Speed - both the download and the upload broadband speed connections - as a quality of service item offered by mobile broadband operators has been reported from 7 NRAs (from Austria, Denmark, Estonia, Finland, Slovakia, Spain and Sweden).[64]

Other mobile broadband factors than speed

Besides download and upload speed, other relevant factors have been mentioned by NRAs such as data allowance, a trial period for the consumer, lower mobile broadband quality in rural areas than in urban areas - due to high costs in rural areas, guarantee of quality of service when applying a contract and buying hardware and quick support when

[62] From Austria, Belgium, Bulgaria, Croatia, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden and the UK.

[63] From Austria, Belgium, Croatia, Denmark, Estonia, Finland, Germany, Italy, Ireland, Latvia, Lithuania, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden and the UK.

[64] The replies did not give any information about the speed levels that are offered by the mobile broadband operators.

problems appear. There are also initiatives carried out to eliminate areas with lack of coverage.

7.2.3 Bundling of services including *inter alia* mobile broadband

In total, 26 NRAs[65] reported that mobile broadband operators offer bundles.The replies to the BEREC's broadband promotion questionnaire suggest that bundling mobile broadband with other service(s) and/or product(s) is quite common. In particular, four NRAs[66] pointed out that bundling of services is a key selling point. In Austria and Greece there is an increasing tendency to bundle services among mobile broadband operators. However, five NRAs[67] reported that bundling is not seen as an important factor in order to stimulate adoption by the end-user, that is, bundling exists but cannot be said to be a key selling point.

Bundles offered by the mobile broadband operators

There is a large differentiation (for instance with regard to the different products and services encompassed) between the replies and a quite wide range of examples of how the bundling of services stimulate adoption by the end-users have been identified.

The bundling of mobile voice with some other service(s) is quite common and is reported by ten NRAs[68] In Austria and in Finland, mobile voice is bundled with SMS and data; in Turkey with SMS and mobile broadband; in Latvia, Slovakia and Romania with broadband and in Portugal with data.

Other types of bundles offered by mobile broadband operators include wireless and fixed broadband as well as landline connections[69] offered through the mobile network. The former is present in Austria, France, Lithuania and the Netherlands, while the latter can be found in Sweden.

[65] From Austria, Belgium, Bulgaria, the Czech Republic, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

[66] From Bulgaria, Croatia, Hungary and Latvia.

[67] From Denmark, Estonia, Latvia, Spain and Romania.

[68] From Austria, Denmark, Finland, France, Germany, Latvia, Portugal, Romania, Slovakia and Turkey.

[69] By the landline connection trough the mobile network is meant that the customer is offered a local number with low-priced calls to other landline subscribers. The only difference for the end-user is that the terminal equipment is connected to a mobile network instead of a fixed line. This solution is supposed to be perceived by the customer as being at large similar to the landline.

Four NRAs[70] reported the commercial offer of double, triple or even quad-play bundles. In Norway, dual and triple-play bundles are offered. The Slovakian NRA reported triple-play bundles with discounts.

A multi-country package for France, Switzerland, Luxemburg, Belgium and the Netherlands (national calls + international messages + international calls, etc) was reported by the Belgium NRA.

The Irish NRA reported the inclusion of content and access to certain applications/sites for free.

7.2.4 Minimum length of contract for mobile broadband

Twenty six NRAs[71] reported that a minimum length of contract exists (eight NRAs[72] did not answer this specific question).

A common trend is that signing a longer contract is associated with some kind of benefit, for example cheaper installation and equipment prices, lower monthly rate and/or free equipment. However, it is also clear that governments and NRAs are also frequently concerned that lengthier contract periods may result in market distortions and reduce the consumers' choice and flexibility.

Situations where a customer can sign a contract without a binding period, were reported by eight NRAs[73].

Six month contracts were reported by two NRAs[74]. In Denmark, six months applies to most of the contracts, since this is currently the longest period of time allowed to be associated with a contract.

Eight NRAs[75] reported one year (12 months) contracts for electronic communications services.

[70] From Denmark, France, Germany and Romania.

[71] From Austria, Belgium, the Czech Republic, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK

[72] From Bulgaria, Cyprus, the Former Yugoslavian Republic of Macedonia France, Iceland, Italy, Luxemburg and Switzerland.

[73] From Croatia, Denmark, Finland, France, Malta, Slovakia, Sweden and Turkey.

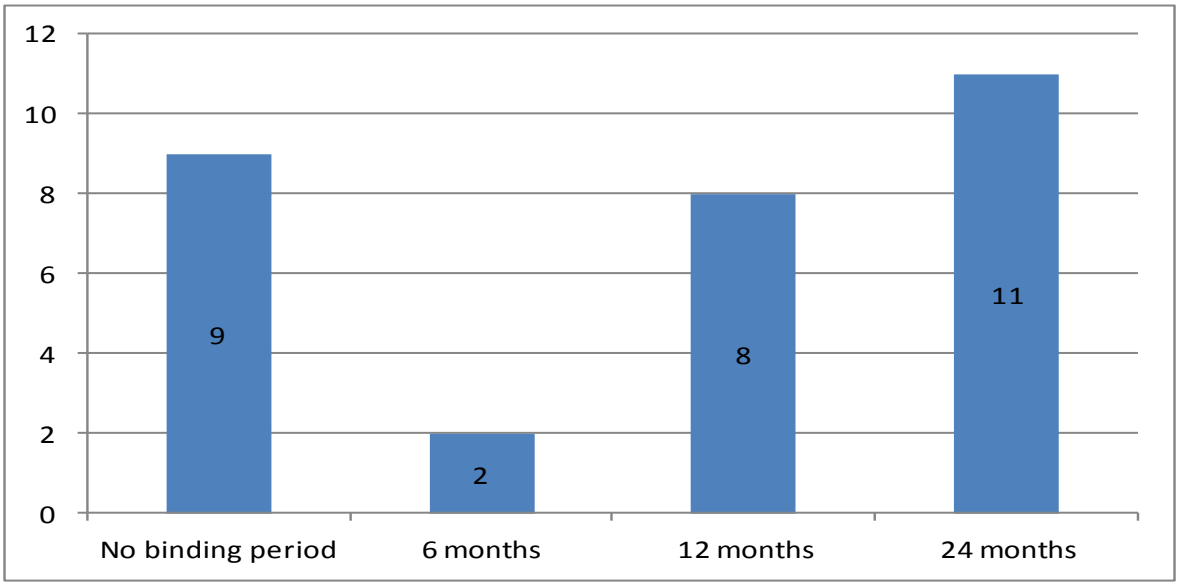
[74] From Germany and Denmark.

[75] From Belgium, Croatia, France, Germany, Greece, Ireland, Norway and Portugal.

Two year (24 months) contracts were reported by 11 NRAs[76] The Portuguese NRA reported that a contract providing for a loyalty period must include certain information. for example, a justification for the loyalty period, the duration and date of expiry of this period, the cost for unblocking if there is such a fee on the equipment and the amount due for early termination of the contract.

Nine NRAs[77] have not specified a concrete minimum period (see Figure 7)

Figure 7 Number of countries with a given minimum contract length for mobile broadband[78]



Source: BEREC EWG End User Broadband Promotion Questionnaire

7.2.5 Other relevant aspects for mobile broadband

PTS reported a rapid rollout of mobile broadband (via HSPA access technologies) in sparsely populated areas. The Croatian NRA reported that there is a continuous development of network upgrade of technologies and that the mobile broadband operators are working on to increase coverage in rural areas as well as to increase the speed provided.

[76] From Croatia, Finland, France, Germany, Latvia, Poland, Portugal, Romania, Slovakia, Spain and Sweden.

[77] From Austria, the Czech Republic, Estonia, Hungary, Lithuania, Malta, the Netherlands, Slovenia and the UK.

[78] The reply of a given NRA may have reported more than a single given minimum contract length, thus resulting in "double counting".

7.3 Comparison between the core aspects of the strategies of the fixed and the mobile broadband operators

7.3.1 Price

Almost all the responding NRAs reported that promotional prices are offered by both fixed broadband operators and mobile broadband operators. Promotional offers differ broadly from one operator to another and from one BEREC Member State to another. No NRA specifically reported that fixed broadband operators and mobile broadband operator never have promotional offers.

7.3.2 Quality of service

The most common quality of service item offered by both fixed broadband operators and mobile broadband operators is related to the Internet speed connection. Fourteen NRAs[79] reported that broadband speed connection is offered as a signal of the quality of the service by fixed broadband operators, while seven NRAs[80] reported that mobile broadband operators use speed in the same manner, as a signal of the quality of the service offered. Hence, it seems that the broadband connection speed is more commonly used as a selling point for fixed broadband connections than for mobile broadband connections. Whether this conclusion is correct is however uncertain since the replies to BEREC's broadband promotion questionnaire do not provide further guidance in this aspect.

7.3.3 Bundling of services

Twenty six NRAs[81] reported that mobile broadband operators offer bundles including mobile broadband while 27 NRAs[82] reported that fixed operators offer bundles including

[79] From Austria, Belgium, Croatia, Denmark, Estonia, Germany, Greece, Ireland, Norway, Romania, Slovakia, Spain, Sweden and the UK.

[80] From Austria, Denmark, Estonia, Finland, Slovakia, Spain and Sweden.

[81] From Austria, Belgium, Bulgaria, the Czech Republic, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

fixed broadband. No NRA reported that operators (either fixed or mobile) do not offer bundles.

An interesting finding is that bundling seems to be a key selling argument for fixed broadband services, since this was reported by six NRAs[83]. Eight NRAs[84] reported that bundling offers come with discounts for end-users. Assuming that discounts for end-users could be interpreted also as an important selling point, it seems that, in at least 14 countries (out of 30 replies) bundling has an important role to play in the strategies of fixed broadband. On the other hand, only five[85] out of 26 NRAs[86] reported that bundling is a key selling point for mobile broadband services.

