EUROPEAN
COMMISSION

Brussels, 26.3.2013
SWD(2013) 73 final

Part 1

COMMISSION STAFF WORKING DOCUMENT

Impact Assessment

Accompanying the document

Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on measures to reduce the cost of deploying high-speed electronic communications networks

{COM(2013) 147 final}
{SWD(2013) 74 final}

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1. PROCEDURAL ISSUES AND CONSULTATION OF THIRD PARTIES

1.1. Introduction

The Digital Agenda for Europe[1], one of the flagship initiatives of the Europe 2020 Strategy, underlines the importance of broadband connectivity for European growth and innovation and for social inclusion and employment. The Digital Agenda sets ambitious coverage and speed targets and requires Member States to take measures, including legal provisions, to facilitate broadband investment.

The 2012 Spring Council has asked for steps to be taken at EU level to achieve costs savings in the deployment of high-speed broadband networks, as part of the efforts to complete the Digital Single Market by 2015.

This impact assessment accompanies a legislative proposal that would, if adopted by the Council and European Parliament, render the deployment of high-speed broadband networks[2] less expensive and more efficient. It would do so by ensuring improved access to suitable physical infrastructure, more opportunities for cooperation in civil engineering works, streamlined permit granting procedures for rolling out broadband networks, and more buildings ready for high-speed broadband.

The Single Market Act II includes this initiative as one of its 12 key actions[3].

1.2. Involvement of other directorate generals

DG Connect set up on 1 March 2012 an inter-service steering group including the following services: Secretariat General, Legal Service, DG Competition, DG Economic and Financial Affairs, DG Energy, DG Enterprise, DG Environment, DG Internal Market, DG Mobility and Transport and DG Regional Policy. The IASG held five meetings between March and September 2012.

1.3. Consultation and expertise

1.3.1. Stakeholder consultation

In preparation of this impact assessment, the Commission services held a public consultation from 27 April to 20 July 2012. The Commission invited stakeholders to give their views on five sets of questions, covering the entire chain of network deployment, from the planning phase to the connection of end-users. Over a hundred written replies were submitted by

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1 COM(2010)245 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Digital Agenda for Europe.

2 The high-speed broadband networks and NGA (next generation access) networks are considered to be synonyms in the text. Any references to studies or documents concerning NGA remain valid to high-speed broadband networks/infrastructure.

3 Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions, COM(2012)573 of 3.10.2012, Key Action 9.

different types of stakeholders from 26 countries across the EU and EFTA. The largest categories of respondents were electronic communications providers (27) and their trade associations (14), as well as public bodies - both central (22) and local authorities (9). Six National Regulatory Authorities (NRAs) responded. Other utilities (7) provided their input mainly via trade associations. Equipment manufacturers (5) and engineering and ICT trade associations (6) also replied. In general terms, the respondents favourably received the Commission's initiative to address civil engineering costs for broadband roll-out. A majority of them confirmed existing problems in the rollout process as well as the potential for cost reduction, thereby supporting the mandate for the Commission to act. The public consultation was an opportunity to collect feedback on the efficiency of different existing practices applicable in some Member States, regions or municipalities. Several solutions were proposed, some very ambitious and some more moderate. A report on the outcome of the public consultation can be found in Annex I, whereas references to the specific ideas provided in the consultation are made throughout the document. An Internet discussion platform for crowdsourcing ideas was also set up in the margin of the public consultation, which allowed for exchange of ideas and interaction between the interested stakeholders.

The Commission services have maintained regular contacts with major stakeholders, both public and private, across the sectors concerned. The views expressed in the framework of these consultations have been incorporated throughout the entire report.

1.3.2. Studies and other information sources

The Commission services have commissioned two studies and had recourse to a number of information sources, for the preparation of the impact assessment. More specifically, Deloitte prepared a study on cost reduction practices with regard to broadband physical infrastructure rollout[4] and Analysys Mason elaborated a study to support this impact assessment[5]. Annex III builds on the study prepared by Deloitte, as further cross-checked with other sources, whereas the study prepared by Analysys Mason forms part of Annex IV. In addition, a more extensive study carried out by Analysys Mason on the costs and benefits of broadband was used to support the analysis of impacts[6].

Furthermore, the Commission services drew upon additional information sources, studies and national best practices (e.g. DE, FR, LT, IT, PT, NL, PL, ES, SE, SI, UK). The complete list of these sources can be found in the bibliography. Detailed information was also collected by the responsible Commission services via the National Regulatory Authorities.

1.3.3. Dedicated events

The Commission services have discussed possible actions to facilitate and reduce the cost of NGA networks' deployment on various occasions, notably in the meetings of the Digital Agenda Europe High Level Group held on 17 January and 4 December 2012, in several meetings of the Communications Committee and in the Smart Grids Task Force. Furthermore, a session in one of the workshops of the 2012 Digital Agenda Assembly, held

[4] Framework Contract n° SMART 2007/0035
[5] Framework Contract n° SMART 2012/0013
[6] Framework Contract n° SMART 2010/0033

on 21-22 June 2012, was dedicated to finding ways at EU level to make the rollout of high-speed broadband easier and less expensive.

1.3.4. Exchange of best practices

The Commission services have drawn from the extensive experience of the Member States, in order to design the different policy options and assess their impact. Best practices, as well as obstacles were discussed in different *fora*, including the High Level Group of Electronic Communications and the DAE High Level Group.

1.4. Opinion of the Impact Assessment Board

The draft Impact Assessment was presented to the Impact Assessment Board on 7 November 2012. The Board examined it and delivered its first opinion on 9 November and its final opinion on 4 January 2013. In response to the recommendations of the Board, the document was revised introducing the following main changes:

- The problem definition (Chapter 2) was completed with an overview of the broadband situation across the different Member States as compared to Europe's global competitors (Section 2.1.2), with an overview of the current regulatory framework (Sections 2.4.1 through 2.4.4 and Annex VI) and with an analysis of the problems and entry barriers holding back the rollout (Sections 2.1.3 – 2.3); furthermore, the analysis of the baseline scenario was reinforced with developing the outlook for each of the inefficiencies (Section 2.6) and impact analysis of good practices (Section 5.4) and a more transparent account was given of the issues selected to be tackled by this initiative (Section 2.4);

- The subsidiarity arguments in Section 2.7 were strengthened to clarify why EU action is needed against the background of possible measures at Member State level and of the possibilities offered by the current regulatory framework;

- The policy options in Chapter 4 were better defined in terms of their content rather than instruments and it was explained how those address the totality of the problems identified;

- The analysis of the impacts in Chapter 5 was deepened, including, among others, cost and benefits of some existing good practices, quantification of expected costs savings and assessment of administrative burdens and social impacts and other costs and benefits of the different options (see in particular Sections 5.2 - 5.3 and Annexes VII – IX);

- The comparison of options in Chapter 6 was re-written in a more synthetic and clearer way;

- The different views of the stakeholders were better reflected throughout the entire report;

2. PROBLEM DEFINITION

2.1. Policy context

2.1.1. The importance of broadband

The achievement of Europe 2020 objectives of smart, sustainable and inclusive growth will very much depend on the availability and widespread use of the broadband. A high quality digital infrastructure underpins virtually all sectors of a modern and innovative economy and is of strategic importance to social and territorial cohesion. It is the backbone of the Digital Single Market, a major and still to a large extent untapped source of growth, and a key factor for EU's competitiveness.

Numerous international studies demonstrate the benefits of broadband for the society[7]. First, it is highly important for competitiveness and innovation and has a clear impact on GDP growth. Second, it is also a net job creator, an enabler of major societal and governmental reforms, as well as a transformational factor – reducing for example the isolation of regions, including Outermost Regions. Finally, broadband has proven to bring significant benefits for the environment. The general economic, social and environmental impacts linked to broadband access are illustrated in detail in Section 5.3.

More generally, living in a connected society changes the economic, entrepreneurial and social environment. A high quality digital infrastructure is a key enabler of economic and social changes and a condition for next generation technologies, services and applications to develop. In fact, it is considered by experts as essential for the 21st century's society as the rail was for the 19th century and electricity for the 20th century.[8]

Acknowledging the importance of broadband rollout, Member States have endorsed the ambitious broadband targets set in the Digital Agenda for Europe. These targets are as follows: 100% broadband coverage by 2013 for all Europeans and increased speeds of 30MBps for all, with at least 50% of the European households subscribing to Internet connections above 100MBps by 2020. DAE targets were set just shortly after the reform of the regulatory framework (2009).

Following the adoption of the Digital Agenda, the Commission issued **a first package of measures aimed at stimulating investment in high-speed Internet in 2010**. As part of the package, the objective of the Broadband Communication[9] was to assist the actions of national and local authorities in enhancing rollout. The Next Generation Access Recommendation[10] was aimed at providing regulatory guidance to national regulators, while the Radio Spectrum

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7 *The Impact of Broadband on the Economy: Research to Date and Policy Issues* April 2012, ITU; this study in particular summarized different evidence generated by the different bodies of theory regarding the economic impact of broadband. See: http://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_Impact-of-Broadband-on-the-Economy.pdf

8 McKinsey Global Institute 2011.

9 COM(2010)472 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: European Broadband: investing in digitally driven growth.

10 C(2010) 6223/3 Commission recommendation on regulated access to Next Generation Access Networks

Policy Programme (RSPP)[11] aimed to improve the coordination and management of spectrum and hence facilitate, among others, the development of wireless broadband.

2.1.2. Broadband in Europe and in the world - a need to step up efforts to roll out high-speed internet

Although basic Internet connections are available to a great majority of European households (95.7%), the EU is currently only halfway towards its goal of 30Mbps access for all by 2020[12].

Great differences exist within the EU as regards the coverage of high-speed broadband. As can be seen in the figure below, some Member States such as the Netherlands or Malta are close to 100%, while others such as Greece and Cyprus are under 10%[13]:

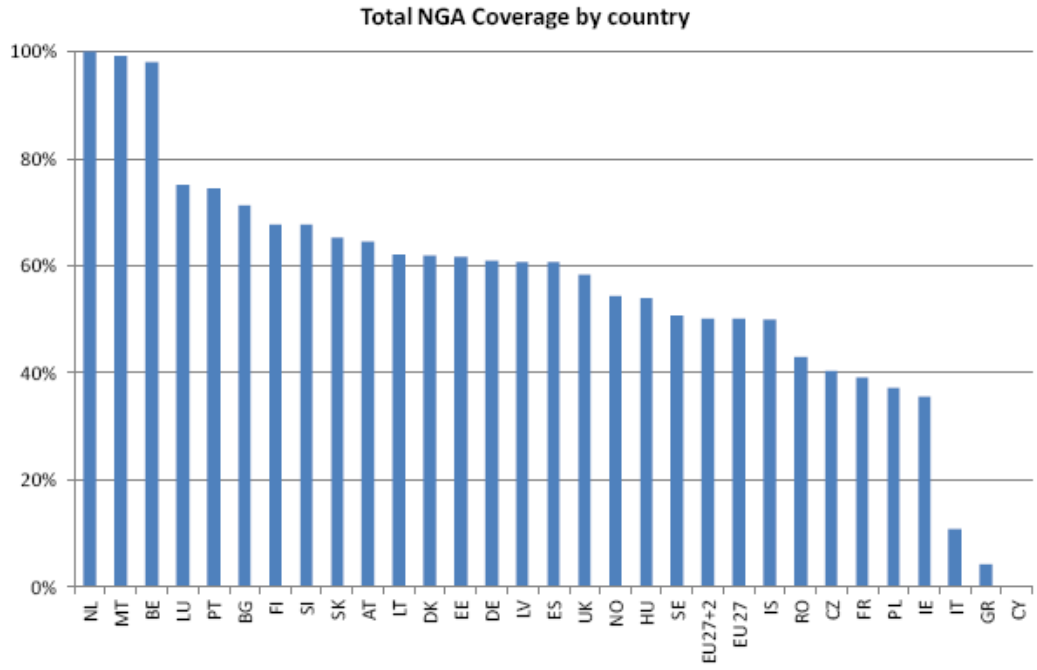

Figure 1 - Total NGA coverage by country in the EU. Source: Broadband Coverage in Europe in 2011, Point Topic for the European Commission

Moreover, out of 105 million European homes with access to high-speed broadband, only 5 million are in the rural areas (12% of the total rural homes in Europe) leading to an increasing isolation of these areas. 35 million homes in rural areas are still waiting for high-speed connectivity, and bringing it to them is likely to require the most considerable effort and investment.