7.3.4 Minimum length of contract

Twenty six NRAs[87] reported a minimum length of contract for mobile broadband and 24 NRAs[88] reported a minimum length of contract for fixed broadband. The maximum applicable contract length seems to be 36 months for fixed broadband, which is reported from two NRAs[89]. The maximum applicable contract length for mobile broadband seems to be 24 months, which is reported from 11 NRAs[90].

According to the replies of BEREC's broadband promotion questionnaire, fixed broadband services seem to have 12 months as the most common contract length, whereas 24 months seems to be the most common contract length for mobile broadband services.

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[82] From Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

[83] From Bulgaria, Croatia, Cyprus, Denmark, Hungary and the Netherlands.

[84] From Belgium, Estonia, Ireland, Lithuania, Slovakia, the UK, Romania and Norway.

[85] From Bulgaria, Croatia, France, Hungary and Latvia.

[86] [86] From Austria, Belgium, Bulgaria, the Czech Republic, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

[87] From Austria, Belgium, the Czech Republic, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey and the UK.

[88] From Austria, Belgium, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Portugal, Slovakia, Spain, Turkey, the UK, Sweden, Romania, Germany and Norway.

[89] From Austria and Lithuania.

[90] From Croatia, Finland, France, Germany, Latvia, Poland, Portugal, Romania, Slovakia, Spain and Sweden.

The length of the minimum contract period appears to be similar between historic operators and alternative operators.

8. Public-private-partnerships role and strategy to promote broadband

According to the 31 NRAs' answers received to the broadband promotion questionnaire, in 16 countries[91] PPS have a relevant role in order to stimulate the development of broadband.

In Estonia, PPPs aim to make broadband available to all the citizens in all the area of the country. Estonia has undertaken the "EstWin Project" - the biggest project ever signed between the public and private sectors of that country - to make 100 Mbps Internet accessible to every citizen by 2015), in a substantial part of the territory. According to an agreement between the Ministry of Transport and the Latvian electronic communications operator "Telekom Baltija", the latter has to provide 286 Kbps speed to cover between 80% and 95% of the Latvian territory until 2012 using Government funding and European Regional Development Fund funding. In some other countries, PPPs aim to make broadband available in rural areas[92].

The responses to the broadband promotion questionnaire show that in the majority of 16 countries where PPPs have some role to play, those are mostly based on deployment of particular technologies to stimulate broadband development, especially in rural areas.

In Greece, a national project based on PPPs for the deployment of FTTH network is being implemented. In the Netherlands, the PPP "Citynet Amsterdam" aimed to build FTTH broadband access network connecting 37,000 households in Amsterdam. BAKOM (Switzerland's NRA) has indicated three important PPPs: "Incumbent and Zurich city utility" (deployment of FTTH in Zurich city area), "Incumbent and Basel city utility" (deployment of FTTH in Basel city area) and "Incumbent and Fribourg utility" (deployment of FTTH in the whole (mostly rural) canton of Fribourg). In Catalonia (Spain), the Xarxa Oberta project is currently developing a public NGA infrastructure providing access to operators who want to connect its last mile infrastructure to the backhaul part of the NGA network. A part of the network shall be used as self provision for the public authorities, and the remaining capacity after supplying connectivity to the public administration will be available to provide services on the private market. In order to implement the project, an independent private company will be selected, through an open tender, to rollout, manage

[91] Estonia, France, Germany, Greece, Italy, Latvia, Lithuania, Malta, The Netherlands, Poland, Romania, Slovenia, Spain, Sweden and Switzerland.

[92] For instance, Germany, Poland, Slovenia, Spain and Sweden.

and operate the network and to provide electronic communications services to the public administration for a period of 20 to 30 years.

In some countries[93], PPPs are focused on ICT/Computer literacy training schemes to educate the population to use information technologies and to develop the usage of e-services. In Lithuania, an alliance "Langas į ateitį" ("Window to the Future") has been established in 2002 by leading electronic communication companies, banks, Information Technology companies and the Ministry of the Interior to promote the use of Internet and e-Services in Lithuania and hereby stimulate the improvement of living standards. "Langas į ateitį" organised different courses: training on computer literacy and Internet usage basics; training on how to use ICT and e-services (2010). In Malta, Community Technology Learning Centres have been established to organize ICT literacy courses in order to improve community access to ICT.

PPPs could be also aimed to put in place public Internet access points[94]. In Lithuania, an international tripartite agreement between the Ministry of Culture, the Lithuanian National Library and the Bill & Melinda Gates Foundation, signed up in 2007 to implement the Project "Libraries for Innovation" has the key objective to achieve, through strengthening and using the capacities of public libraries, a considerably better use of the capacities of information technologies among the Lithuanian population, especially the rural population and social risk groups, for obtaining information and communication. The same type of project has been started in Romania in 2009. The Romanian "Biblionet program" will facilitate free access to information for Romanian citizens by fostering the development of a modern public library system in Romania. In Malta, community technology learning centers equipped with computers and broadband connectivity were established and are open to any community member.

The Swedish example shows that the various organisations that are aimed to achieve the targets related to broadband development can be established also on the basis of PPPs. The Swedish government's Broadband Council, joining representatives of various organizations, undertakings, public authorities and the government was established to help achieve the targets laid down in the government's Broadband Strategy.

Table 5, in annex, offers a brief description of some PPPs projects that are being developed to promote broadband in 16 European countries.

[93] Fior instance, Lithuania, Malta and Poland.

[94] For instance, in Lithuania, Malta and Romania.

With regard to the results achieved by the PPPs, it is good to note that in a recent study commissioned by the IRG to the FSR (2011), a regression model based on data from 23 European countries[95], was developed, which concludes, *inter alia*, that the adoption of PPP had a "positive effect and a significant impact on broadband penetration".

The same study also draws attention, *inter alia*, to the facts that:

a) The allocation of internal risks (e.g. related with concessions and rights of way) and external risks (e.g. related with demand uncertainty), combined with the specificities of the long-term contracting between stakeholders are crucial to the success and performance of the PPPs;

b) It seems important for the PPPs' success to integrate, in its design, demand-side initiatives meant to increase broadband adoption.

Finally, it is interesting to note that where municipalities are involved in PPPs, that their participation can assume different roles, namely of facilitator[96], sponsor[97], coordinator[98] or developer[99] (Troulos and Maglaris, 2011).

[95] Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, UK and Turkey.

[96] *"Municipal involvement is limited to facilitating constructions, for example handling rights-of-way. Private parties deploy their networks that they subsequently own*".

[97] *"Cities facilitate and coordinate the efforts of non-profit organizations that build the NGA network. The infrastructure may be owned by the public partners or the municipality".*

[98] "*Municipalities invest in the PPP but their role is to ensure consistency of deployment with city planning roadmaps. Operation and exploitation are assumed by the private partners. The city retains ownership of the network".*

[99] "*Cities build and manage physical infrastructures as a utility network, mostly in partnership with electric utilities. The infrastructure is owned by the municipality and/or the electric utility".*

9. NRAs' perception regarding obstacles to broadband promotion

This section presents the main findings from those sections of the BEREC's broadband promotion questionnaire aimed at collecting the NRAs' perceptions regarding the obstacles to broadband promotion[100].

"Europe", in the presented figures, stands for the European countries that were asked to reply to the BEREC questionnaire, whilst "EU27" stands for the 27 EU Member States. "EU27"' results are highlighted in the analysis only insofar as those results are visibly different from "Europe"' results.

Both the supply-side and the demand-side obstacles to broadband promotion are highlighted in this document, in the context of the whole national territory and also the rural areas of the countries[101].

NRAs were asked to classify the demand-side and supply-side obstacles, according to a scale between 1 (inexistent barrier) and 5 (very important barrier).

The average presented in the figures is equal to the sum of classifications attributed by the NRAs whose reply to a specific question was not "DR" (did not reply) or "DK" (do nort know) divided by the number of those NRAs.

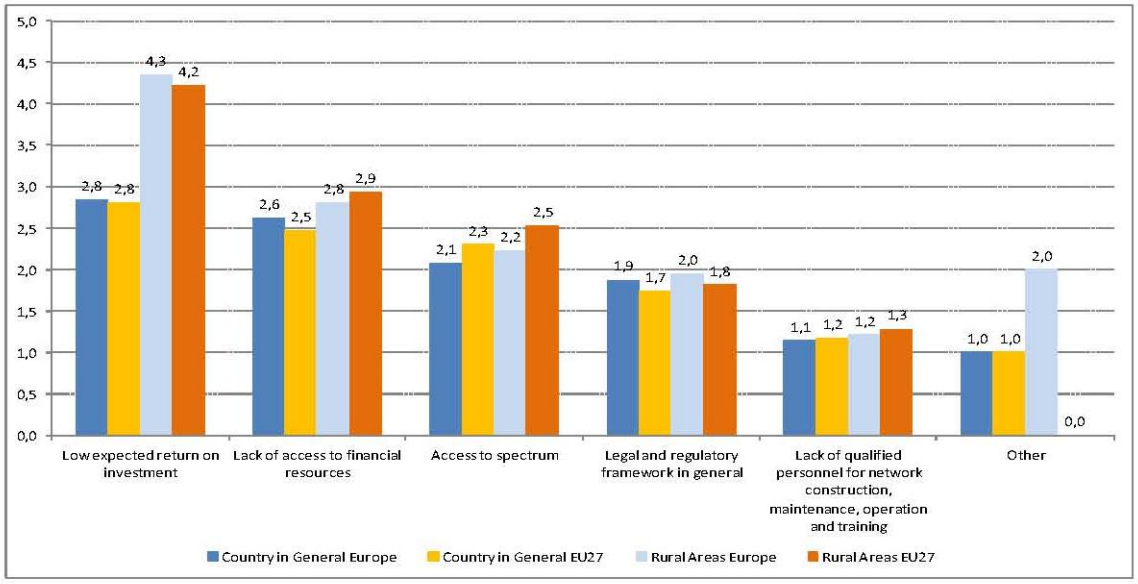
Among the NRAs that could identify and rank obstacles to broadband promotion (approximately 2/3 of the NRAs that replied to the BEREC's questionnaire on broadband promotion), the major obstacles on the supply-side in Europe (both for the country in general and for rural areas) relate to the low expected return on investment (which again is impacted upon by ARPU, the take-up on the demand side[102] and the costs of network roll-out on the supply-side); lack of access to financial resources and access to spectrum (see Figure 8).