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11 http://ec.europa.eu/information_society/activities/broadband/wireless/index_en.htm

12 https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/KKAH12001ENN-PDFWEB_1.pdf Chart 1, p. 8

13 http://ec.europa.eu/digital-agenda/en/news/study-broadband-coverage-2011

Thus, the digital divide becomes increasingly important in the context of high-speed broadband, as citizens are not only deprived of access to information, as it is the case with basic broadband, but also of an entire range of Internet-based digital services available only on high-speed connections, such as eHealth, eEducation, or eGovernment.

From an international perspective, investments in high-speed broadband are taking place more quickly in parts of Asia and in the United States, leading to significantly better coverage (see figure 2) and higher speeds. In the US, high-speed networks now pass more than 80% of homes, a figure that quadrupled in three years. Japan and South Korea were at 86.5% and, respectively, 68% already in 2009[14]. In addition, there is a very strong growth in coverage of high-speed broadband in Russia and China[15].

Take-up of high-speed broadband in Europe is generally also rather low, as compared to other important world economies. South Korea, with 20.6% of subscriptions per 100 inhabitants, has the highest take-up of fibre worldwide, i.e. double that of Sweden (9.7%), the best in the EU (as of December 2011)[16]. Japan has the second highest fibre take-up at 17.2%. The high take-up in Asia may be related to the relatively inexpensive high-speed connections, attractive content offerings and the growing use of multiple connected devices.[17]

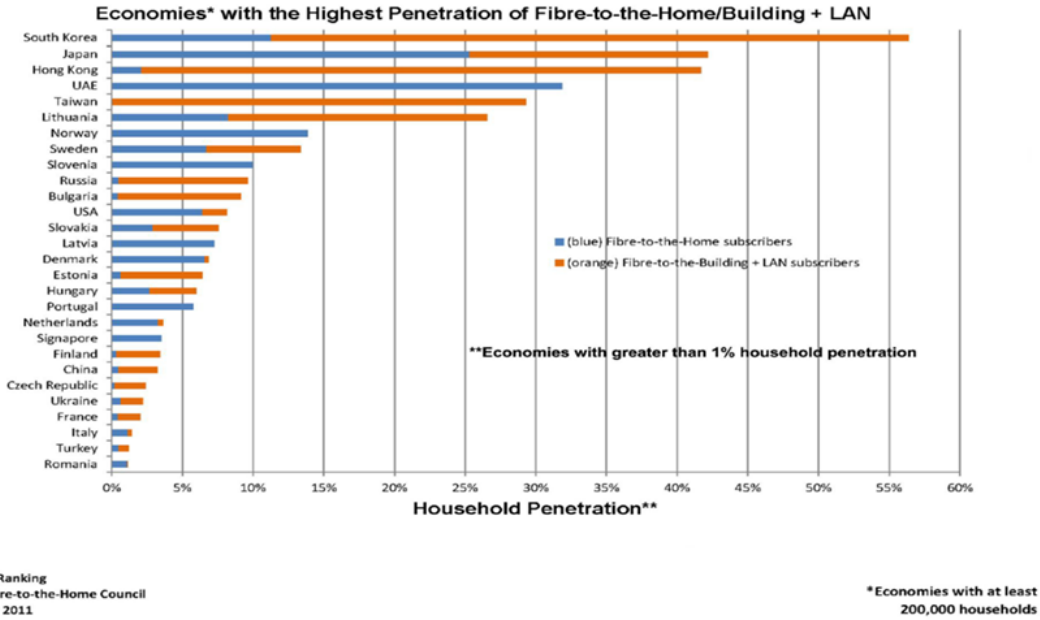

Figure 2 - Economies with Highest Penetration of FTTH/FTTB. Source: FTTH Council

According to experts[18], it could cost more than 200 billion EUR to bring high-speed broadband to all Europeans in line with the Digital Agenda targets. While investments in the

14 http://www.oecd.org/internet/broadbandandtelecom/oecdbroadbandportal.htm

15 http://www.ftthcouncil.eu/documents/Reports/Market_Data_December_2011.pdf

16 See OECD Fixed and wireless broadband subscriptions per 100 inhabitants (December 2011), http://www.oecd.org/internet/broadbandandtelecom/oecdbroadbandportal.htm

17 See OECD prices in December 2011 http://www.oecd.org/internet/broadbandandtelecom/oecdbroadbandportal.htm#prices

18 A review of recent studies indicates that between € 38bn and € 58bn would be needed to achieve the 30 Mbps coverage for all by 2020 (using a mix of VDSL and next generation wireless) and between €

telecom sector **amount to** 12.4% of the total revenues of 256 billion EUR throughout the EU in 2010[19] – only a limited share of these are in next generation networks.

2.1.3. Factors holding back high-speed broadband rollout

- Several factors explain why investments are not occurring in Europe as fast as they do in other parts of the world.

- Operators typically point to a lack of demand. Moreover, the traditional telecommunications eco-system has changed as the boundaries between IT, telecom, broadcasting, and other media are constantly blurring. The convergence of services means that the all Internet-relevant industries need to adapt and rethink their strategies, so that value keeps flowing sustainably across the Internet value chain. In this context, creation of successful European content offers could significantly contribute, among others, to bigger demand for high-speed broadband.

- Lack of demand is often linked to a lack of awareness concerning the benefits of broadband and a lack of e-skills. In this regard, differences between Member States are significant: 54% of Romanian citizens versus 5% in Sweden have never used the Internet. Only 43% of EU population claim to have medium or high Internet skills.[20]

- On the other hand, regions where telecom operators historically profited from well-developed networks tend to be slower in their shift towards high-speed broadband, as compared to areas where electronic communications networks were relatively under-developed and which leapt forward.

- The high costs of rolling out networks and the uncertainty concerning future income and returns on investment are often quoted as factors deterring investment, in particular in a climate of financial restraint. This is particularly relevant in rural and sparsely populated areas, where rollout necessarily involves higher costs.

2.1.4. New measures to stimulate high-speed broadband

The analysis above shows that Europe needs to step up its efforts to stimulate high-speed broadband rollout. A recent study[21] shows that without public intervention, by 2020, 94% of the households would be covered with connections of at least 30 Mbps, and only 50% would be covered with connections of 100Mbps, with a take up of 26% significantly below the DAE targets.

In this context, the Commission is taking the following actions:

181bn and € 268bn to provide sufficient coverage so that 50% of households are on 100 Mbps services" source: Tech4I2 and Analysys Mason (2012)

19 http://ec.europa.eu/information_society/digitalagenda/scoreboard/docs/2012/scoreboard_broadband_markets.pdf.

20 Digital Agenda Scoreboard 2012

21 Analysys Mason Tech4i2 "The socio-economic impact of bandwidth" (SMART 2010/0033)

First, the Commission is striving to ensure a predictable and consistent regulatory framework, which enhances competition while providing the right incentives to investors.

Second, the Commission is proposing measures to foster demand, and in particular to stimulate demand for high bandwidth.

Third, the Commission is taking various measures within the framework of the Radio Spectrum Policy Programme, in an effort to ensure that sufficient spectrum is available for the further development of mobile broadband, recognising the increasing use of wireless Internet.

Fourth, the Commission is taking initiatives to ensure that, at EU level, appropriate funding is available for the rollout in areas that are underserved. While in the densely populated 'black' areas operators are ready to invest and the market will deliver on its own, in the 'grey' and 'white' areas support is needed. For the latter, structural funds and public funding within the frames of the revised Guidelines for Broadband State Aid will contribute to this objective.

The initiative discussed in this Impact Assessment, aimed at reducing the cost of deploying high-speed electronic communications networks complements the efforts described above. It follows a call from the **2012 Spring European Council,** which underlined the importance of broadband and asked for additional steps to be taken to achieve costs savings as part of efforts to complete the Digital Single Market by 2015[22].

2.2. Scope of the initiative

This initiative looks at ways to **facilitate and reduce the cost of rolling out high-speed electronic communications networks**. It is estimated by several studies (OECD 2008, WIK 2008, Francisco Caio 2008, Analysys Mason 2008[23]) that up to 80% of the costs of deploying new networks are civil engineering costs. While these costs differ in function of the technology used, similar figures have been advanced by most respondents to the public consultation[24]. The same studies, echoed by feedback from stakeholders, show that a major part of these costs can be attributed to inefficiencies in the rollout process. Some of these **inefficiencies can be eliminated and thus costs could be significantly reduced** by implementing simple measures, such as a more intensive use of existing physical infrastructure, cooperation with utility companies, and improved coordination of all the actors involved in network rollout.

The current electronic communications regulatory framework contains certain tools which the National Regulatory Authorities can use to make the rollout of networks more efficient. For example, NRAs can impose companies to share their infrastructure under a well-defined set of circumstances, including in-house wiring, under Article 12 of the Framework Directive. According to the same article, the NRAs can also request providers of electronic

22 http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/128520.pdf .

23 http://www.oecd-ilibrary.org/docserver/download/5kz83r71zt9n.pdf?expires=1354706494&id=id&accname=guest&checksum=ABF880A53E2CCF52CD3972CBDE6AAD64

24 http://ec.europa.eu/information_society/policy/ecomm/library/public_consult/cost_reduction_hsi/index_en.htm

communication networks to provide information on their physical infrastructure. Finally, Article 11 of the Framework Directive imposes a set of standards for granting rights of way. These provisions are described in detail in Annex VI. However, the provisions are mostly optional (NRAs are to decide whether or not to use the powers granted to them by Article 12), as well as limited in their scope and reach. These limitations are discussed extensively in Sections 2.4.1 through 2.4.4.

Some Member States (e.g. France, Lithuania, Germany, the Netherlands or Portugal), aware of the opportunities, started introducing more far reaching cost reduction measures going beyond the current regulatory framework. Promoting such measures at EU level would allow **scaling them up, for greater efficiency gains** and at the same time to ensure **positive effects for the Single Market**. Such measures were not promoted at an earlier phase at EU level due to the lack of experience in implementing them. At the same time, the imperative of reaching the ambitious broadband targets of the Digital Agenda only appeared after the review of the regulatory framework for electronic communications currently in force, as signalised in section 2.1.1 above.

This initiative is complementary to other actions undertaken to facilitate the development of infrastructures in Europe, such as the Inspire Directive[25] or the Broadband State Aid Guidelines as is explained in greater detail in Chapters 4 and 5.

2.3. Problem definition

The problem addressed by this initiative derives from the presence of a bottleneck in electronic communications access networks, typically between the distribution frame and the network termination point, which reaches end users, associated with economic inefficiencies. This terminating part of the network, also called "local loop" or "last mile" may not have been rolled out or often has more limited speed capacity than the core network and is economically difficult to duplicate or replace, in particular in semi-urban and rural areas where distances are longer and population density is lower. An important inefficiency in the rollout process is related to the presence of high sunk costs generated by civil engineering works – e.g. digging, ducting etc., associated with heavy administrative burdens for undertakings involved in that process.

This specific problem is one of the factors affecting investments in broadband infrastructure, as discussed in Section 2.1, conditioning the digital divide among Europeans, on the functioning of the Digital Single Market, and on EU's competitiveness.

In order to propose solutions to bring down costs and raise efficiency, it is essential to understand the main cost components and drivers of cost sensitivities in the deployment of electronic communications networks. It is equally important to understand the main administrative bottlenecks.

Both the overall costs and the cost components of rolling out networks vary greatly in function of the technology deployed. The main cost components for a Fibre-to-the-Premise connection consist of the costs of ducting, the cost of installing the fibre, the costs of the in-

[25] Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007, establishing an infrastructure for spatial information in the European Community (INSPIRE), OJ L.108/1, 25.4.2007.

house wiring and the cost of consumer premise equipment. For mobile broadband, the costs are typically split into physical infrastructure, base station and microwave backhaul, on the one hand, and customer premises equipment, on the other hand. Despite the great variation in cost items, the costs of civil works (ducting and physical infrastructure) form the dominant component in both cases. It fact it is widely agreed that **civil engineering works constitute the dominant part in overall network deployment costs**[26], regardless of the technology used, with estimates as high as 80% for certain technologies.

There is significant variation in deployment costs per region and Member State given a number of country or region-specific factors which make deployment more or less inefficient. Whereas the cost of active equipment is relatively fixed, the other main cost elements are variable and depend, mainly on (1) **labour rates**, (2) **topography** of the concerned areas, (3) **pre-existing network infrastructure**, such as cables that could be upgraded or ducts that could be reused, including inside buildings (4) **population density**, (5) **average size of multi-unit dwellings** (MUDs) and (6) **legislation** imposing certain technical specifications **for civil engineering works** (such as the depth at which cables should be buried or visual rules for antennae installations).