[100] The concrete identification of each NRA reply to this section of the BEREC questionnaire was omitted ab initio (following a consultation with the NRAs) since those questions were considered sensitive and subjective in nature, understanding also that it is believed that the omission of that identification would contribute to a higher and more complete volume of replies.

[101] Please bear in mind that some NRAs that replied to the questionnaire did not reply to the full set of questions put forward.

[102] Which on its turn can be influenced by a wide variety of factors, including, for instance, the income *per capita*, the availability of contents in native language, the degree of innovation and the level of competition.

Figure 8 Perception on supply-side factors that may be considered barriers to broadband adoption



Source: BEREC WG End User Broadband Promotion Questionnaire

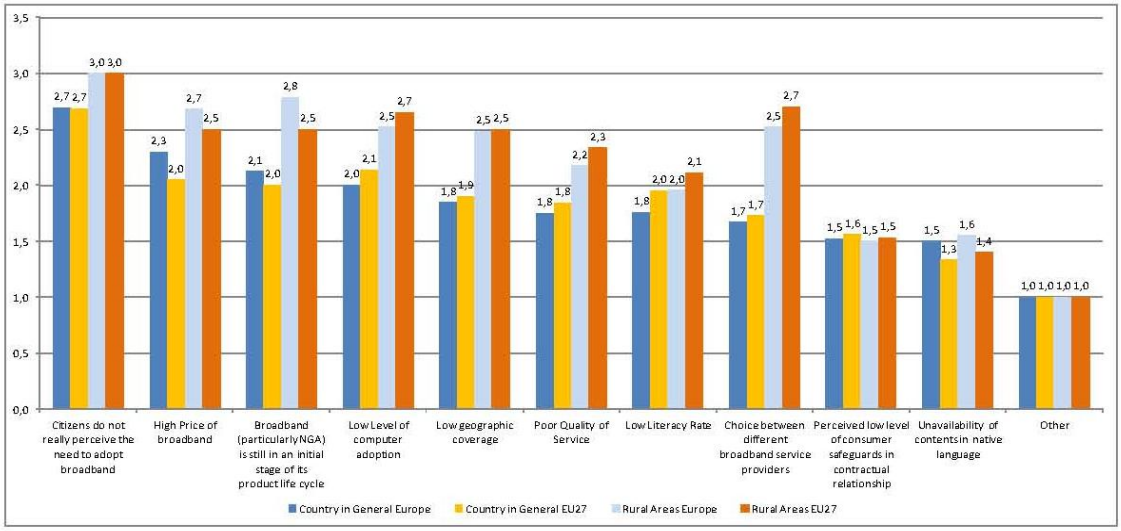
The figure presents the NRAs answers to the questionnaire as their subjective perception of obstacles. It is not based on empirical market data research.

Source: BEREC WG End User Broadband Promotion Questionnaire

In particular, the perception of an inadequate European legal and regulatory framework as a barrier to broadband promotion should be considered with caution. In fact, at the time the replies were given, some Member States had not yet fully transposed the new European regulatory framework. It would therefore be difficult to distinguish whether an eventual obstacle would be connected in reality to the new or to the previous European regulatory framework. In addition, it seems too early to say to what extent the European regulatory framework is facilitating broadband adoption.

Assessing, from a global perspective, the top four major factors that may, in practice, act as barriers to broadband adoption on the demand-side for the country in general (see Figure 9), those that seem more relevant in Europe correspond to citizens to do really perceive the need to adopt broadband, the high price of broadband, broadband (particularly NGA) is still in an initial stage of its product life cycle, and low level of computer adoption.

Figure 9 Perception on demand-side factors that may be considered barriers to broadband adoption



Source: BEREC WG End User Broadband Promotion Questionnaire

The figure presents the NRAs answers to the questionnaire as their subjective perception of obstacles. It is not based on empirical market data research.

Source: BEREC WG End User Broadband Promotion Questionnaire

In complement to the results of the BEREC's broadband promotion questionnaire, it is worthwhile noting that a recent survey by the EU Eurobarometer has indicated that European web users are frustrated by a lack of native language content. According to the latest research, over half of all European Internet "surfers" use a language other than their native tongue when online, with 44% of those surveyed stating that this was a barrier to truly understanding the online content. Unremarkably, English appears to be the working language for the Internet, with the EU survey recording that 48% of European web surfers resort to English when a native translation is unavailable.

The research also illustrated the economic impact for firms that inadequately translate their websites. Only 18% of EU Internet users polled would purchase goods or services in a foreign language. Poorly translated web content represents a missed opportunity for firms that operate on the Internet.

Still looking at Figure 9, but now considering, from a global perspective, the top three major factors that may act on the demand side, as barriers to broadband adoption, particularly in rural areas correspond to:

a) Europe: to Citizens do not really perceive the need to adopt broadband, to NGA is still in an initial stage of its product life cycle, and to the high price of broadband;

b) The EU27: to Citizens do not really perceive the need to adopt broadband, to the low level of computer adoption and to the lack of information to foster choice between different broadband service providers.

According a case study developed by Peronard and Just (2011) focusing on the Danish experience, in the rural areas, the logic of broadband adoption relates not only to functional and utilitarian values but also with "existencial" values, since broadband "provides a means of forming community relations, social transparency, and a sense of belonging".

It is also worthwhile to mention that, according to NRAs' perceptions, beyond the NRAs, various stakeholders including operators, national governments, NRAs and other entities such as regional/local authorities and organisations, end-user associations and broadband stakeholders associations have an important role to play in the promotion of broadband.

10. Advice to policy makers and NRAs regarding broadband promotion measures

Considering the previous analysis, there seems to be a place (with regard to broadband promotion) for effective public policies and regulatory intervention. However, according to a recent extensive literature review produce by the FSR (2011) a comprehensive analysis of the interaction between the various supply-side and demand-side policy tools is still missing.

Notwithstanding this, the results of an empirical regression model developed by the FSR (2011) suggest that the sequencing public policy is extremely important in the definition of optimal strategies for public policies and regulatory action. In fact, as the adjustment of the supply to the demand is more difficult than *vice versa*, when the supply level is low investment in demand-side initiatives is expected to be relatively ineffective. Hence, to optimise the impact of public policies on broadband promotion, supply-side policies (aimed at, *inter alia*, reaching a minimum level of network infrastructure) should come first, followed by a combination of supply-side and demand-side policies (with the latter being potentially more relevant) at a subsequent stage. This finding is of particular relevance in the context of NGA development, which is currently at an early stage.

Moreover, the aforementioned model predicts that the larger the diffusion of broadband in a given European country, the larger the impact arising from the adoption of an additional demand-side policy will be. In this context, since sustained competition in the broadband markets contributes to broadband diffusion and to lower prices, it should also be considered a major broadband promotion factor (FSR, 2011; Costa, 2009).

10.1 Supply-side broadband promotion measures

The importance of maintaining sustainable competition remains important. Notwithstanding (and within the limits of State Aid rules), the EC supports the intervention by national and local authorities given that substantial investment will be needed to achieve the broadband target set forth in the Digital Agenda for Europe.

The EC considers the implementation of operational plans establishing national targets for ultra-high speed networks and coordination between Member States to accelerate the transfer of best practices between policy makers (for broadband in general and for NGA deployment in particular) as ancillary instruments to promoting broadband adoption.

With regard to supply-side measures to promote broadband, the study of the FSR (2011) highlights, in particular, the positive impact on broadband promotion of the initiatives taken by PPPs as well as of the long-term loans programs and national financing programs. On the other hand, the results of the econometric model presented in that study suggest that broadband mapping programs, tax incentives and administrative simplification measures seem to have a weak impact upon broadband promotion. This finding does not necessarily imply that the adoption of such measures is counter-productive or that the potential future results are of little importance. It only means that the statistical relationship between those measures and the historical patterns of broadband diffusion is insufficient to predict a significant increase of broadband penetration following the adoption of such measures.

In general, the BEREC has already addressed a number of supply-side obstacles, which have a relevant impact on broadband adoption, especially with regard to NGA networks, meeting the stakeholder's expectations regarding the promotion of open and competitive networks and the adequate specification of coherent wholesale product standards.

In particular, and more recently with regard to NGA networks, the BEREC has drawn attention to the importance of the appropriate design and implementation of wholesale products to reach an access point (namely access to ducts and or dark fiber) and of wholesale access products (such as access to in-house wiring, access to concentration points, cabinet unbundling, ODF unbundling, enhanced bitstream) (BEREC, 2011a).

Moreover, NGA broadband initiatives and measures aimed at the promotion of roll-out of NGA networks have been considered as well as other initiatives such as an infrastructure mapping. Furthermore, BEREC has drawn attention to the need for establishing transparent and effective migration processes between the legacy networks and the NGA networks. A previous BEREC Report (BEREC, 2010c) looked at implementation issues of relevant wholesale products in an NGA environment (dealing with, *inter alia,* possible elements of reference offers or the implementation of transparency obligations) and discussed practical migration issues.

Still with regard to NGA networks, BEREC has issued an opinion on to the EC Draft Recommendation on regulated access to Next Generation Access Networks of 28.04.2010 (BEREC, 2010a). Following up on this activity, BEREC is currently looking at the implementation of the NGA Recommendation across Member States and is also

updating the Broadband Common Positions (BEREC, 2010d). These are expected to be concluded in 2012.

The BEREC (2011c) has also issued a recent report on specific aspects of broadband commercialization which draws the NRAs' attention to the usefulness of resourcing to an *ex-ante* margin squeeze test which considers the effects of discounts and promotions on nominal prices and costs of broadband offers (eventually in conjunction with a prior communication regime for the SMP operator's retail offers), in order to prevent anticompetitive effects.

Another important BEREC initiative, focusing at the supply side, is the monitoring report on broadband common positions (BEREC, 2011d), which clearly shows in general – in a wide variety of wholesale offers supporting broadband services – a high level of conformity, without prejudice to the need of a future review focusing on issues related with NGA, fair and coherent access pricing and non-discrimination.

Specifically, with regard to the main supply-side barriers identified concerning broadband adoption, for instance the lack of access to financial resources and the access to spectrum, the BEREC, the NRAs, the governments and the EC have already been taking a series of important measures.

In those cases where operators are unlikely to invest due to the absence of a perceived business case, some form of State Aid may be applied to incentivise the roll-out of broadband networks, in particular NGA networks. Therefore, BEREC has addressed the issue of "open access" in the context of the EC's State Aid Guidelines and has also analysed other forms of mandated access which may be based on competition law and/or national legislation (BEREC, 2011e). BEREC also provided input to the revision of these State Aid Guidelines (BEREC, 2011f).

A possible lack of access to financial resources may also be addressed through co-investment as it reduces the overall roll-out costs for all operators. The NGA Recommendation of 2010 also mentions "risk-sharing" as a means to speed up roll-out.[103]

[103] See recital 24 or article 26 of the NGA Recommendation, similar also to the 2009 Better Regulation Directive (2009/140/EC), where arti 8(h) 5.(d) whereby "*cooperative arrangements between investors and parties seeking access to diversify the risk of investment, while ensuring that competition in the market and the principle of non-discrimination are preserved*" shall be permitted to promote efficient investment and innovation in new and enhanced infrastructure.

However, the NGA Recommendation also states the limits of such risk-sharing, e.g. no discrimination of third operators.[104]

On financing, the EC encourages early investment and roll-out and guidance in national plans about EU broadband funds and EIB instruments in eligible regions, but also PPPs public and private partnerships for financing broadband infrastructure. Direct public funding should be targeted so as to alleviate barriers to private investment. Hence, civil works should be shared by all potential users and not just electronic communications operators, and NRAs should ensure fair and non-discriminatory access to broadband operators to stimulate competitive service provisions in areas that would otherwise be uneconomic. In order to reduce the administrative burden, State Aid measures could also cover national framework schemes, avoiding multiple notifications of individual projects (EC, 2010b).

To reduce inefficient investment expenditures, some NRAs may intervene in planning authorisations (by making the installation of passive infrastructures a requirement thereof) and oblige the disclosure of local access infrastructure from operators, the coordination of civil works and the provision of rights of way to simplify and accelerate procedures.

The achievement of the broadband coverage target set out in the Digital Agenda could be assisted by the full implementation of the spectrum policy by the Member States, which notably includes the availability of spectrum, the rapid award of use rights and the existence of secondary trading.

In this context, BEREC has also been cooperating with the RSPG, in order to promote a coherent approach to modern spectrum management and to facilitate the implementation of a common European spectrum policy. In addition, BEREC, in cooperation with the RSPG, is exploring the way in which the economic and social value of spectrum for electronic communication services is determined in relation with frequency assignment issues. The Joint BEREC-RSPG Working Group has already produced a Report on Infrastructure and Spectrum Sharing in Mobile/Wireless networks.

Other supply-side measures used to promote broadband, which can be and have been implemented by governments, relate, for instance, to tax incentives and subsidies to broadband operators, in particular to those investing in rural non-competitive areas.

[104] See Annex I, point 7 (therefore, volume discounts shall be subject to certain conditions, i.e. they shall only reflect the reduction of risk for the operators and shall allow a sufficient margin for an efficient competitor over an appropriate timeframe).

To sum up, when looking at the supply-side, the NRAs participating in BEREC, are already able to choose - when relevant and at the context of their specific national market conditions - from a wide array of effective regulatory obligations, which are strongly consistent with the principles of transparency, equivalence, non-discrimination and with the ladder of investment.

10.2 Demand-side broadband promotion measures

On the demand-side, there is a reasonable mix of measures that can be implemented to promote broadband and encourage adoption by end-users, the rationale being that the direct monetary cost of new technologies is only one of the factors driving adoption and fostering policies that aim at reducing the cost of access as well as at increasing the perceived value of broadband services.

When choosing the appropriate mix of demand-side factors, it is important to take into consideration the specific conditions of the targeted consumers, namely with regard to a broad range of factors that may influence broadband adoption, such as, for instance, disposable income *per capita*, level of education, age or occupation, as it is also noted by the FSR (2011).

While the study produced by FSR (2011) suggests that, in abstract, all demand-side policies have proven to be effective in stimulating broadband diffusion in European countries, the same analysis highlights that services and knowledge-intensive products are one of the core aspects of broadband penetration at a country level and, hence, their growth should be encouraged.

In this section of the report, a number of demand-side measures that can be considered to promote broadband are identified. It is good to note that this list of measures is descriptive but not prescriptive. That is to say that the relevance of these measures within a concrete and specific context needs to be assessed by the entities which are actually taking care of its implementation. In this process, it is important to establish the exact extent to which there is a clear demand for demand-side measures, thus respecting the consumer sovereignty and avoiding a “paternalistic” approach with regard to the end-user. In addition, the powers and competencies of governments, NRAs and public authorities vary from country to country. Hence, the identification of the entities which would be more appropriate to implement a given measure is also naturally not prescriptive, but is given for illustrative purposes considering typical situations. Concerning NRAs it should be

recalled that one of their important instruments to promote consumers choice for broadband services is the promotion of competition as this will ultimately lead to greater choice among providers, better quality and lower prices, i.e. a better value proposition. Related to this are measures to facilitate switching so that consumers do actually make use of their options.

In order to address the obstacle of **broadband adoption high costs**, the following measures could be considered:

a) Provision of subsidies and tax incentives to end-users who connect to and subscribe to broadband services, especially to low-income individuals or families[105];

b) Since broadband adoption is closely related to computer adoption - according to EC survey data (EC, 2011a) less than one in every ten households with a computer does not have Internet access) - subsidies and tax incentives attributed to low-income individuals and families and or to students, to facilitate computer purchase, could be considered in order to increase the number of broadband subscriptions;

c) Demand-aggregation measures (as a way to evaluate the potential commitment of end-users to the adoption of broadband, namely via pre-registrations) may play an important role in the coordination of the potential consumer demand, contributing to achieve an efficient resource allocation and also economies of scale (FSR, 2011). In particular, demand-aggregation initiatives have been especially relevant to the implementation and adoption of “traditional” broadband in the UK and seem to be exerting a reasonable impact on the promotion of electronic communication services supported in NGA by operators such as Lyse Tele in Norway, Wilhelm.tel in Germany and OnsNet in the Nuenen’s area in the Netherlands (Analysis Mason, 2008).

When considering the use of subsidies and or tax incentives, it is important that the responsible authorities first carefully analyze what segment of end-users will be targeted (e.g. those living in rural areas, low-income users, senior citizens, disabled citizens, etc). Then, policy makers must decide how the funds will be used by the recipients. For

[105] Jeanjean (2010), analysing supply-side and demand-side measures within the scope of NGN, suggests that consumer subsidies are expected to be more efficient for speeding up deployment in densely populated areas, while infrastructure subsidies tend to be more efficient in rural areas.

example, they might decided that recipients may only be allowed to use funds to help pay for all or part of their connection costs and not any other element of the costs of subscription.

In addition, public policy makers need to decide on how will funds be effectively allocated to the target recipients. For example, funds may be allocated indirectly via operators (through vouchers, rebates, or calling cards) or directly to recipients through government vouchers, tax credits, government checks distributed by a social agency, and/or government sponsored calling cards.

This mechanism can be relatively simple and transparent at the design stage. However, implementation might be ineffective and challenging, as users may change their "status" in time, move to other locations, and/or transfer their benefits to other parties in a secondary market. There is therefore a significant risk of distorting the market through this mechanism. Since it usually involves continuous transfers to individuals, it deals most with the unsustainable portion of the access gap (users that are not capable of paying electronic communications services at cost - aligned tariffs). Hence, direct end-user subsidies are more common among Universal Service programs in developed countries.

As for the **perceived low level of consumer safeguards in contractual relationships**, it is recognized that consumers are, in general, concerned with contractual obstacles involving restrictive terms and conditions and, in particular, financial penalties for breaking up the contractual terms. Besides the existence of fixed contractual term periods, additional concern are raised where contracts containing such terms are connected with subsidised equipment as this may create additional contractual obstacles.

In this context, it is important to ensure the adequate implementation of transparency obligations at national level either directly by the primary law or through decisions of the NRAs (secondary legislation), which set out more or less detailed conditions under which information is to be made available by service providers. The national legal basis is supported by (or results from) the transposition of relevant European law provisions. NRAs and consumer authorities could play a significant role in informing consumers about contractual terms, in imposing transparency obligations on broadband providers and in applying penalties in case of unlawful provisions in contracts.

In parallel, governments, NRAs and consumer associations may have also a role to play by clarifying to end-users, when relevant, the most pertinent contractual clauses.

In order to **boost the consumer confidence in the contractual relationship** with the broadband service providers, the following two measures seem relevant to contribute towards consumer confidence, when adopting and using broadband services:

a) Promotion and monitoring of mechanisms (namely by governments, NRAs, operators and equipment manufacturers) which ensure correct billing;

b) Improvement of the effectiveness of complaint handling procedures (namely by governments, NRAs and operators).

In this framework, it is expected that the EC issues, by 2012, a Code of EU online rights summarizing existing digital rights in the EU[106]. It seems important that this code is divulged, in articulation with Member-States, in a user-friendly format which is easily accessible to all end-users.

With regard to the issue of **choice between different broadband service providers**, consumers often face difficulties in finding, understanding and using the information available on the market in order to make those consumption decisions that would optimally satisfy their needs and, thus, enable them to put an effective pressure on service providers.