The screening process analysing the cost drivers that can lead to inefficiencies demonstrated that some of the underlying causes of the high costs of civil engineering works in the context of network rollout cannot be tackled through an EU legislative initiative, such as national labour rates, topography, population density and average size of multi-unit dwellings. Nor can norms related to certain digging techniques be imposed at EU level, due to the technological bias they carry along.

On the other hand, the EU can ensure that the most efficient use is made of pre-existing passive network infrastructure. Yet, the use or co-deployment of pre-existing infrastructure, such as ducts, towers or poles, or to co-deploy, is often blocked or undermined by a variety of reasons. For example, lack of information is an important constraint. Indeed, access to detailed and valid information on the route, location and size of these civil engineering infrastructures is essential for letting operators prepare their deployments by taking into account availability of the existing passive infrastructure. If there is no information on its route, a duct "does not exist".

Where bottlenecks exist in the utilisation of pre-existing infrastructure or of other relatively simple solutions to cut costs (such as co-deployment), they are considered inefficiencies in the rollout process and therefore treated as underlying causes.

In order to ensure a complete picture of the inefficiencies in the deployment process that can be tackled through an EU initiative, the public consultation has specifically addressed these questions to stakeholders. Various inefficiencies and bottlenecks have been reported by several stakeholders as entry barriers, related to different stages of the deployment chain, holding back the rollout of high speed broadband. Respondents referred in particular to:

(1) The lack of transparent information on available infrastructure, which lead to unintentional duplication of networks and damages, leads to additional costs in terms of more

[26] Analysys Mason, 2008, Analysys Mason 2012, WIK, 2008

expensive deployment due to difficulty to negotiate sharing arrangements without proper knowledge of existing physical infrastructure suitable for deployment;

(2) The fact that specific procedures for infrastructure sharing, in particular across utilities or coordination of civil works are missing leads to additional costs, e.g. duplication of civil works and permits.

(3) Administrative obstacles related to receiving permits from authorities or property owners. The number and length of uncoordinated and unclear permit granting procedures in the Member States and sometimes even within Member States, regions or municipalities, leads to additional costs due to delays, lack of transparency and sometimes even abuses;

(4) The poor in-house equipment for receiving high-speed broadband networks at home contributes to inefficiencies of investments, e.g. leading to retrofitting which implies higher cost if compared to pre-equipment of buildings.

While some stakeholders tend to insist more on certain issues (e.g. companies deploying fixed networks on duct sharing and wireless operators on administrative permits), it is widely agreed that all these are relevant problems areas regardless of the technology deployed (see for more detail Annex I on the main outcomes of the public consultation).

Finally, in order to make sure that the screening process was complete and coherent, the inefficiencies identified by stakeholders and compared with the key cost components for deploying electronic communications networks, have been also cross-checked with the main steps involved in deploying a network.

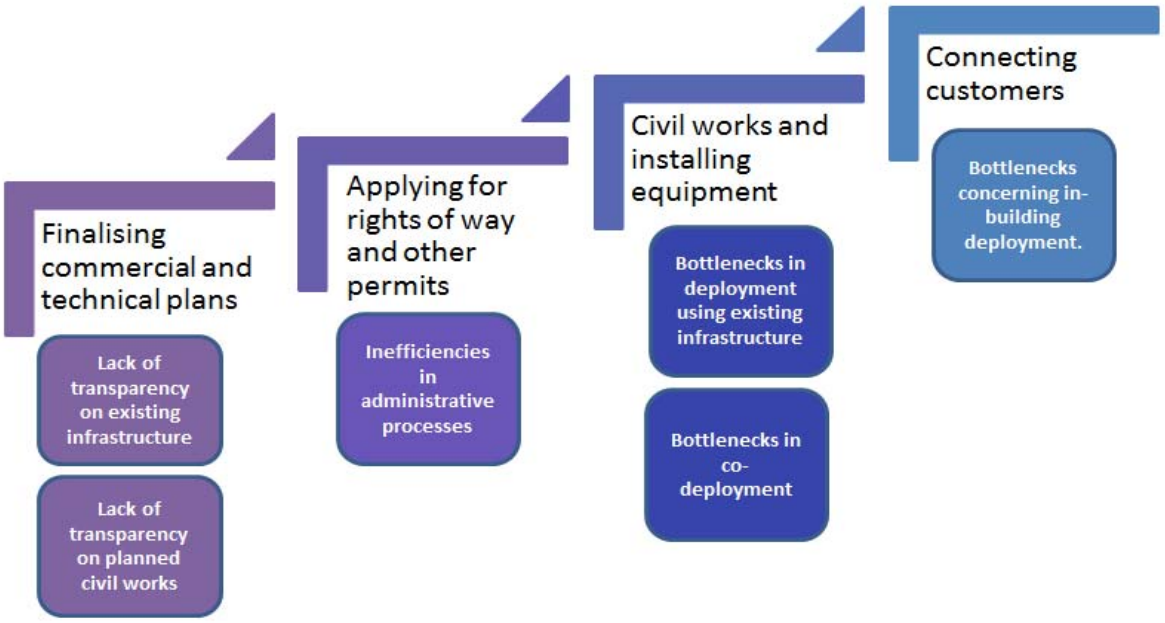

Figure 3 - Simplified steps involved in a typical network rollout, involving a mix between self-digging, co-deployment, and utilisation of existing physical infrastructure

The figure above illustrates that the problem areas are related to the typical steps and processes involved in deploying networks. It is based on the assumption that a company would like to deploy in a most efficient way (using existing ducts and/or co-deploying, if possible), but that at the same time a certain proportion of self-digging will remain necessary.

As each problem area is linked to a specific step in the rollout process, tackling these problems areas together will result in a set of coherent and mutually reinforcing actions. It is therefore essential that any solution proposed to respond to the problem of the high costs and complicated procedures covers all such areas. As an illustration, Analysys Mason (2012) estimates that if measures were taken to address the identified set of problem areas, the potential Capex savings to operators are in the range of 20–30% of total investment costs[27].

This initiative tackles the four main areas which were identified as clear underlying factors and which could potentially be addressed through EU legislation: (1) **inefficiencies or bottlenecks concerning the use of existing physical infrastructure** (such as, for example, ducts, conduits, manholes, cabinets, poles, masts, antennae installations, towers and other supporting constructions), (2) **bottlenecks related to co-deployment**, (3) **inefficiencies regarding administrative permit granting**, and, finally (4) **bottlenecks concerning in-building deployment**.

[27] The estimation is based on the following assumptions: 25% of the deployment is in existing ducts, saving 75% in Capex for this part, 10% of the deployment connects the network to new housing developments, and co-deployment with other operators/utility companies is used, saving 15–60%, and 5% of the deployment connects the network to pre-wired MDUs, saving 20–60%. In addition, there will also be social, environmental, and economic benefits.

2.4. Underlying causes of the identified problem

This section examines in more detail the four areas where the highest inefficiencies and bottlenecks are encountered, focusing on the *underlying causes* of the identified problem. These correspond to areas which lead to unnecessary costs that could be tackled by an EU initiative.

2.4.1. Persistent barriers to use existing physical infrastructures suitable for broadband rollout

When deploying networks, undertakings may greatly reduce cost by using existing physical infrastructures suitable for broadband rollout. **Using existing physical infrastructure as opposed to building from scratch can bring significant cost savings of up to 75%**[28] of civil engineering works in case of shared only deployment. Based on a series of reasonable assumptions, for instance that deploying a network will always involve some self-digging, Analysys Mason estimated these savings on the initial cost for broadband deployment (i.e. CAPEX) as **ranging from 29 to 58%**[29] **of the total costs**. While savings are expected to vary greatly in function of several factors, e.g. the existence of ducts, their availability, the technical state they are in, their topography, or their specifications, in general the potential for costs reduction is widely recognised by industry (see Annex I).

The current regulatory framework for electronic communications provides the tools for NRAs to impose access to ducts belonging to telecom companies. This is generally applied to companies with significant market power (SMP), as recommended by the NGA Recommendation[30], but can also be applicable to telecom companies which do not have SMP under certain well-defined conditions (the so-called symmetric obligations regarding facility sharing[31]). The same regulatory framework also empowers the NRAs to request information concerning the ducts or other physical infrastructure of telecom companies, and to set up infrastructure inventories.

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28 Enhancing Next Generation Access Growth in Europe (Engage group), consisting of 12 partners from 10 European countries that estimated that the initial cost of network deployment in Western Europe using existing ducts ranges from EUR20 to EUR25 per metre, rather than an average of EUR 80–100 per metre for deployments that require digging, thus resulting in a 75% cost saving.

29 Analysis Mason Research (2012), PIA versus self-build in the final third: digging into the cost.

30 For example, instead of a greenfield investment, where civil engineering works can take the costs very high, alternative operators can use the existing infrastructure (such as ducts) of incumbent operators to deploy their networks.

31 Art.12 of Framework Directive.

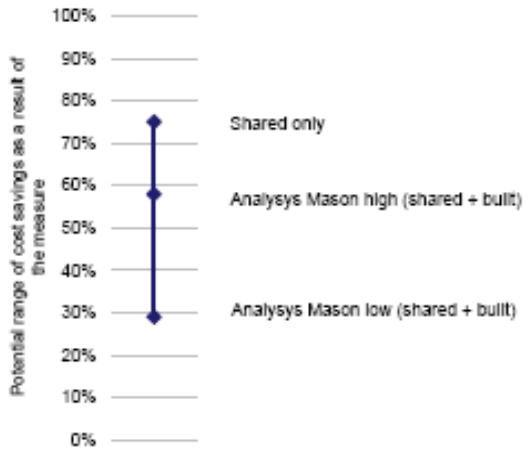

Figure 4 - Range of potential cost savings in network rollout resulting from using existing physical infrastructure (Source: Analysys Mason 2012)

Yet, this potential for savings is not properly capitalised. The provisions described above are not always applied or are not implemented consistently throughout the EU (see Section 2.6 for details). Some of this varied implementation of the current provisions can be explained by the different national circumstances (e.g. whether ducts are present). Still, studies and feedback from industry show that, even under similar circumstances, conditions for duct access vary greatly, which particularly affects cross-country operators and forms a serious barrier to the deployment of broadband networks beyond the national borders and subsequently to the provision of pan-European services and the functioning of the digital single market more generally.

Access to infrastructure belonging to other utilities (such as electricity poles or sewerage pipes) is a strongly underused solution to bring down costs. A rare example is the one of a French alternative operator that has used the sewerage network in Paris to deploy fibre. Reggefiber, the largest Dutch passive FTTH infrastructure owner is also considering making use of sewerage networks to deploy in the last mile in rural areas, and estimating savings between 20% and 25%**.** In France, aerial power lines of the transport network have been used to install optical fibre with more than 18,000 km of power lines of high and very high voltage equipped with optical fibres at the end of 2011. As reported by the Danish Energy Association, trench sharing between power line and fibre ducts has lowered the deployment costs of FTTH infrastructure, and stimulated infrastructure-based competition.

While the different technical specifications and increased security concerns might render, in the opinion of some telecoms operators, these solutions slightly more complicated and costly than the sharing of infrastructure inside the telecoms world, the size of the utility networks greatly expands the real choice of companies willing to expand their own networks through a mix of sharing and self-build.

Despite these advantages, this kind of cross-utility cooperation is not covered by EU law. Only a small minority of NRAs have the expertise as well as the legal tools to deal with transparency and access to infrastructure obligations across sectors (France, Germany, Lithuania, Portugal). In most cases, there is no legal basis facilitating such cooperation across

utilities, making it difficult to come to commercial agreements on sharing risks and costs and to find a suitable arbitration mechanism in case of conflicts. Moreover, regulation in certain Member States discourages utility companies to cooperate with telecom operators (for example, where the profits of energy companies are regulated).

Creating legal grounds for such cooperation on a voluntarily basis is, therefore, likely to bring benefits in terms of coverage, especially where telecom incumbent infrastructure is not available or where restrictions to self-deployment apply.

It can be noted also that some provisions concerning transparency of information on existing and new physical infrastructures, as well as on access to these infrastructures may be envisaged by the current draft *EU Guidelines for the application of state aid rules in relation to the rapid deployment of broadband networks*. These guidelines are expected to increase transparency, but only partially (for infrastructure benefiting from state aid).