Intervention might therefore be needed to address the issue of deficient consumer information under its various aspects, namely lack of information, unclear or hard to find information and misleading information. A key opportunity to further consumers' participation in the broadband markets is helping them to adopt decisions in their best interest mostly by increasing market transparency.

In this context, an important role can be played by NRAs and consumer associations in the promotion of initiatives that contribute to divulge reliable information, increase transparency and facilitate the comparison of essential service characteristics, such as, for example, price and quality of service (for instance with regard to the actual download and upload speeds and blocking / prioritisation issues), in order that consumers have easier access to adequate information when adopting broadband services and making the best choice between service providers and services being offered[107].

[106] Action 61 of the Digital Agenda for Europe.

[107] The Draft BEREC Guidelines on Net Neutrality and Transparency BoR (11) 44, currently under consultation, deals, *inter alia*, with these issues.

A variety of methods and tools can be used by NRAs and consumer associations to inform end-users. The approaches vary from static and unidirectional (such as publication of general information on websites maintained by NRAs), to dynamic and unidirectional (e.g. through media campaigns) and to dynamic and bi-directional or interactive (interactive maps to check available broadband services providers and speeds in a given region, offer comparison websites, consumer assistance via telephone, e-mail, etc.).

Transparency issues are currently dealt within the scope of another BEREC project dealing specifically with net neutrality. That project builds upon the enhanced transparency provisions of the new European regulatory framework.

Albeit the above mentioned activities may seem more relevant for keeping consumers online, it is also true that if the potential consumers that are not yet online receive positive feedback (namely from the actual consumers) regarding the billing and complaining procedures. This may positively impact upon the adoption of broadband.

To render the use of **broadband more attractive to end-users**, it seems important to:

a) Provide incentives to the production of contents in the native language, since raising awareness on this aspect could lead to the increase of the content available in native languages (FSR, 2011; Costa, 2009), mostly on electronic commerce where consumers are reluctant to give their money when they do not fully understand the terms and conditions applicable to such purchases. It is evident that governments, local authorities, operators and content suppliers could develop relevant activities to achieve this purpose. A good example of an initiative in this domain, is provided by the EC objective, foreseen in the ICT Policy Support Work Programme 2011, to enhance the multilingual Europeana[108] content base with material that is representative of the diversity and richness of Europe's cultural heritage;

b) Promote e-government and the provision of on-line public services. This is a field where governments, local authorities, NRAs and operators have a significant role to play. Besides the examples already provided at national level, it is interesting to mention that the EC, in its ICT Policy Support Programme 2011, has established the objective to fund several actions with a view to: (i) test and show the added value of Service Oriented Architectures and Cloud Computing for e-Government

[108] http://www.europeana.eu/portal/

services, in order to enhance their larger deployment in the public sector and to (ii) pilot IPV6 upgrade for e-government services in Europe. Among the projects co-financed by the EC with regard to European crossborder e-government, it is possible to highlight the STORK (related with electronic identity for easier access to public services), the PEPPOL (aimed at crossborder public procurement), the SPOCS (with the objective of simplifying the on-line procedures for the provision of on-line services) the epSOS (associated with European patents smart open services, with a focus on ePrescription and eMedication systems) and the e-CODEX (related with making judicial information accessible for citizens);

c) Promote electronic commerce, for instance increasing, whenever possible, the security of transactions. In this area, the activities of governments, local authorities, equipment manufacturers, NRAs, international *fora* (e.g. ITU, ETSI and ENISA) are deemed important. It is also relevant to mention that the EU cybercrime platform should be fully operational and interlinking with national platforms by 2012, further contributing to enhance the security of transactions.

Considering the concrete obstacles derived from a **low digital literacy rate**, examples of measures that could be envisaged (namely by governments, local authorities, NRAs, consumer associations and operators) include the:

a) Launch of general information and digital literacy campaigns to educate end-users about the advantages of broadband adoption;

b) Connection of schools to broadband at a discounted price;

c) Creation of digital literacy and broadband adoption clearing houses: establishing some local information access centers where the public can (i) access broadband for free or at a reduced rate, especially with regard to low-income individuals and (ii) participate in educational and training programs, to boost consumer confidence in the adoption benefits by improving digital competencies;

d) Support to training institutes for the purpose of educating people with low digital literacy, teachers (considering the impact on students' training) or specific programmes. Besides the examples already provided at national level, it is worthwhile to mention that the EC defined, for 2011, the objective of creation and evolution of a socially-powered, multi-lingual portal, where teachers, pupils and parents can improve and test best practices regarding eLearning resources.

In the future, it should be highlighted that the EC has included in the investment priorities foreseen for the European Social Fund (article 2 (b) of the Proposal for a Regulation of the European Parliament and of the Council on the European Social Fund and repealing Regulation (EC) Nº 1081/2006)) [109] enhancing the accessibility, use and quality of information and communication technologies, through the development of digital literacy, investment in e-inclusion, e-skills and related entrepreneurial skills.

Other initiative that could contribute to the shaping of public policies regarding digital literacy, is the publication by the EC, in 2012, of a paper proposing indicators on digital competences and media literacy to be discussed in the context of the review of the benchmarking framework with Member States and National Statistical Institutes[110].

Specifically with regard to **disabled end-users**, it seems important to stress the role of:

a) Guides/leaflets targeted at making available, resourcing to an accessible format and language, information regarding concrete broadband services (and other electronic communication services), tariff plans, facilities and equipments that are of interest to citizens with disabilities;

b) Promoting universal design, in order to render equipments suitable for use by citizens with disabilities more generalized and more affordable, thus avoiding expensive retro-fitting solutions.

In this context, in addition to the examples already provided at national level, it relevant to note that the EC, in its ICP Policy Support Programme 2011, has referred the objective to launch a pilot addressing tools, templates and specifications for accessible page creation and design, content creation and management.

It is also worthwhile to refer that the monitoring work developed by the BEREC in 2011 regarding equivalent access and choice for disabled end-users (BEREC, 2011g) is expected to continue in 2012.

[109] http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/pdf/2014/proposals/regulation/esf/esf_proposal_en.pdf

[110] Action 62 of the Digital Agenda for Europe.

Consultation questions

Question 1 (section 5): What elements do you consider essential for the successful definition and implementation of governments' strategies to promote broadband:

a) Overall at the national level? What role, if any, could NRAs play to enhance the effectiveness of those strategies?

b) Specifically at rural and peripheral areas? What role, if any, could NRAs play to enhance the effectiveness of those strategies?

Question 2 (sections 6 and 9):

Among the main supply-side obstacles to broadband promotion, NRAs have perceived the low expected return on investment, the lack of access to financial resources and the access to spectrum. In addition, NRAs have considered, among the main demand-side obstacles to broadband promotion, aspects such as the citizens' lack of perceived need to adopt broadband, the high price of broadband, the fact that NGA is still in an initial stage of the product life cycle and, mostly in rural areas, the lack of choice between operators.

2.1. What of the above mentioned factors, if any, would you not consider as obstacles? And what other factors, if any, would you add to the list of main obstacles to broadband promotion? Please reply with specific regard to:

a) Supply-side obstacles;

b) Demand-side obstacles.

2.2 Taking into account namely your assessment of the existing and potential obstacles to broadband adoption, what elements do you consider essential for the successful definition and implementation of NRAs' strategies, in particular from a demand-side viewpoint, to promote broadband?

When replying to question 2.2 above, please mention also what core strategic differences, if any, should be weighted regarding the consideration of those elements in rural/peripheral areas and in urban areas.

Question 3 (section 7): What elements do you consider essential for the successful definition and implementation of operators' strategies, in particular from a demand-side viewpoint, to promote broadband, with regard to:

a) Fixed broadband?

b) Mobile Broadband?

c) NGA Broadband?

When replying, please mention what role, if any, could NRAs play to enhance the

Question 4 (section 8): What elements do you consider essential for the successful definition and implementation of public-private partnerships strategies, in particular from a demand-side viewpoint, to promote broadband? What role, if any, could NRAs play to enhance the effectiveness of those strategies?

Question 5 (section 10): In addition to the initiatives already taken by BEREC with regard to the promotion of broadband from a supply-side perspective, what other initiatives do you perceive it is important that BEREC develops in the future from that perspective?

Question 6 (section 10): A list of potential measures was identified, in the present document, that could be adopted or reinforced in order to promote broadband from a demand side perspective.

a) Are there any identified demand-side measures that you consider innapropriate?

b) What other demand side measures, if any, would you consider particularly important to promote broadband?

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Glossary

ANACOM – NRA of Portugal.

ARPU – Average Revenue Per Unit.

AT – Austria.

BAKOM – NRA of Switzerland.

BG – Bulgaria.

BE – Belgium.

BEREC – Body of European Regulators for Electronic Communications.

CH – Switzerland.

CY – Cyprus.

CZ – The Czech Republic.

DE – Germany.

DK – Denmark.

DSL – Digital Subscriber Line.

EC – European Commission.

EE – Estonia.

EETT – NRA of Greece.

EIB – European Investment Bank.

EL – Greece.

ES – Spain.

EU – European Union.

FI – Finland.

FICORA – NRA of Finland.

FR – France.

FSR – Florence School of Regulation, Communications and Media.

FTTB – Fiber To the Building.

FTTH – Fiber To The Home.

GDP – Gross Domestic Product.

HAKOM – NRA of Croatia.

HR – Croatia.

HU – Hungary.

HSPA – High Speed Packet Access.

IC – Iceland.

ICT – Information, Communications and Technology.

IE – Ireland.

IRG – Independent Regulators Group.

IT – Italy.

LT – Lithuania.

LTE – Long Term Evolution.

LU – Luxembourg.

LV – Latvia.

MCA – NRA of Malta.

MK – The Former Yugoslavian Republic of Macedonia.

MT – Malta.

NGA – Next Generation Access.

NL – The Netherlands.

NO – Norway.

NRA – National Regulatory Authority.

ODF – Optical Distribution Frame.

OECD – Organization for Economic Co-operation and Development.

Ofcom – NRA of the United Kingdom.

PL – Poland.

PPP – Public-Private Partnerships.

PT – Portugal.

PTS – NRA of Sweden.

RO – Romania.

RSPG – Radio Spectrum Policy Group.

SE – Sweden.

SI – Slovenia.

SK – Slovakia.

SMP – Significant Market Power.

SW – Switzerland.

TK – Turkey.

UK – United Kingdom.

UKE – NRA of Poland.

Annex

Table 2 Projects targeted at rural and peripheral areas

MS	Project name	Objectives	Calendar	Funding (millions of euros)	Speed (Mbps)
BG	Development of Regional Broadband Access Networks in Less Urbanized and Rural Areas	1. The main objective is to provide adequate broadband network coverage in areas which are lacking any broadband access ("white areas") in order to achieve 100% geographical broadband coverage in Bulgaria by 2013. Broadband penetration in Bulgaria (January 2010) was below the average, e.g. at 13% compared to the European average of 24.8%). The measure should bridge the "digital divide" in terms of access to adequate broadband services between areas with such services available and "white areas". 2. "White areas" should be provided with all services which are currently available in urban areas, thereby fostering the economic and social development of the targeted areas. 3. The measure is envisaged to improve the quality of living of the citizens, improve and upgrade education methods and health services, develop tourism and provide fast and up-to-date information to citizens.	2011 - 2013	20 (Operational Programme "Regional Development" 2007 – 2013 of which 85% is a contribution from the European Regional Development Fund and 15% is national public cofinancing).	>2
CZ	The National Policy in Electronic Communications - Digital Czech Republic	1. Ensuring by 2013 high-speed Internet access in all populated localities of the Czech Republic with a minimum transmission speed of at least 2 Mbps (download) and in cities of at least 10 Mbps.	1.2013	n.a.	Rural areas: 2 Mbps for 100% of households. Urban areas: 10 Mbps for 100% of households.

		2. Ensuring by 2015 high-speed Internet access in rural communities with a transmission speed of at least 50% of the average transmission speed achieved in cities. At the same time, 30% of households and businesses in cities should have access to connections with transmission speeds of at least 30 Mbps.	2. 2015	n.a.	Rural areas: At least half of the average speed in urban areas for 100% of households. Urban areas: 30 Mbps for 30% of the households.
FI	Broadband 2015 project	99% of the households are no further than 2 km distance from 100 Mbps connection. State subsidy is targeted to non competitive sparsely populated areas.	2010 - 2015, pilot projects started 2009, legislation since 1.1.2010	66 (from the State) plus 24.6 (from the EU)	100
FR	Programme national "très haut débit"	Long term loans to operators on market terms (market economy investor principle) to leverage FTTH investments in less dense areas.	2010-2017	1,000	100
DE	Federal Government's Broadband Strategy	The Federal Government Broadband Strategy aims to promote access to high-speed broadband by 2010, especially in areas neglected by the market the government will provide incentives in these areas through support programmes amounting to a total of over 150 million Euros. Different funds are available: GAK ("joint task for the Improvement of Agricultural Structures and Coastal Protection"): GAK funds can be used to fund rural communities in Germany that are either without broadband or have broadband speeds of less than 2 Mbps. GRW ("Joint Task for the Improvement of Regional Economic Structures"): All broadband investments made by industry can be financed with the GRW funds under the existing provisions. In the future, GRW	All German households should have access to broadband Internet at the end of 2010 at latest. Bring broadband access of or above 50 Mbps to 75% of the households by 2014	Total over 150. GAK: maximum government subsidy 500,000 euros. GRW: The Federal Government assumes that by 2013, approximately 60 million euros of GRW funds will be spent on developing broadband access.Total over 150 million euros; GAK: maximum government subsidy	2 -50 Mbps

		assisted areas will also receive increased funds from the GRW as part of infrastructure development. The GRW programme enables local authorities in the assisted area to receive support in providing capable broadband access (at least 2 Mbps) at affordable prices.		500,000 euros GRW: The Federal Government assumes that by 2013, approximately 60 million euros of GRW funds will be spent on developing broadband access.	
EL	Rural Broadband Project.	Gradually fill the gap between the urban and undeveloped territories (agriculture and islands) regarding broadband access and digital services.	2013 - 2014.	Circa 150 (from the Rural Broadband project) plus 50 (from the EU)	n.a.
HU	n.a.	Promote the implementations in rural non competitive areas.	2011 - 2013	40 (from the EU)	10
IE	National Broadband Scheme (NBS)	Provide access to affordable, scalable broadband services in certain designated electoral divisions in rural Ireland (NBS coverage area) where broadband coverage was deemed to be insufficient.	2010	79,8 (the Exchequer and the EU)	In 2010, from 1,6 (at cell edge) to 6,8 (at cell centre). In 2012, from 2,3 (at cell edge) to 10,4 (at cell centre).
LT	Rural Area Information Technology Broadband Network - RAIN	Provide broadband access for all rural public sector administration institutions, hospitals, laboratories, schools, museums, libraries, public Internet access points and also for rural residents and business companies.	2005-2008	Circa 21	n.a.
	Rural Area Information Technology	n.a.	2009-2013-03	Circa 50	100 to 1,000 (1Gbps)

	Broadband Network RAIN Development - RAIN-2				
PL	Operational Programme Development of Eastern Poland. Priority Axis Broadband network in Eastern Poland.	1. Increasing access to broadband in six voivodeships. 2. Erstablishment of a transregional broadband network comprising five regional backbone networks in voivodeships of Eastern Poland. 3. Training persons endangered by “digital exclusion”.	2007-2013	Circa 300 (255 from EU funds)	n.a.
PT	NGA in Rural Areas	Covering 140 municipalities by five contracts signed with the Government following five Public Tenders for the installation and operation of "High-Speed Networks in Rural Areas" - 50% of the population of each municipality encompassed in the public tender must be covered within 24 months.	2013	275,8 (of which 106,2 are public investment - State aid is supported with EU funding).	Min. 40
	Broadband Community Networks	Construct networks of over 1,000 km of fiber-optic cable which enable broadband connections and services supported by fiber-optics in disadvantaged regions.	2008	34	1 Gbps to 10 Gbps (in the transmission network)
RO	Project for development of broadband - Support for setting up broadband networks in undeserved areas	Finance the building of broadband network infrastructure in those areas of Romania where the inhabitants are deprived of the possibility to access broadband services.	2011-2014	Circa 86 (70 from EU Funds and 16 from national budget). Additionally, a 30% to 50% contribution is expected to come from the winning bidders	Home users – 1 Business users – 4 (“best effort”)

SI	n.a.	Subsidies for developing networks in rural non competitive areas.	Depends on public tenders for each rural area	59 (EU funds involved)	0,256 – 1 000
ES	National Program for Broadband Deployment In Rural And Isolated Areas - PEBA	n.a	2005-2008	85	Min. 0,256
	Avanza Infrastructures aid program (Avanza Infraestructuras), action line F1	Development of broadband and other telecommunications services in rural and isolated areas.	2008-2011	8,69	Min. 0,256
	Avanza Infrastructures aid program (Avanza Infraestructuras), action line F2	High-capacity rural networks - develop backbone networks (transport network) in rural areas, improving the bandwidth and network capacity provided by telecommunication operators.	2008-2011	46,29	n.a
UK	Local Broadband Fund	Provide support for broadband schemes to reach those in remote and rural communities.	2015	Up to 23	n.a.
LV	Next Generation Access Network for rural area	Percentage of individuals regularly using Internet - 75%, Percentage of households with broadband access - 75% - 2013 Fixed broadband penetration - 40%, Set up 280 connection points to NGN - 2015; 50% of all households have subscription to Internet connection above 100Mbp - 2018 Set up 2,000 connection points to NGN, 100% administrative entities could use connection to	Phase I 2011 – 2015; Phase II 2014 – 2018	Phase I total financing - 22 (EU funds - 19) Phase II total financing - 100	n.a.

		NGN – 2020.			
	Development of Broadband Communications Infrastructure in Rural Areas	Ensure access to broadband services for electronic communications operators and to enable at least 10,000 households in five administrative districts of the country to get connection to Internet, thus increasing the number of Internet users by 20% in districts where connection to Internet is viable.	2006 - 2008	~ 18 (EU funds and the state budget ~ 5,5)	0,256
SE	Rural Development Programme	Increase deployment of broadband in rural areas - where operators do not have an interest to invest in broadband infrastructure - via subsidies to build or upgrade broadband.	2007-2013	27 - initial stage (European Recovery Plan) 4,3 - from 2011 with potential to increase	n.a.
	Ducting fund	Increase deployment of broadband in rural areas - where operators do not have an interest to invest in broadband infrastructure - via subsidies to build ducts.	2008 and ongoing	Circa 10,3	n.a.
	PTS Co-financing of Rural Development Programme and Duct funding	Increase deployment of broadband in rural areas - where operators do not have an interest to invest in broadband infrastructure - via subsidies.	2010 and ongoing	12,3 during 2010-2011	n.a

Source: BEREC Broadband Promotion Questionnaire

Table 3 National broadband strategies

MS	Project name	Objectives	Calendar	Funding (millions of euros)	Speed (Mbps)
CZ	The National Policy in Electronic Communications - Digital Czech Republic	1. Ensuring high-speed Internet access in all populated localities of the Czech Republic with a minimum transmission speed of at least 2 Mbps (download) and in cities of at least 10 Mbps.	1.2013	n.a	Rural areas: 2 Mbps for 100% of households. Urban areas: 10 Mbps for 100% of households.
		2. Ensuring high-speed Internet access in rural communities with a transmission speed of at least 50% of the average transmission speed achieved in cities. At the same time, 30% of households and businesses in cities should have access to connections with transmission speeds of at least 30 Mbps.	2. 2015	n.a.	Rural areas: At least half of the average speed in urban areas for 100% of households. Urban areas: 20 Mbps for 30% of the households.
DK	n.a.	All homes and enterprises should be able to access at least 100 Mbps.	2020	Market based growth. In 2009	100
	Joint public digital strategy	The Danish government, municipalities and regions works together to launch a joint public digital strategy.	2011 - 2015	n.a.	n.a.
EE	EstWIN project	At least 100 Mbps broadband connection availability for everyone everywhere.	2015	64	100
FR	Programme national "très haut débit" (volet B)	Financing up to 33% of public participation in local authorities' FTTH projects.	2010-2017	750	100