In conclusion, there are several bottlenecks or barriers that prevent the sharing of infrastructure from happening at full potential: (1) **limited transparency** as concerns existing physical infrastructure suitable for broadband rollout, (2) inconsistently applied regulation or lack of appropriate **legal basis / institutional framework**, (3) **commercial issues** (lack of business interest) or anti-competitive behaviour, and (4) **technical** unfeasibility.

2.4.2. Barriers to cooperation in civil engineering works

Coordination of civil engineering works can greatly reduce the costs of investment. Not only telecom companies can cooperate with each other in order to share costs. In principle, such cooperation is possible across sectors, and it can easily involve both private actors and public companies. For example, when undertaking road maintenance works, or when repairing water pipes, telecom companies could profit from these civil engineering works and lay ducts or networks at the same time. The incremental costs of laying ducts, while civil engineering works are already undertaken, are generally considered to be marginal[32]. In addition, coordination of works reduces nuisance to citizens.

Analysys Mason (2012) estimates the **potential savings from co-ordinating civil engineering works when the project is shared between two parties at 50% of the civil engineering works cost, or up to 40% of the total costs.** Furthermore, if more than two operators were to be involved, the civil engineering works per operator decrease further, producing savings up to 53% for three players. More conservative estimates, corrected for the fact that the actual network deployment plans rarely coincide entirely, range between 15% and 30% of total cost savings[33].

[32] Tech4I2 and Analysys Mason (2012).

[33] Möglichkeiten des effizienten Einsatzes vorhandener geeigneter öffentlicher und privater Infrastrukturen für den Ausbau von Hochleistungsnetzen, Dr. H. Giger et al, 2011

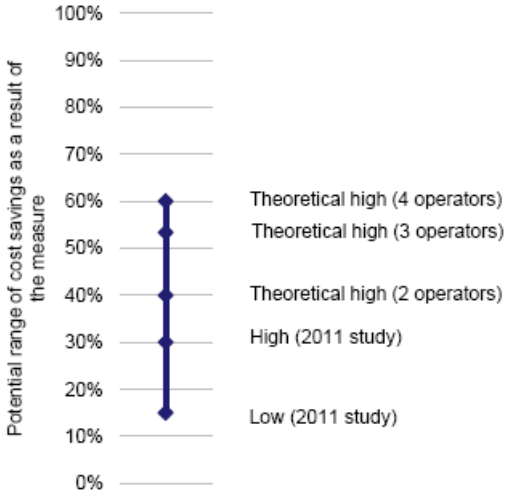

Figure 5 - Range of potential cost savings in network rollout resulting from coordinating civil engineering works (Source: Analysys Mason 2012)

The regulatory framework foresees that Member States may require telecom operators to take measures to facilitate the coordination of public works, in certain pre-defined circumstances (Art. 12.2 of the Framework Directive - see Annex VI). In addition, coordination of public works is currently required by several national infrastructure / civil engineering laws. A few Member States (e.g. Finland, Slovenia, France and the Netherlands) have well run mechanisms of informing telecom companies of planned public works and allowing them time to file requests for deploying networks at the same time.

Yet, such **cooperation seldom occurs in practice**. Rare examples include the co-deployment of LTE in the north of Sweden by two mobile operators or a more organised co-deployment involving several local authorities in Finland. These cases are however an exception rather than the rule.

When asked what lies behind this fact, most companies refer to the lack of transparency regarding planned works of other parties, together with the non-matching time horizons as important factors deterring co-deployment. The information on planned investments of other operators, utilities or public authorities is most often not widely / publicly available, or it becomes available once it is too late to plan and organise co-deployment. Companies are moreover reluctant to share their plans concerning network deployment, as they consider it commercially sensitive information (e.g. other operators might be able to move faster). On the other hand, some of the companies fear coordination of civil works could imply the risk of additional administrative burden related to the need for modification of building permits, increase of fees, delays from the need to await the replies to the call for coordination.

When it comes to co-deployment across utilities, the difference in time horizons for investments is an even greater issue: certain utility companies deploy at a slower pace than telecoms, due to security reasons, or because of the different pace of technological progress-related infrastructure obsolesce across sectors. Moreover, utility companies have often no business interest in co-deployment, nor a history or culture of cooperating with telecom operators. Just like in the case of infrastructure sharing across utilities, co-deployment might

be hampered by the lack of rules regarding cost and risk sharing, or the lack of an appropriate institutional framework (e.g. a competent dispute settlement body). These barriers are affecting cross-border operators to an even greater extent, in particular the lack of transparency and the lack of a suitable legal framework.

In conclusion, it seems that the most important barriers to co-deployment are: (1) the **lack of transparency** concerning planned works, (2) the long and non-matching **time horizons** involved in planning and executing works, where discrepancies are even higher across sectors; (3) **commercial considerations** (scepticism to reveal commercial plans or lack of business interest), (4) the **lack of an appropriate legal / institutional framework**, especially as regards cross sector cooperation, and finally (5) **technical incompatibilities.**

2.4.3. Burdensome administrative procedures

Companies most often describe the administrative procedures and processes necessary to start rolling-out networks as burdensome and costly. The companies refer to **a lack of transparency** as regards the conditions for obtaining the necessary permits, to the high number of authorities involved in the process of granting permits, and a **great diversity of applicable rules, requirements and procedures**, with no coordination vis-à-vis other authorities and permits. In most cases, no single information point exists concerning all the necessary permits, specific planning rules applicable locally, etc. These problems have been long reported. In OECD publication 'Public rights of way for fibre deployment to the home' of 2008, the onerous procedures related to permit granting have been identified as one of the obstacles in faster broadband rollout[34]. Evidence gathered by the GSM Association [35] shows that some of the procedures can be very **lengthy**: in case of base stations planning permissions in Europe typical timescales are higher than 20 months in several Member States, with a tendency for these delays to increase rather than decrease over time. As raised in the OECD study, access to rights of way and ducts is crucial for new entrants in order to compete effectively in local markets and to foster facilities competition. As confirmed in the public consultations, problems occur because municipalities in some countries consider access to rights of way as a revenue opportunity, resulting in fees which can be over and above the costs incurred or in unreasonable conditions for granting rights of way.

[34] http://www.oecd-ilibrary.org/docserver/download/5kz83r71zt9n.pdf?expires=1354706775&id=id&accname=guest&checksum=E86E9A498C17A651E7CC6943C10E9FBA

[35] http://www.gsma.com/gsmaeurope/gsma-europe-report-on-base-station-planning-permission-in-europe/.

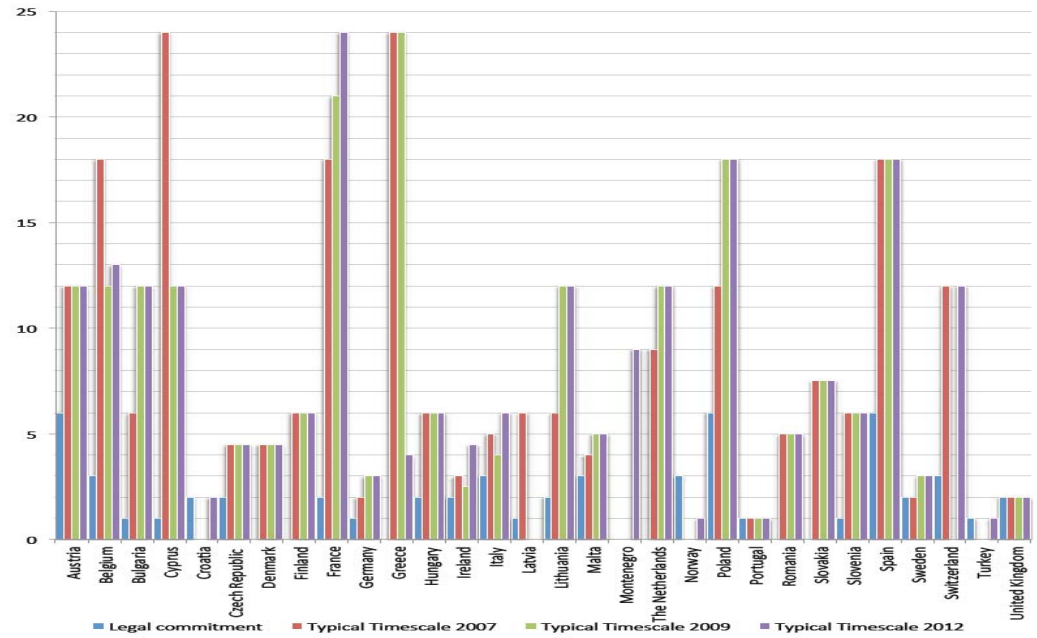

Figure 6 - Comparison between legal commitments and typical timescales for issuing base station planning permissions across Europe (Source: GSM Association)

The current regulatory framework foresees (under Article 11 of the Framework Directive - see Annex VI) a limit of six months for the granting of rights of way, and offers general guarantees with respect to the transparency of the process. However, besides rights of way, several other permits and administrative processes are necessary to rollout electronic communications networks and these latter are not covered by the current regulatory framework for electronic communications.

Few best practices however do exist. For example certain municipalities from the Netherlands or from Finland (Tampere) take an active coordination role regarding all necessary permits besides rights of way. In some countries, such as the Netherlands, rights of way are free of charge. A recent Greek law has also established a "one-stop-shop" for obtaining all the necessary permits to roll out a radio-network. Exemptions exist for certain categories of antennae and base stations e.g. in Greece and in the Netherlands. In Italy requests for certain permits are deemed as approved when no explicit decision is taken within a given deadline ("tacit approval").

Yet, surveys and feedback from industry show that such examples are an exception rather than the rule (see results of the public consultation). Operators consistently refer to permit granting as one of the important problem areas in network development. Such delays and lack of transparency severely affect the growth and competitive dynamics in the electronic communications markets and in the wider ecosystem (e.g. equipment manufacturers).

These problems are all the more severe for companies rolling out across borders that apply for permits not just in various Member States, but also with all the various regional and local governments.

In conclusion, the most common problems quoted in relation to permit granting are (1) the high number of different, **uncoordinated rules and procedures**, (2) the **lack of transparency** of these rules and procedures, (3) the **long delays** and, in some cases, (4) the **unreasonable conditions**, including fees, attached to rights of way.

2.4.4. High barriers to deploy in-house equipment in existing buildings

Connecting customers at their premises, which normally requires deploying in-building equipment is a very **expensive and cumbersome process**. An operator willing to install or upgrade the wiring in an existing multi-apartment building would typically need to bear the high costs related to the vertical and horizontal wiring, connect this wiring to its terminating segment or to the terminating segment of another operator (which sometimes requires works on the common ground belonging to the building), and thus to obtain permission from each and every individual owner of the building. Similarly, in the case of wireless networks, the costs of installing equipment (in a visually acceptable way) would have to be borne and permissions would be required from all owners.

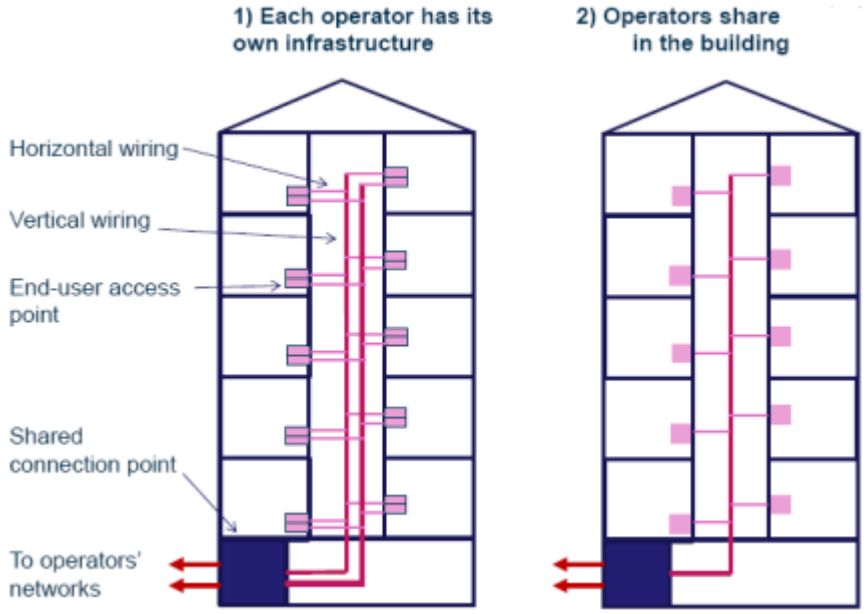

Figure 7 – Illustration of possible solutions for in-building wiring of MDUs (Source: Based on Analysys Mason 2012)

In order to guarantee a comprehensive approach to facilitating the rollout of high-speed broadband, it is therefore essential to tackle the issue of in-house equipment. This is an area where the (unnecessary) duplication of works leads to high inefficiencies as well as inconveniences for owners.