	Programme national "très haut débit" (volet C)	Exhaustive coverage of territory.	2010-2017	250	none
MK	National Strategy for the development of the broadband Internet	-	2009-2011	n.a.	n.a.
DE	"Federal Government's Broadband Strategy" *(February 2009)*	1. Ensure that all German households will have access to broadband Internet at the end of 2010 at latest. 2. Bring broadband access of or above 50 Mbps to 75% of the households by 2014	1.2010 2. 2014	150 by 2010 60 by 2013 Circa a third of a total of 13.3 bn €	50
EL	National FTTH project.	Development of a passive infrastructure of open access that will provide broadband connection over fiber optics to one plus million households and companies, all over the country.	n.a.	n.a.	100
IT	n.a.	Plan "Italia Digitale"	2008-2020	n.a.	n.a.
	n.a.	Broadband national plan to overcome digital divide (inside Italia Digitale Plan)	2009-2012	100 (for year 2011)	n.a.
	n.a.	Ultra broadband network development plan (inside Italia Digitale Plan)	2011-2020	8,000 (public and private investment; industry contribution)	n.a.

LT	Lithuanian Information Society Development Programme	Ensure the broadband electronic communications network infrastructure development in areas where the market can not ensure infrastructure development and service delivery; Renew the infrastructure of public Internet access in libraries; Promote competition in broadband electronic communications market, to increase the efficiency of market regulation, to achieve that by 2020 all Lithuanian citizens have access to Internet connection faster than 30 Mbps.	2011-2019	n.a.	30
PL	n.a.	A common aim of the three projects mencioned below is the promotion of broadband access, with resource to the implementation of broadband networks, public Internet access points and financial support for people endangered by “digital exclusion”. 1. Regional Operational Programmes designed for 16 voivodships 2. Operational Programme Development of Eastern Poland 3. Operational Programme Innovative Economy	2007 – 2013	Circa 1000	n.a.
PT	NGA Strategy Guidelines	a) One million users by 2010; b) All primary and secondary schools and all public justice services by 2010; c) All public hospitals, health centers, museums and libraries and all public institutions of higher and polytechnic education by 2009.	2008-2010	n.a.	n.a.
RO	National Broadband Strategy	Household BB penetration - 40% (2010) and 80% (2015) % population using Internet to interact with public authorities - 10% (2010) and 50% (2015) % population using e-government services - 20% (2010) and 50% (2015) % online commercial operations (e-commerce) - 5% (2010) and 40% (2015) Household computer penetration - 50% (2010) and 90 (2015) % population using Internet for training and education - 10% (2010) and 40% (2015) Enterprise BB penetration - 70% (2010) and 90% (2015).	2009 - 2015	1 250	1 (residential) 4 (businesses/public authorities)
SK	National Strategy for the Broadband	Releasing 790 - 862 MHz frequency band for the broadband service growth by 2013 Provision of broadband access availability for all with 1Mbps access speed by 2013.	2013	113	1

	Access in the Slovak Republic (Government Resolution no. 136/2011)	Long-term target of broadband strategy: promote access for much higher Internet speeds (30Mbps and more) for all by 2020.	2020	n.a.	30
SI	Strategy of broadband networks development	1. 90% of the population to have access to broadband with minimum speed of 20Mbps 2. 90% of the population to have optical access (FTTH) or comparable (more advanced) connection by 2020. 3. A revised strategy for information society development, which will include NGA development measures.	1. 2015 2. 2020	1. 20 2. FTTH	n.a.
ES	Avanza Infrastructures aid progrma (Avanza Infraestructuras), universalisation of broadband	Pursue broadband access universalization activities, with a basic objective/requirement of at least 1 Mbps downstream speed (in the white areas of traditional broadband).	2012	57.5	At least 1
	Avanza Infrastructures aid program (Avanza Infraestructureas), development of NGA	Pursue activities regarding the promotion of the development of the Next Generation Networks (in white NGA areas without competing broadband infrastructures).	2012	75.7	50
SE	Broadband strategy for Sweden	1. 90% of all households and businesses should have access to broadband at a minimum speed of 100 Mbps 2. 40% should already have access to broadband at that speed	1. 2020 2. 2015	100	100

TK	10th Transportation Forum organized by Ministry of Transportation	Individual communication systems through Low Earth Orbit Satellites and broadband communication broadcasting systems should be promoted The number of broadband subscribers will be targeted to reach 12 million in 2013, 30 million in 2023. Establishment of fiber optic network through the country, making Turkey an intersection point among its region. Dissemination of fiber to the home and broadband wireless access technologies.	2009-2023	n.a.	n.a.
UK	Broadband Delivery UK	Stimulate Private Investment to deliver the best superfast network in Europe by 2015	2015	Circa 600 million euros[111]	At least 20

Source: BEREC Broadband Promotion Questionnaire

[111] £ 530 million at 01.04.2011 exchange rate.

Table 4 Strategies targeted at consumers

MS	Project name	Objectives	Calendar	Funding (millions of euros)	Outcome
BE	starttosurf@ home	Access to a PC and to Internet at a fair price.	Until Dec. 2010	n.a.	n.a.
HR	e-Croatia	A set of activities and projects carried out within the state administration with the aim of raising awareness and needs of the process of computerization of state administration and overall society.	1) 2003 - 2007 2) 2009 - 2011	n.a.	Progress in the efficiency and transparency in the use of ICT in all areas of life, from government and education, to justice and health.
DK	n.a.	The Danish Government has presented a new proposal where it devotes half a billion DKK to IT-project in the Danish public schools. The funding can be used to buy connections, hardware, software and to upgrade the skills of teachers and pupils. The elderly are given free or subsidised courses on how to use a computer and the Internet.	Not settled	67	n.a.
MK	n.a.	The Government partialy financed notebooks for students. Every student at the time of graduation is eligible of voucher with wich government cover part of the cost of the new notebook.	2008-2011	n.a.	n.a.
DE	"Aktionsbündnis 50plus"	Initiative aiming at promotion of basic broadband uptake by generation 50+	ongoing	n.a.	n.a.
HU	n.a.	Laptop program for secondary schools.	2012	n.a.	n.a.
IT	n.a.	Incentives to ADSL subscription for people under 30 years old.	2010	110	n.a.
MT	Blue skies	Households with no prior broadband connection were eligible to apply for a one time scheme that would subsidize the first	Q1 2008. Subsidy covered 2008-2009.	Approx. € 0.75	6,000 new connections. An

		12 months subscription.			increase of 3% in household broadband connection
	PC for 99c	Families were supported by a grant which amounted to 16% of the total cost of the PC but not exceeding €186.40c. Banks supported the scheme by offering advantageous loan packages that equated to daily re-payments of not more than 99c.	2008 and is close to closure.	Subsidy costs off set as forgone revenue through VAT.	8 192 end-users benefitted from this scheme.
	SMARTSTART	To assist end-users with a disability or end-users eligible to social assistance to be able to acquire a refurbished computer at a small charge.	Launched in 2008. Project still ongoing.	Cost recovery basis.	A total of 981 families benefitted from this scheme.
PL	Operational Programme Innovative Economy	1. To ensure Internet access for citizens theatned by "digital exclusion" because of low-income or disability. 2. To raise awareness of society in terms of ICT with resource to educational activities.	2007 - 2013	Circa 390	n.a.
PT	e.iniciativas	The national policy for the information society and promotion of access to broadband was defined, in 2005, in the programme Ligar Portugal. Among its core objectives, the need of mobilize the Portuguese society for the use of ICTs was enhanced and among the guidelines emerged stimulation to collaboration nets, as well the promotion of social inclusion. In the first case, public initiatives were taken for the diffusion of ICTs, in order to extend their use. In the second case, it was established as a principle the will to assure the use of ICTs by the least- favoured social groups. In order to generalize the access to laptops and broadband, according to the principles previously presented, the government launched the e.iniciativas ("e.initiatives") on the 01.06.2007 which consisted on a proposal composed by a laptop plus a broadband access for an initial down payment of 150 euro and a monthly payment less than the normal subscription fee. Among the targeted categories are students, primary and secondary school pupils and teachers.	ongoing	Circa 390	A study commissioned by ANACOM, published in January 2010, suggested the existence of direct positive impact upon the adherents and their family (especially concerning more regular usage of the laptop and of the Internet).