The current regulatory framework foresees that NRAs can impose obligations related to the sharing of in house wiring in cases where the duplication of such infrastructure would be economically inefficient or physically impracticable (see Annex VI).

A few NRAs have used this possibility and included mandated access to in-house wiring under SMP regulation, but these measures are in general considered to have limited impact.

Other Member States have looked for ways to address these difficulties beyond the telecoms regulatory framework: in France, Spain, Poland and Portugal there are regulatory requirements of different character to deploy high-speed broadband ready wiring in new buildings. In addition, there are obligations on operators reaching existing buildings regarding the sharing of costs and, respectively, access. In the United Kingdom, the government issued guidelines for property developers for next-generation broadband networks in new buildings. Indeed, the savings resulting from equipping new buildings with next generation access, as compared to "retro-fitting" existing buildings are estimated to potentially go as high as 60%.

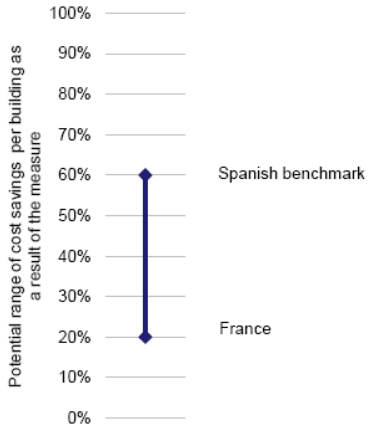

Figure 8 - Range of potential cost savings in network rollout resulting from equipping new buildings with NGA access, as compared to retro-fitting (Source: Analysys Mason 2012)

Nevertheless, in general, the practices concerning in-building equipment remain scarce and lack harmonisation, including as regards standardisation. Operators widely agree that this area represents one of the most problematic and difficult ones in the context of network deployment, as well as one where solutions cannot spread easily. The underlying causes in this area can be summarised as follows: (1) **high costs** of equipping existing buildings (2) cumbersome procedures related to working inside buildings and **deploying the terminating segment** on common grounds (mainly delays and difficulties to obtain owners' consent), (3) inconsistent application or **lack of regulation** tackling the inefficiencies associated with duplicating in-building infrastructure and (4) **lack of standardisation** in this area.

2.5. The main stakeholders involved

The following stakeholders may be particularly affected by the Initiative to Reduce Cost of Rolling-Out High Speed Communication Infrastructure in Europe:

- Telecom operators, utility companies, physical infrastructure owners, municipalities, communities, private funds, entrepreneurs, or any other companies seeking to roll-out broadband networks or being asked for access to their existing or to be deployed network. They should benefit most from the cost reduction measures in their deployment efforts.

- Public authorities (such as local, town planning, environmental, archaeological, and others) dealing with granting rights of way and other permits at national or local level.

Streamlining permit granting procedures as well as the establishment of new coordination and transparency mechanisms for infrastructure access and civil engineering works will add to the administrative burden of certain authorities;

– Contractors of the operators and municipalities, e.g. companies executing different elements of civil engineering works. The increased efficiencies in the rollout process will change the pattern of demand for civil engineering works companies; in the medium and long term, an increased rollout of high-speed networks is expected due to the savings created, to the profit of civil engineering works companies;

– Manufacturers of the equipment and technologies related to broadband deployment; Increased rollout and duct sharing, in particular cross-utilities, will increase the demand for new solutions and will trigger innovations;

– Housing industry: Construction companies and housing developers will have to follow new requirements concerning in-house equipment, which on the other hand, brings will increase value;

– EU citizens and businesses: As concerns direct effects, more access to physical infrastructure and a better coordination of civil engineering works will imply less digging, leading to reduced public nuisance; indirectly, increased broadband rollout has positive effects on employment, e-inclusion, access to public services, general comfort of life.

2.6. How would the situation evolve if no further EU action were undertaken

As signalised in Section 2.3, some measures have been introduced in several Member States, at national, regional or local level, however not in a consistent nor coherent manner. In some Member States measures are evolving to best address the encountered issues. Before proposing any initiative in this area, it is, therefore, necessary to check to what extent the identified inefficiencies could be addressed without the EU action. Screening local, regional, and national initiatives is also necessary in order to ensure that any proposal would not lead to lowering the effectiveness of existing standards in the extent concerning measures to facilitate and stimulate broadband rollout.

A study[36] was commissioned to verify the existence, the nature and the maturity of measures of this kind throughout the EU. In addition, the inputs to the public consultation (mostly from the NRAs) provided information on specific measures. The overall analysis of the results from these and other sources is presented in Annex III – Analysis of Baseline scenario and confirms that cost reduction initiatives have been launched or are currently being planned or implemented in different EU Member States. The assessment can be summarised as follows, in the view of the identified inefficiencies:

Inefficiencies or bottlenecks concerning the use of existing physical infrastructure

[36] Deloitte Tech4i2 "Study on cost-reduction practices with regard to broadband infrastructure rollout" 13/09/2012. Part of Study leading to an Impact assessment on the structuring and financing of broadband infrastructure projects, the financing gaps and identification of financing models for project promoters and the choice of EU policy. (SMART 2007/0035)

As regards the transparency aspect, the number of EU Member States has implemented a local or central physical infrastructure atlas or infrastructure registry or is currently working on introducing such solutions (AT, BE, CY, CZ, DE, DK, EE, FI, FR, IT, LT, LU, NL, PL, PT, RO, SI, ES, SE, UK). Very few have developed an advanced open-access and digital infrastructure atlas, including not just telecom ducts but also other utilities and all physical infrastructures suitable for broadband roll out (DE, PT). The purpose of these atlases/registries and platforms also differs. In the case of many of them, the main purpose is to avoid damages at the time of carrying out civil works (NL, DK, FI, SE). Some of the initiatives seem to have been developed with a view to implementing the Inspire Directive (e.g. CZ, BE), whereas the initiatives in PT, DE and one of three mapping initiatives in SE are aimed at infrastructure sharing and co-deployment. For example in practice the German initiative entails that information on infrastructure location is provided to Bundesnetzagentur (NRA) in electronic form, using standard file formats. All data is collected from the infrastructure owners themselves, rather than from new ground surveys, and is done on a voluntary basis. It is envisaged that infrastructure owners will in future be mandated to provide information via a web application. The project aims to cover the entire Federal Republic of Germany. As of May 2012 501 infrastructure owners were participating in the scheme, 91 parties had requested to use the database and overall 71 497km2 of area had been mapped, covering a population of 3.5 million. In comparison, the Portuguese NRA decided in 2009 to implement a Centralised Information System, a central infrastructure atlas aimed at reducing the cost of deploying new electronic communications equipment. Providing and regularly updating information is mandatory for all organisations that own or operate infrastructure suitable for accommodating electronic communication infrastructure (including roads, railways, water and gas infrastructure). This requirement applies to local authorities, state-owned companies, utility companies, electronic communications companies, and any other bodies that may own relevant infrastructure. It extends further to the incumbent, Portugal Telecom, which must provide information on available space within its ducts. While different authorities (NRA, local authorities, Ministry) can be involved in infrastructure mapping and at different levels (central/local), most of the activity is in the hands of national authorities.

Overall, there is a positive trend of development, yet limited mostly to mapping of telecoms infrastructure. As already mentioned in section 2.4.1 the *EU Guidelines for the application of state aid rules* in relation to the rapid deployment of broadband networks may help to establish some EU wide rules concerning transparency of information on existing and new physical infrastructures, as well as on access on these infrastructures to the extent that the concerned infrastructure benefits from state aid.

Yet, even with further positive development of this trend the impact of business as usual measures over the three years would not be significant enough to address inefficiencies sufficiently in view of the DAE targets. For example, the existing mapping exercises hardly provides to operators interested in deployment a right to perform surveys on the spot which are crucial in the absence of reliable data on infrastructure. Moreover, the mapping of the physical infrastructure of other utilities as enhanced by the Inspire Directive, does not necessarily address transparency deficiencies, given that Inspire does not provide an EU wide right for operators to access available information. This means that bottlenecks resulting from little transparency would persist in many cases.

As regards the access conditions to the existing infrastructure, a majority of EU NRAs have imposed access obligations on operators with significant market power, setting pricing rules for ducts access. Symmetric obligations concerning ducts access on operators (FR, LT, MT, NL, PT) have been imposed by the minority of the NRAs, including those few that have imposed access obligations across sectors (FR, DE, LT, PT). For instance in Lithuania, FTTH coverage reached circa 60% of households at the end of 2011 and FFTH connections accounted for 50% of all broadband connections. The exact costs savings are unknown at this stage, however; the NRA considers that without having adopted access measures, the deployment of high-speed network would have been much more limited. In Portugal extensive legislation exists providing that all existing ducts suitable for the provision of electronic communications network must be made available to operators. Also in this case exact data on costs savings are missing but the NRA considers that the implementation of this measure has led to infrastructure competition bringing benefits to end users. Germany has put in place legislation to oblige public utility companies to provide access to their infrastructure upon request. Since July 2012 the same applies to all owners of relevant infrastructure, including private utility companies. Any related disputes would be subject to an arbitration process. Overall, decisions on granting access obligations are in hands of NRAs. In practice the authorities rarely adopt symmetric obligations and in many cases the legal basis for cooperation across utilities is missing. In other cases the legislative obstacles discouraging utility companies to cooperate with telecom operators persist (e.g. some utility companies have to respect the principle of 'charges cover cost', therefore if exploiting their physical infrastructure would result in a reduction of their costs, this reduction should be reflected in their charges, decreasing their business interest in sharing opportunities). The current trend of development is not likely to lead to a significant impact over the next three years.

Barriers to cooperation in civil engineering works

Coordination of civil engineering works initiatives are emerging at local level (e.g. BE, DK, FI, LU, SE, NL). In FI utility companies, municipalities and telecom companies regularly meet to share their plans and discuss cooperation options. Such cooperation occurs as formalised practice (e.g. BE, DK, DE) or ad hoc. In other Member States (FR, LV, MT, PL, PT, SI, ES,) national law provides for some elements of coordination of civil works, in particular in case of works carried out on public roads (MT, PL, UK). In France both operators carrying out installation or maintenance projects of significant length are obliged to announce their plans to the local authorities. At the same time the local authorities are required by law to inform operators of their intention to launch civil works. PT imposed, in 2009, on public sector companies and electronic communication companies an obligation to make planned works public, including on the national centralised mapping system to facilitate sharing. The notice must contain in particular information on the characteristics of intervention, the time needed for execution of works, charges and other conditions to be observed, as well as a deadline for joining the work and contact point for further clarifications. In addition to that, preclusive provisions are included affecting future interventions in the area covered by the notification. The notice must be given by the respective promoting entities no less than 20 days prior to the start of works, whereas a deadline for joining the project is set for not less than 15 days. In the opinion of some stakeholders, the existing transparency mechanisms are not always effective, among others due to the short time period between the announcement and the beginning of works. Despite the number of these positive examples and also the legal basis in the EU law allowing to

Member States to require telecom operators to take measures to facilitate coordination of public works in specific circumstances (Art. 12.2 of the Framework Directive), the trend of development is not significantly positive, as there are little signs of scaling-up these local mechanisms of coordination over the next three years and in practice they rarely lead to co-deployment, especially across utilities.

Inefficiencies regarding administrative permit granting

Different examples of legislation streamlining permit granting process are emerging in some Member States. For instance, in Greece a 'one stop shop' approach was adopted recently. The one stop shop acts as a contact point dispatching requests to the competent authorities and verifying the strict respect of deadlines. Exemptions have also been made for small antennas and low emission sites. Some Member States have in place laws limiting the powers of local authorities to deny rights of way for telecoms operators wishing to deploy electronic communications networks (AT, NL, PL, PT). Some others plan to adopt relevant legislations or guidelines (CZ, IE, UK). Few local initiatives are also present (NL, FI cities). Some Member States have also streamlined the process of receiving permissions from private owners (NL, PL). Further developments in this regard depend on the willingness of authorities and/or political determination to adopt specific laws. These developments are not sufficient to establish a positive trend for the future. The existing legal basis in the regulatory framework (Art. 11 of the Framework Directive) does not guarantee either that the identified inefficiencies in permit granting would be addressed in the perspective of next three years. Besides rights of way, several other permits and administrative processes are necessary to rollout electronic communications networks and these latter are neither covered by the current regulatory framework nor by the identified practices.

Bottlenecks concerning in-building deployment

Several NRAs made use of the powers to mandate access to existing in-house installations under the SMP regulation obliging dominant operators have to open their in-house equipment to other operators. A number of Member States developed specific legislation concerning in-house installations: FR, ES, LT, PL and PT. In some Member States the efficiency of the measures has been put into question (e.g. CZ, LU, LV, MT). In IE, IT, and UK the authorities chose a soft law approach adopting guidelines or promoting standards (AT, FI and DE to some extent). The number of initiatives and their strengths in some aspects allows establishing a positive trend. Under the current regulatory framework the NRAs can impose obligations related to the sharing of in house wiring in cases where the duplication of such infrastructure would be economically inefficient or physically impracticable (see Annex VI). Yet, the pace of take-up of these best practices seems to be limited and there is no guarantee of addressing all the identified inefficiencies in a comprehensive way across the EU within the reference of period of three years. In particular, the spontaneous development of national legislation in this regard does not guarantee equal chances of telecoms operators across the EU in terms of the right to negotiate and to access existing in-building physical infrastructure. The scope and character of obligations on operators could also differ, putting in some cases technological neutrality at risk.

As shown in Section 2.3**, it is essential to take action across all the relevant areas** corresponding to the steps in the rollout process in order to maximise the effects. As results from the available information only a few Member States have some measures in all these

fields (DE, FR, PT, in some extent IT). However, the results of the public consultation demonstrate a general perception that none of the Member States has in fact taken measures effectively addressing all the identified problem areas. As further explained in Section 4.1 the simple fact that some measure is in place does not guarantee that the identified bottlenecks and inefficiencies are sufficiently addressed. In addition, in many Member States, next to measures in some areas obstacles in others are not tackled. For example in the Netherlands, on one hand there is effective information on the physical infrastructure for the purpose of avoiding damages and on the other hand there are regulatory restrictions[37] on energy companies which reduce their business interest in cross-sector cooperation. Finally, in many Member States more efforts to date have been limited (e.g. BU, SK, CY). Overall even where measures are present across several Member States, they are usually implemented in different ways e.g. duct mapping and access to ducts are imposed either on telecom and/or non-telecom operators.

Taking into account that decision powers and responsibilities for the adoption of specific measures are located differently across the Member States (local authorities, NRAs, central authorities), prospects for a more consistent, holistic and orchestrated approach among Member States to all identified inefficiencies and bottlenecks persistent to the whole investments process, remain limited.

The first legal measures in this area appeared in the late nineties (e.g. ES first generation in-house wiring regulation of 1998). Yet until now the approaches among Member States have not converged. While in some Member States national legislation is further evolving, in others the adopted general legal basis is little used. The emulation of best practice is limited also. For example in the area of mapping, the DE project could be considered as successful or well advanced. However, Member States have not generally adopted a similar approach and the most common trend appears to be mapping for the purpose of avoiding damages (BE, NL, SE, DK). In general, there is limited consistency between national approaches or processes and the dynamic in the emulation of best practice is not satisfactory. Overall, despite a number of actions across the EU, initiatives remain too limited and scattered which does not allow to effectively overcome described entry barriers limiting broadband deployment.

Even with the continuous support from the Commission side, e.g. exchanges of best practice, it is highly improbable that such measures will spread throughout the EU at a sufficient pace and scale to ensure real efficiency gains in the network deployment process and to trigger investments in support of the Digital Agenda targets.

Moreover, the 2009 review of the regulatory framework for electronic communications which vested NRAs with new powers with a view to encourage co-location and sharing of networks elements has not ensured the development a coherent European approach addressing all steps in the investment process. Although the revised Regulatory Framework has only been implemented as of recent (transposition date of 25 May 2011) and, therefore, has not yet been fully tested. It is important to recall some of its limitations. First, regulating operators asymmetrically constrains the scope of such measures to operators with significant market power. Secondly, the possibility of intervention under Article 12 of the Framework Directive,

[37] Utility companies have to respect the principle 'charges cover cost', therefore if any form of exploitation of their physical infrastructure would result in a reduction of their costs, this reduction should be passed on to the consumers – users, which reduces their business interest in such measures

as enhanced in the review is restricted. NRAs may only impose certain obligations on electronic communications network providers concerning facilities sharing, coordination of public works, and request of information in view of setting up inventories and access to the terminating segment including in-house wiring. The scope of measures is limited by the specific criteria of Article 11 of the Framework Directive which limits the range of issues related to procedures for the granting of rights of way. The regulatory framework cannot apply to non-telecoms physical infrastructure. Third, dispute settlement under the framework does not cover other sectors such as utilities. Finally, when it comes to in-house equipment, NRAs can only impose obligations regarding the existing wiring and are not required to act on new buildings, thereby foregoing an important opportunity to achieve savings. Generally, despite being vested with tools, NRAs are not able to effectively and comprehensively address the identified problem areas and the framework leaves significant room for variation in the way provisions can be implemented. Moreover, the application of the existing tools is not mandated by the current regulatory framework, but only allowed/left to the discretion of Member States/NRAs. For these reasons the existing electronic communications framework will not be sufficient to address all identified bottlenecks and inefficiencies in the rollout process, and it will not prevent the emerging patchwork of measures in the EU.

Other EU initiatives could likely contribute to address some of the identified inefficiencies and bottlenecks. For instance Structural Funds may co-finance mapping projects. Similarly in the future mapping could be financed from the proposed Connecting European Facility. However, generally co-financing possibilities using EU funds may not apply to the same extent to all Member States, and concern specific projects having limited possibility to holistically tackle the inefficiencies and bottlenecks in all identified areas requiring intervention. In addition the Inspire Directive already activated a process of transparency in relation to part of the relevant physical infrastructure[38]. However, given the architecture of the Inspire Directive, the operators are not in a position to directly benefit from the available information to deploy broadband.

It appears from the analysis above that current European instruments do not sufficiently and adequately address the problem of the high costs and burden related to rolling out networks. This might be explained by the adoption of the review of the Telecoms Regulatory Framework at the time when the DAE targets of broadband penetration and take-up were less clearly and explicitly spelled out. The explicit steer given at the highest EU level in the year 2010 on the Digital Agenda for Europe put high on the agenda the importance of consistent measures enabling broadband deployment in line with the ambitious EU targets.

Yet, not all Member States have moved ahead adopting measures going beyond the current regulatory framework for electronic communications. Infrastructure sharing across sectors is, for example, only mandated in LT, PT, DE. In contrast, cross-sector infrastructure sharing measures are constrained in a number of MS, due to legislative or regulatory obstacles. The tools available and level of Member State activity are not uniform across the problem areas. The legal and regulatory framework in the EU and across the Member States is currently conducive to a significant variety when it comes to measures facilitating and reducing the cost of broadband rollout. Overall, current trends do not assure sufficient progress in meeting

[38] Utility and governmental services are included in Annex III of the Inspire Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007, establishing an infrastructure for spatial information in the European Community, OJ L.108/1, 25.4.2007

the DAE targets, neither the existing practices have managed to set high standards which could be put at risk by the considered measures.

2.7. Right of EU to act

2.7.1. Single Market perspective and subsidiarity

According to the 2010 report on the Single Market[39], telecommunications services and infrastructures in the EU are still highly fragmented along national borders. A more recent report on the cost of non-Europe[40] has shown that the untapped potential of the Single Market corresponds to a yearly amount of 0.9% GDP, or 110 billion euros. A significant fraction of this potential can be found at the level of network infrastructures: different regulatory approaches to network rollout increase the cost of access to national markets, prevent the exploitation of economies of scale at services and equipment level and hinder the development of innovative services which could emerge on very high-speed networks running in a seamless fashion across borders.

High-speed broadband infrastructure is the backbone of the Digital Single Market. As recalled in the Single Market Act II Communication[41], a 10% increase in broadband penetration can result in a 1-1.5% increase in the GDP annually and 1.5% labour productivity gains[42]. Member States cannot afford to leave citizens and businesses outside the footprint of such infrastructures and have subscribed to the broadband targets of the Digital Agenda for Europe. These goals will only be achieved if the infrastructure deployment costs are lowered and if Member States adapt their national policies to this effect across the EU. At the Spring 2012 European Council, Heads of State and Government have called themselves for action at EU level to provide better broadband coverage in order to complete the Digital Single Market, including specifically by 'reducing the cost of high speed broadband infrastructure'.

Modifying legal and practical arrangements across the various infrastructure deployment steps can lead to significant cost reductions. As indicated above, barriers can be lowered by e.g. allowing for more intensive usage of existing physical infrastructures, more cooperation on planned civil works, removing obstacles to high-speed-ready in-house equipment.

Some Member States noticed that opportunities and started adopting specific cost reduction measures both at national and local level. The implementation or decision powers in this regard often belong to local authorities. Yet, the fact that civil works are performed at the local level is not in itself undermining the case for EU action to reduce costs related to such works. In the past the EU undertook several initiatives aimed at problems with a local connotation which included both Directives (see individual energy consumption metering in the Energy Efficiency Directive 2012/27/EU) and Regulations e.g. enabling network developments (see gas network capacity sharing and transparency requirements in Regulation 715/2009/EC; unbundling of the local access telecom network in Regulation 2887/2000/EC on the unbundling of the local loop).

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39 A new Strategy for the Single Market, report by Mario Monti to the President of the European Commission, 9 May 2010

40 Steps towards a truly Internal Market for e-communications in the run-up to 2020, Ecorys, TU Delft and TNO, released on February 2012

41 COM (2012) 573

42 Booz and Company, Maximising the impact of Digitalisation, 2012

Under the subsidiarity principle, which main purpose is to bring decision-making within the Union as close to the citizen as possible, the Union is entitled to act if a problem cannot be adequately settled by the Member States acting on their own. On the other hand, if the action of the Union does not give prospects for more effective solution, the national authorities are expected to act individually. Therefore, it is crucial to verify whether the possible action by the Union would provide added value, compared to individual actions by Member States.

First, the extensive research has shown that the available measures are scarce and scattered[43]. In fact, several Member States have taken no measure in this field, nor they have concrete plans as regards such actions. When present across Member States, the measures differ greatly, sometimes even from region to region and from municipality to municipality. As such, the existing initiatives do not seem to be holistic, whereas it is essential to take action across the whole rollout process, across sectors, in order to achieve a coherent and significant impact ("*a 90% bridge is not a bridge*"). In the absence of common rules on transparency concerning existing infrastructures and planned civil works, without proper coordination mechanisms among the different local, regional and national levels, within and across public network industries, the costs of deployment are not stable and the economies of scale cannot be properly exploited. This means a significant untapped potential regarding measures to reduce the cost of broadband rollout and facilitate it.

The uneven playground impedes the development of the Single Market. According to a research work conducted by Copenhagen Economics, "the Digital economy can potentially provide a major boost to the EU productivity and growth" and they estimate that at least 4% additional GDP (EU 27) can be gained in the longer term (between 2010 and 2020) by stimulating further adoption of ICT and digital services through the creation of a digital single market. Moreover, with large parts of the EU not being connected to high-speed broadband infrastructure due to excessive costs of rollout, the Digital Single Market will remain incomplete. Citizens and consumers in those areas will not benefit from digital services and providers will not be able to distribute their content/applications affecting the wider eco-system.

In the view of the current dynamics of regulatory development it is very likely that this emerging patchwork of rules at national and sub-national levels will persist or accentuate and, as such, will increase the fragmentation of the Single Market. This fragmentation will impede the further development and growth of European companies - be them telecom companies, equipment manufacturers, or civil engineering companies - with consequences for European competitiveness[44]. Such fragmentation constitutes an obstacle for companies wanting to reach economies of scale at European level in the face of increasingly global competition.

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[43] See 2.6 and Annex III, which are based on repeated dedicated contacts with the Member States via the desk officers, on in-house questionnaires, on several studies out of which one specifically dedicated to this topic, done by Deloitte, and on the results of the public consultations.

[44] While deployment of broadband networks remains "a local affair", the telecommunications business is a global one. In fact, 78% of the European mobile subscriptions belong to four operators (Vodafone, Telefonica, T-Mobile/DT, and Orange/FT). These are also the companies that "matter" globally: they are quoted among largest telecom players worldwide, both in terms of revenues and of brand value. It is therefore essential for a company to benefit of scale so that it can deliver and compete in this environment.