RO	The "Euro 200" Program	Promotion of computer acquisition through a financial aid granted to pupils or students with the age of maximum 26 years and the gross revenue of maximum 150 RON per family member	2011	n.a.	n.a.
	Access to broadband services for SME and non-profit organizations	Subsidise an important part of the expenses incurred by small and medium companies when connecting to broadband services (80% of eligible costs for SMC and 95% of eligible costs for non-profit organizations).	2008 - 2013	46 from ERDF	n.a.
	Broadband in schools Program	Ensure that all Romanian schools are connected to broadband services and children are using information society technologies. Beside the broadband connection (a monthly subscription with a 2 Mbps medium best effort speed), this program involves the acquisition of a maximum 10 PCs for every school, the acquisition of the necessary school servers, the acquisition of various software program licences, the building and the managing of a local network for school's IT laboratory etc.	2008 - 2012	30 (26 from ERDF and 4 from national budget)	n.a.
ES	Avanza Infrastructures program	The aim is to spread and to communicate the broadband advantages and opportunities for rural citizens.	2008-2011	0,77	n.a.
	Citizens' loan program (préstamo ciudadanía)	The main objective is to supply credit facilities in order to purchase computer equipment. The main benefit for the citizens is that the interest rate is 0%. The maximum amount citizens can achieve in these kind of loans is 3,000 euros refundable in three years.	2006-2010	286,3	More than 244,000 citizens have received these loans.
	University students' and youth loan programs (préstamo jóvenes y universitarios)	The main object is to supply credit facilities in order to purchase computer equipment. The main benefit for the students is that the interest rate is 0%. The maximum amount students can achieve in these kind of loans is 3,000 euros refundable in five years.	2006-2010	45,9	More than 34 950 students have received these loans.
	IT loans (préstamo TIC)	The main object is to supply credit facilities for SMEs to purchase computer equipment. The main benefit for the SME is that the interest rate is 0%. The maximum amount that SMEs can achieve in these loans is 200,000 euros	2006-2010	1 846,30	More than 152,000 SME have received these loans.

		refundable in three years.			
SE	Municipal involvement in improving computer and Internet litteracy among elderly	Elderly given free or subsidised courses how to use a computer and the Internet.	n.a.	n.a.	n.a.
	Schools offering students free computers	Many schools across Sweden provide students personal computers on loan with the aim of improvning computer litteracy and to prepare the students for a world of digitalization and globalization.	n.a.	n.a.	n.a.
	Home PC-reform	Sweden has had a home-PC-reform. Within the reform employees could buy a computer through their employer and the cost was deducted on the gross salary.	1997-2006	n.a.	1,5 million people took advantage of the reform and the PC penetration grew high rapidly.
	A Digital Agenda for Swedish schools	By giving students an opportunity to use Internet and computers at school they will achieve other digital skills than those they should have received at home anyhow by using Internet and computers in their daily social life.	From 2011 and running.	n.a.	Too early to say
TK	The Strategic Plan of Information and Communication Technologies Authority	1) To support e-transformation process in the public institutions 2) To disseminate electronic communication services over broadband networks 3) To contribute to ensuring information security efforts.			
UK	Race Online 2012	To get as many people as possible online, with a target of 1 million people	2012	n.a.	
	UK Online Centres	To get one million people online by 2013	April 2010 - March 2011	£ 30m	

Source: BEREC Broadband Promotion Questionnaire

Table 5 Examples of PPP projects to promote broadband

MS	Name of PPP	Objectives	Actual outcome and implementation calendar
EE	"EstWIN project"	At least 100 Mbps broadband connection availability for everyone everywhere.	In progress. Should be implemented by 2015.
FR	"THD Seine"	FTTH roll out all over Hauts-de-Sein département.	Current project. 6 years for roll-out, 25 years for contract.
	"Gironde Numérique"	Backhaul network + white zones coverage.	n.a.
DE	"Unser Ortsnetz LLC"	To provide broadband access to customers in the countryside.	All PPPs have already made accessibly several residential streets
	"Inexio"	PPPs with several municpalities; rolling out for about 40 muncipalities.	n.a.
EL	"National FTTH project"	The development of a passive infrastructure of open access that will provide broadband connection over fiber optics to one plus million households and companies, all over the country.	The techno-economic advisor of the project has been selected (estimated finalization: early 2012). An open tender for the legal advisor will be announced before Summer 2011. A public tender will be issued in 2012.
IT	"Trentino Network"	Full broadband cabling of Trentino region, in cooperation with private companies.	n.a.
	"Lepida Network"	Broadband optical and wireless network for Emilia-Romagna region.	n.a.
	"Lombardia Region Administration project"	Full clearement of digital divide in	30.06.2011

		Lomabardia region, with activities in about 400 town/villages.	
LV	Agreement between Ministry of Transport and electronic communications operator "Telekom Baltija"	According to an agreement (signed in 2007), "Telekom Baltija" has to provide 286 Kbit/s speed to cover 80% - 95% of territory of Latvia until 2012.	2012
LT	"Alliance Window to the Future" ("Langas į ateitį")	To promote the use of Internet and e-Services in Lithuania and hereby stimulate the growth of living standard as well as Lithuania's competitiveness among European and other countries of the world.	From 2002 until now. Today Lithuania has a network of more than 800 public Internet access points. Different courses have been organized: a)Introduce and train using ICT and e-services to 16.000 adult residents of Lithuania (2010); b) Computer literacy and Internet usage basics to 50 400 Lithuanian residents (2006-2008); c) Training on computer literacy and Internet usage basics to 20,000 Lithuanian adults (2003).
	The project "Libraries for Innovation "	The key tasks of the project: a) Equipping all the perspective and yet non-informatized public libraries with public Internet access, and expanding and modernizing public Internet access in the libraries already having it; Strengthening, in essence, information competence of public libraries' staff and	2008-2012 The estimated project impact on the libraries and the communities: a) 859 libraries will be provided with approximately 4,000 computers; b) 861 libraries will be equipped with broadband Internet connectivity; c) Eleven training centers with the capacity of 220

		helping them to become active promoters and helpers of the local community in mastering the capacities of information technologies.	training places will be set up; d) Training for circa 2,000 librarians; e) Approximately 50,000 Lithuanian adults will undergo the training in computer literacy; f) The public access Internet facilities will reach the adults and seniors, as well as the disabled and other socially disadvantaged groups; General public will involve more actively in the use of the public access Internet facilities for job hunting, learning, e-services, communication, etc.
MT	"Community Technology Learning Centres (Telecentres)"	A scheme aimed at equipping NGO's engaged in education initiatives within the community with computer equipment and broadband connectivity. These centres are open to any member of the community wishing to access the broadband Internet. Centres are also used for ICT literacy courses.	Launched in 2004. The project is still active. Sixteen centres around Malta are currently operative.
NL	"Citynet Amsterdam"	To build FTTH broadband access network connecting households in Amsterdam.	Started in 2006.
PL	"Wielkopolska Sieć Szerokopasmowa (WSS)"	Ensuring universal, fast and secure access to knowledge, electronic services and information	Should be implemented by June 2013.

		offered via the Internet, in particular in rural areas and small towns	
RO	"Net City"	Cable-ducts for operators' networks (in these underground ducts there will be installed cables (fiber optic or copper) for lowering the up-in-the-air cables). Dark-fibers available to all operators on the routes requested by them. Metropolitan network for the provision telecommunication services between public institutions and Bucharest City Hall.	Started in June 2008 (until end of 2012).
	"Biblionet"	To facilitate free access to information for Romanian citizens by fostering the development of a modern public library system in Romania. Biblionet will concentrate on four core program components: - facilitate access to information; - preparing public librarians; - promoting the value of libraries; - fostering governement support.	2009-2014 A number of 795 public libraries was equipped with 3 318 computers with public access to broadband services and 905 librarians were trained in the field of information technology.
SI	n.a.	To develop new networks in rural areas.	n.a.
ES	n.a.	Bring broadband connectivity in rural or low-density municipalities in various regions.	Murcia: N699/2009 State Aid decision. Galicia: N424/2010 State Aid decision to be implemented in the

			period 2010-2013. Asturias: N323/2009 State Aid decision
	Xarxa Oberta	To develop a public infrastructure and wholesale access to the backhaul part in order to facilitate government departments and agencies, public administration bodies, citizens and business access to services on NGA networks (currently 96 municipalities).	Xarxa Oberta (Catalonia): N 407/2009 in proccess of implementation.
SE	"Säfflebygdens fibernät och Säffle kommun" "Byn Lindefallet i Hudiksvalls kommun" "Hejde-Väte och Grötlingbo på Gotland"	To give all inhabitants (in the areas the PPPs was set up for) access to broadband	"Säfflebygdens fibernät och Säffle kommun" was completed in 2010. "Byn Lindefallet i Hudiksvalls kommun" started in 2002 and was completed in 2004. "Hejde-Väte och Grötlingbo at Gotland" started in 2008 and was completed in 2010. Inhabitants in the areas where PPPs were set up for now have access to broadband.
	"The Government's Broadband Council"	The Government's Broadband Council is an oganisation and a meeting place for everyone working in the Swedish broadband market. Representatives of organisations, business, undertakings, public authorities and the Government are invited to take part in the Broadband Council.	2010 and ongoing Has put the issue on the benefits and availability of broadband on the political agenda. Increased emphasis on bredbadn in Rural Development Programme. Has contributed to develop a common picture of the biggest obstacles to the strategy's objectives

		The purpose of the Broadband Council is to work together – making use of constructive solutions – to help achieve the targets laid down in the Government's Broadband Strategy and enable Sweden to have world-class broadband.	are achieved
	"Broadband initiative"	5,25 billon SEK to stimulate broadband expansion.	2001 – 2007 Contributed to 1) expansion of broadband in remote areas that otherwise would have been occured, 2) better competition even in small towns and previously closed networks have been opened up, 3) profitable from a socioeconomic perspective, 4) major share (90%) has been used to new infrastructure - mainly optic fiber. The 2001-2007 funding and the broadband infrastructure which was built during that period has been very important for Sweden. Broadband initiatives of today are a continuation of the work done during 2001-2007.
CH	"Incumbent & Zurich (city) utility"	Deploying FTTH in the city area	Finished in 2017 200,000 households (100%)
	"Incumbent & Basel (city) utility"	Deploying FTTH in the city area	2017 95% of Households
	"Incumbent & Fribourg (city+region) utility"	Deploying FTTH in the whole (mostly rural)	~2,600 households (pilot project)

		canton of Fribourg > all contracts are under revision by the federal competition authority > all utilities participating in the FTTH-Roll-out are publicly owned	
TK	n.a	To facilitate the excavation works and prevent the dublication, some municipalities installed their fiber infrastructure and lease it to ISPs.	In a current situation, İstanbul Metropolitan Municipality has 1 025 Km fiber infrastructure (229 Km are planned next time).
	n.a	To develop the fiber infrastructure nationally and bind settlements among themselves, some Institutions install and develop their fiber infrastructure.	n.a

Source: BEREC Broadband Promotion Questionnaire