For instance, significant local presence and resources need to be spent on acquiring information on rights of way in each community, as well as on all other relevant permits, on acquiring information on available infrastructures suitable for broadband rollout (if any), on negotiating access and/or co-deployment and on subsequently designing detailed rollout projects. In fact, the diversity of rules in these areas is so great that it makes little sense to plan network rollout at European level. Rather, investment plans need to be adapted to local rules and works have to be subcontracted separately, in function of the solution chosen for each small area. Indeed, the great majority of respondents in the public consultation expressed that administrative permits necessary to rollout networks represent a significant source of uncertainty and a time and resource consuming process. The fact that local presence needs to be ensured in every municipality throughout very long periods (starting before rollout plans are defined through the completion of the projects) puts resource constraints on companies willing to roll across regions and countries. The lack of transparency on rights of way also prevents proper planning across borders. Pan-European providers have in particular expressed frustrations and inability to compete globally due to the variety of rules in acquiring access to existing infrastructure and making co-deployment arrangements.

Moreover, it appears that the Regulatory framework as revised in 2009 will not be sufficient for achieving significant cost reductions throughout the entire EU in the short and medium term (see Section 2.6). Even with continuous support from the Commission side, it is highly improbable that such measures will spread through the entire Union at a sufficient pace and scale to ensure real cost sensitivities in the network deployment process and to trigger more investments in support of reaching the Digital Agenda targets by 2020.

Therefore, it can be argued that the current patchwork of rules creates barriers to invest cross-border, thereby amounting to obstructions to the freedom to provide electronic communications services and networks, as guaranteed under the existing EU legislation and thus have a direct effect on the functioning of the internal market[45].

In contrast, measures at EU level would allow more efficient planning and investment processes (and thus economies of scale) for telecom players. Moreover, such economies of scale and associated savings would go beyond the telecom sector and would spread to other industries as well (e.g. equipment manufacturers could have an EU market for technical solutions enabling cross-utility cooperation; civil engineering works companies could benefits from cross-border works).

Measures at EU level would also ensure equal treatment and non-discrimination of undertakings as well as of investors, in line with "those objectives and tasks closely linked to the subject-matter"[46] of several instruments already provided for in the EU law, in particular concerning the electronic communications sector[47] but also concerning other sectors (e.g. utility companies seeking to make profit from their physical infrastructure, synergies in setting up smart grids).

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45 See also Cases C-434/02 *Arnold André* [2004] ECR I-0000, paragraph 30, and Case C-210/03 *Swedish Match* [2004] ECR I-0000, paragraph 29; see also, to that effect, *Germany* v *Parliament and Council*, paragraph 95, and Case C-491/01 *British American Tobacco (Investments) and Imperial Tobacco* [2002] ECR I-11453, paragraph 60.

46 See Case C-217/04 paragraph 47.

47 See for example Recital 8 of the Better Regulation Directive 2009/140/EC, Recital 22 of the Framework Directive, Recital 1 and 4 of Regulation 2887/2000/EC.

In addition, specific subsidiarity safeguards are possible. For example, the decision about the most competent bodies to be appointed to perform tasks related to permit granting, transparency functions, civil works coordination and dispute resolution could be left to Member States. With regard to permit granting, the procedural autonomy of the Member States to allocate competences internally will have to be observed. It is also possible to provide exemptions for categories of buildings subject to considered obligations related to high-speed broadband ready in-house equipment.

In this light EU action concerning costs reduction measures seems to provide added value comparing to scare and scattered national practices and as such to be in the interest of the EU citizens, while respecting the subsidiarity principle.

2.7.2. Proportionality

In order to comply with the proportionality principle, action should be limited to what is necessary to achieve the objectives identified. As a result, **cost reduction measures, in particular those related to national administrations and procedures, should however strictly focus on increasing coordination and transparency, and on harmonising (minimal) conditions enabling the relevant stakeholders to exploit synergies and reduce inefficiencies in the rollout, rather than on shifting competences** from local level to national or European level. Also, while the measures proposed would aim at reducing barriers to access to physical infrastructures, they should not impair ownership rights and should preserve commercial negotiation, as much as possible.

For this reason **the initiative should aim at removing barriers and at providing the relevant stakeholders with the minimum tools needed to fully exploit the potential synergies,** without imposing specific business models and leaving open the possibility to adopt more detailed provisions. Therefore the initiative will only marginally affect on-going initiatives in Member States.

In contrast, it will allow Member States to build on their current measures and select the organisation which better suits their particularities, without necessarily imposing further costs. Furthermore, the initiative will build on and, respectively, complement existing obligations at EU level, in particular the INSPIRE Directive and the State Aid Guidelines. The synergies between these measures can bring costs down and positively impact the proportionality of the initiative.

The proportionality and subsidiarity of each of the proposed policy options will be further tested separately, in Chapter 6, in view of its particular objective.

2.7.3. Legal basis

Under these circumstances and in view of the objective of improving the conditions for the establishment and functioning of the internal market, the European Union has a legal basis to act pursuant to Article 114(1) of the TFEU[48]. Accordingly, as confirmed by the case law, this Article confers on the EU legislature discretion, depending on the general context and the specific circumstances of the matter to be harmonised, as regards the harmonisation

[48] See case C-66/04 paragraph 44 and case C-217/04 paragraph 42.

technique most appropriate for achieving the desired result, in particular in fields which are characterised by complex technical features[49].

3. OBJECTIVES

3.1. Specific and general objectives

The **specific objective** of this initiative is to remove the bottlenecks and reduce the inefficiencies described in Section 2.2, thereby reducing the costs of rolling out high speed broadband infrastructure. At the same time, acting in this area at EU level will also tackle the emerging patchwork of practices, which would otherwise create further barriers in the Digital Single Market and hinder the achievement of sufficient scale for exploiting the full cost reduction potential.

To quantify this objective, a figure of 25% savings on CAPEX investment is proposed. This is based on a relatively conservative estimate provided by Analysys Mason for "a typical Member State", in the context of integrated cost reduction solutions. In comparison, as it results from the public consultations, the measures implemented under the baseline scenario are widely considered as insufficient. Yet, there is no comprehensive and reliable data to that effect, as national authorities do not perform relevant analysis. Building on the high costs of broadband rollout which are reported to deter from investments, **this initiative aims at proposing a coherent and systematic set of measures in order to reduce the costs of rolling out high-speed broadband networks by 25%.**

This specific objective must be seen within the **general objective of stimulating broadband investment and rollout** throughout the EU, in line with the Digital Agenda targets. No indicator for the general objective of stimulating broadband rollout is proposed, as its achievement would depend on a significant number of measures and factors outside the scope of this initiative. Nevertheless, any proposal should be equally checked against the general objective of stimulating broadband investment, too. As Figure 9 recalls and as argued in Sections 2.1 and 5.2, broadband investment is a pre-condition for a deepened Single Market and a reduced digital divide in Europe and has significant impacts on growth and jobs and on EU's competitiveness.

As explained in Section 2.2, while not all cost drivers can be tackled through an EU initiative, there are four main problem areas which are clear underlying factors: inefficiencies related to the use of existing physical infrastructure, bottlenecks related to co-deployment, bottlenecks regarding permit granting, and, finally inefficiencies concerning in-building deployment.

As mentioned in Chapter 2, each of these problem areas is related to a step in the rollout process (see figure 3). In order to achieve significant results**, it is therefore essential** that these areas are tackled simultaneously, **that the corresponding operational objectives are pursued altogether,** although they are distinct. The **operational objectives** of the initiative are described below.

[49] See Case C-66/04 paragraph 45 and Case C-217/04 paragraph 43.

3.2. Operational objectives

3.2.1. Increasing the use of existing physical infrastructure suitable for broadband rollout

Several bottlenecks and inefficiencies have been identified regarding the current regime of access to physical infrastructure suitable for broadband rollout: (1) limited transparency as concerns existing physical infrastructure suitable for broadband rollout, (2) inconsistently applied regulation or lack of appropriate legal basis / institutional framework, (3) commercial issues (lack of business interest) or anti-competitive behaviour, and (4) technical unfeasibility.

A first operational objective of this initiative is then to **facilitate and increase the use of existing physical infrastructure suitable for broadband rollout.** In order for this objective to be achieved, all the identified bottlenecks which can be tackled through an EU initiative should be covered, thus with the exception of the technical limitations. Therefore this objective can be further separated into two sub-objectives: **achieving more transparency** concerning the available infrastructure suitable for broadband rollout and achieving a more **consistent and effective regulatory regime** concerning access to this infrastructure **regardless of its owner and purpose**.

In order to reach the intended overall savings aimed at, 25% of the deployment is assumed to take place in pre-existing ducts. Therefore, measures in this area would aim at a situation where, throughout the EU, **at least 25% of the deployment takes place in pre-existing infrastructure.**

3.2.2. Increasing cooperation in civil engineering projects throughout the EU

The main barriers to cooperation in civil engineering works identified have to do with (1) the lack of transparency concerning planned works, (2) the long and non-matching time horizons, (3) commercial considerations (scepticism to reveal commercial plans or lack of business interest), (4) the lack of legal certainty, especially as regards cross sector cooperation, and finally (5) technical incompatibilities.

It follows that the second operational objective of this initiative is therefore to **increase cooperation in civil engineering projects** through the EU, in particular by ensuring transparency, while providing a reasonable time to react, and by providing increased legal certainty for cross-industry / cross-utility cooperation.

In order to reach the overall savings targeted, measures in this area would aim at a situation where, throughout the EU, **at least 10% of the high-speeds networks are set up in co-deployment.**

In addition, special attention should be given to ensuring that public works are used as much as possible, taking into consideration the subsidiarity and proportionality principles and state aid rules.

3.2.3. Streamlining administrative procedures related to network rollout throughout the EU

The most common problems quoted in relation to permit granting are (1) the high number of different, uncoordinated rules and procedures, (2) the lack of transparency on these rules and procedures, (3) the long delays and, in some cases, (4) the unreasonable conditions, including fees, attached to rights of way and other permits needed to deploy physical infrastructure.

It then follows that the third operational objective is **to streamline the administrative procedures related to network rollout throughout the EU**, mainly by increasing the transparency and coordination of the permit granting processes, while ensuring the enforcement of deadlines as well as minimum standards as regards "reasonable conditions".

Since this objective is of a rather qualitative nature, no quantitative indicator is proposed for achieving it. Progress in this area will be ensured through analysing qualitative indicators such as fair and timely decisions on applications, transparent and reasonable conditions to permits.

3.2.4. Increasing the provision of buildings with open high-speed broadband-ready infrastructure throughout the EU

Deploying high-speed broadband infrastructure inside buildings has been identified as being a bottleneck in the rollout process mainly due to (1) the high costs of equipping existing buildings (2) cumbersome procedures related to working inside buildings and deploying the terminating segment on common grounds (mainly delays and difficulties to obtain owners' consent), (3) inconsistent application or lack of regulation tackling the inefficiencies associated with duplicating in-building infrastructure, and (4) lack of standardisation in this area.

The fourth and final operational objective of this initiative is therefore to **increase the provision of buildings with open high-speed broadband-ready infrastructure** throughout the EU **and ensure access to the terminating segment,** so as to reduce the costs and burdens associated with connecting customers.

In order to reach the intended overall savings, 5% of the deployment is assumed to reach high-speed broadband ready multi-unit dwellings. Therefore, measures in this area would aim at a situation where, throughout the EU, **at least 5% of the newly deployed networks reach multi-unit dwellings which are high-speed broadband ready.**

The figure below summarises the relationships between the context, the defined problem and underlying factors, on the one hand, and the general, specific and operational objectives, on the other hand.

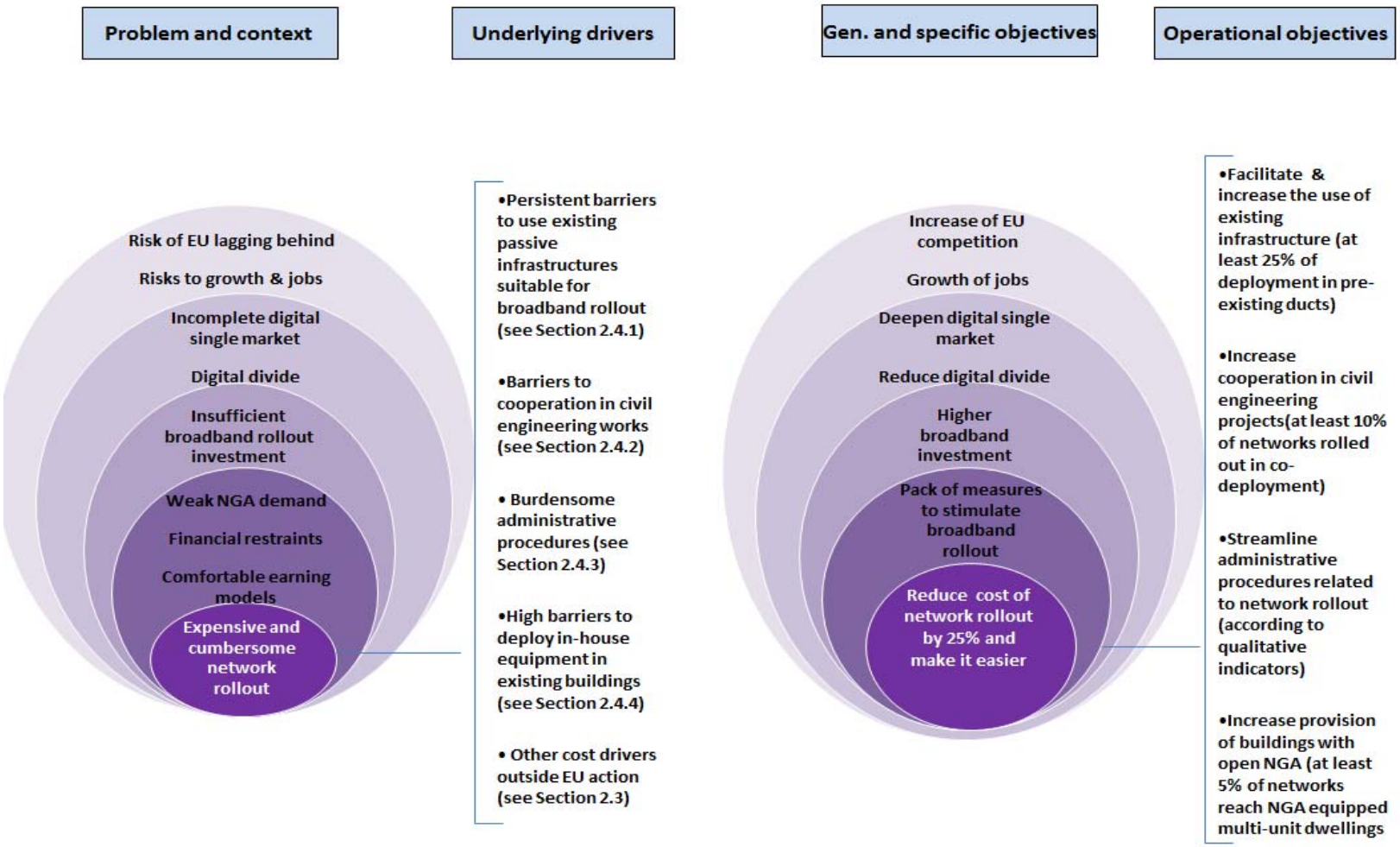

Figure 9 - Problem Definition and Objectives

4. POLICY OPTIONS

This chapter presents the policy options proposed to address the objectives of (1) increasing the use of existing physical infrastructure suitable for broadband rollout, (2) increasing cooperation in civil engineering works, (3) streamlining the permit granting procedures needed for broadband rollout and (4) increasing the existence of and facilitating access to high-speed broadband-ready buildings . All these operational objectives should contribute to the specific objective of facilitating the broadband rollout and reducing the costs of this process, in the context of the efforts undertaken by the Commission to stimulate it. Therefore, all the proposed policy options will be tested against these wider objectives.

Four broad policy options are presented, comprising measures in each of the four areas of action identified in Section 2.3, dealing with underlying causes. As underlined above, it is essential that all **policy options cover each of the problem areas** so that each policy option offers comprehensive solutions covering the entire process of network rollout (see Figure 3 from Section 2.3).

When defining the contents of each policy option, different solutions for tackling each of the identified problems were considered. The selection of solutions took place as follows.

First, **a wide range of solutions was collected during the consultation process**, mainly based on best practices encountered in Member States and in third countries, as well as on proposals made by stakeholders during the public consultation.

Second, these **solutions were then pre-screened against their potential to reduce the costs of broadband rollout in the first place, as well as considering the subsidiarity and proportionality principle and** other EU policy objectives such as competition and technological neutrality[50]. Remaining solutions were **tested for effectiveness *vis-à-vis* the operational, specific, and general objectives of the initiative, as well as the main impacts[51]**.

Annex V presents a non-exhaustive list of the most important policy options which were discarded, *prima facie,* on the basis of the above-mentioned criteria[52].

Finally, these pre-selected solutions were combined in **packages** so as to **address the totality of problem areas in a coherent and mutually reinforcing way from the conception phase until final realisation**. The logic of linking the envisaged solutions the way they are presented below has to do with their **scale and scope**. The scale and scope of the proposed measures increase with every policy option. Passing from Option 2 to Option 3 represents for example a major increase in both scale and scope, since Option 3 would affect a larger number of stakeholders, i.e. not only telecom operators but also other utilities, and would

[50] E.g. imposing technical solutions such as micro-trenching were discarded at this stage already because of the need to ensure technological neutrality.

[51] E.g. delaying deployment permits for companies that were offered the chance to co-deploy / to use existing infrastructure but refused was discarded at that stage as being potentially counter-competitive and against the general objective of the initiative.

[52] E.g. restrictions to public works in order to "force" co-deployment or mandating specific business models such as infrastructure clearing houses

grant rights and obligations to actors deploying broadband and other owners of infrastructure. Similarly, Option 4 is expected to affect yet more stakeholders; for instance all houses would have to be equipped with high-speed ready infrastructure; also the scale of intervention is wider (e.g. coordination of civil engineering works is in some cases made mandatory depending on the option, while there is a significant difference in the degree of harmonisation within the different options).

The public consultation generally confirmed the demand for solutions exploiting savings potential. While stakeholders did not agree in the assessment of possible measures, status quo solutions were rarely considered. Some of the stakeholders supported 'soft law' solutions, which could be adopted either under option 1 or 2, but rather as an addition to more ambitious solutions. Some of the considered solutions raised questions or indeed concerns from some stakeholders, but this did not lead to rejecting the need of measures. The critical voices have been included in the description of specific options, where relevant, to demonstrate how they were addressed.

In a nutshell, the policy option packages can be described as follows:

Option 1	***Business as usual***	**Monitoring and exchange of best practices, including guidance:** this option is in fact building on the baseline scenario.
Option 2	***Promote efficiency gains within the telecom sector***	**Promoting savings / cost reduction within the telecom sector:** this option promotes a more intensive, coherent and harmonised application of the existing provisions and tools of the telecoms regulatory framework.
Option 3 (3a +3b)	***Enable efficiency gains across sectors***	**Unlocking the potential of cross-sector cooperation to achieve higher savings and efficiency gains:** this option would propose more holistic and more ambitious cost reduction measures throughout the EU, applicable to non-telecom players too. Two further sub-options are presented, differentiated in function of the instruments to be adopted (sub-options 3a and 3b).
Option 4	***Mandate efficiency gains across the EU***	**Mandating cost reduction measures throughout the EU and across sectors:** this option groups the most ambitious cost reduction solutions proposed in terms of both scale and scope, while striving at the same time for the highest degree of uniformity throughout the EU.

4.1. Option 1 – "Business as usual"

Monitoring and exchange of best practices, including guidance

Figure 9 illustrates the relation between the proposed actions and the operational objectives.

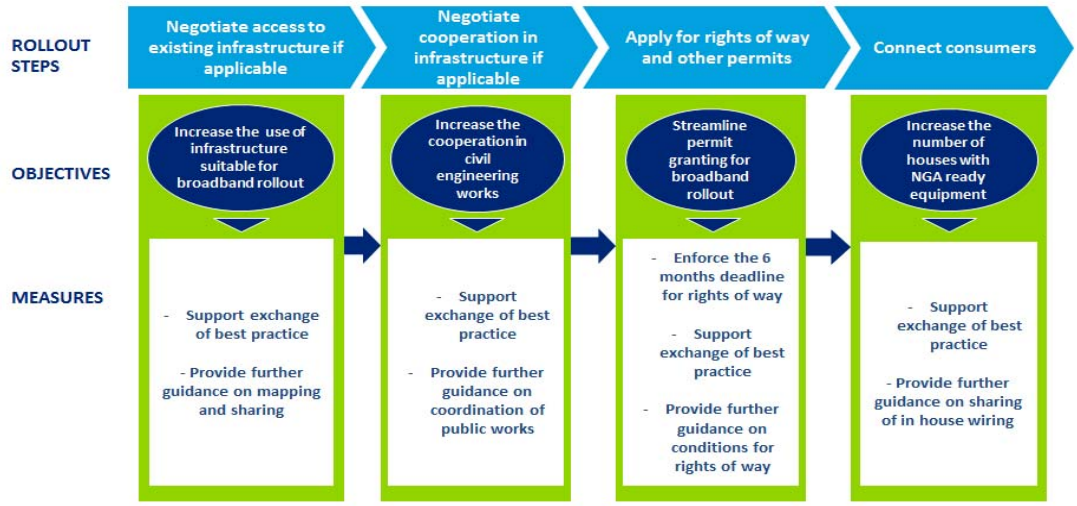

Figure 10 - Option 1: Business as usual

Under this option, the Commission would **proceed doing business as usual and monitor measures taken at national level**, since such measures are not entirely new and best practices are already emerging.

Specific actions envisaged would include supporting exchange of best practices and providing further guidance based on the existing provisions of the regulatory framework for electronic communications and emerging best practices in the analysis of the baseline scenario (Section 2.6).

To address persistent barriers to use existing physical infrastructures suitable for broadband rollout, barriers to cooperation in civil engineering works and high barriers to deploy in-house equipment in existing buildings, guidance documents would focus on practicalities of potential infrastructure inventories, of facility sharing, sharing of in-house wiring, and on best practices in the coordination of civil engineering works (based on Art. 12 of the Framework Directive). Furthermore, to partially address burdensome administrative procedures, guidance could cover practicalities concerning transparency and monitoring of the 6 months deadline for rights of way (based on Art 11 of the Framework Directive). In addition, the guidelines could also take into account best practices already existing in Member States. The Commission would also continue to support exchange of best practices in various fora (e.g. The Digital Agenda Assembly, the High Level Group on Electronic Communications, etc.).

Under this Option, Member States would retain full discretion as to whether or not to use any of the powers given by the regulatory framework (which however are limited to the electronic communications sector, e.g. they do not enable NRAs to take measures imposing sharing of infrastructure and coordination of civil works across utilities and other infrastructure owners). They would moreover remain free to decide whether they want to follow any of the Commission guidelines. Finally, only compliance with the time limit of 6 months for granting rights of way could be tackled through enforcement action, including infringement proceedings. Further guidance on infrastructure sharing could be given on a case by case

basis through the so called "Art. 7 procedure"[53] where the Commission and BEREC are assessing remedies (as for example on SMP obligations ensuring access to ducts of the incumbents or possibly on symmetric sharing obligations) proposed by the NRAs following market analysis and are ensuring their consistent application in conformity with the regulatory framework.

The role of the Commission would complement processes that are already taking place, as indicated in Section 2.6 above. More details on the existing practices can be found in Annex III. In particular, point 1 of Annex III presents a general overview of existing measures differentiating between existing practices that could be considered best in class (marked in blue) and all other existing or planned measures (marked in yellow). The best practices have been identified on the basis of the feedback from the public consultation, and from the results of the studies, in particular the study of Analysys Mason. The identified best practices should be considered as relative, i.e. in comparison to other existing measures; against this background best practices seem to be the most efficient, where the objectives, as identified in Section 3, are best ensured. As the data on all related costs of implementation of these measures are not complete, the costs factor has not been decisive in identifying the best practices.

4.2. Option 2 – Promote efficiency gains within the electronic communications sector

Promoting savings / cost reduction within the electronic communications sector

Under this Option, the Commission promotes a more intensive, coherent and harmonised application of the existing provisions and tools of the regulatory framework for electronic communications with a view to reduce the costs of broadband rollout and facilitate its deployment.

[53] Based on Art.7, 7a and 7b of the Framework Directive

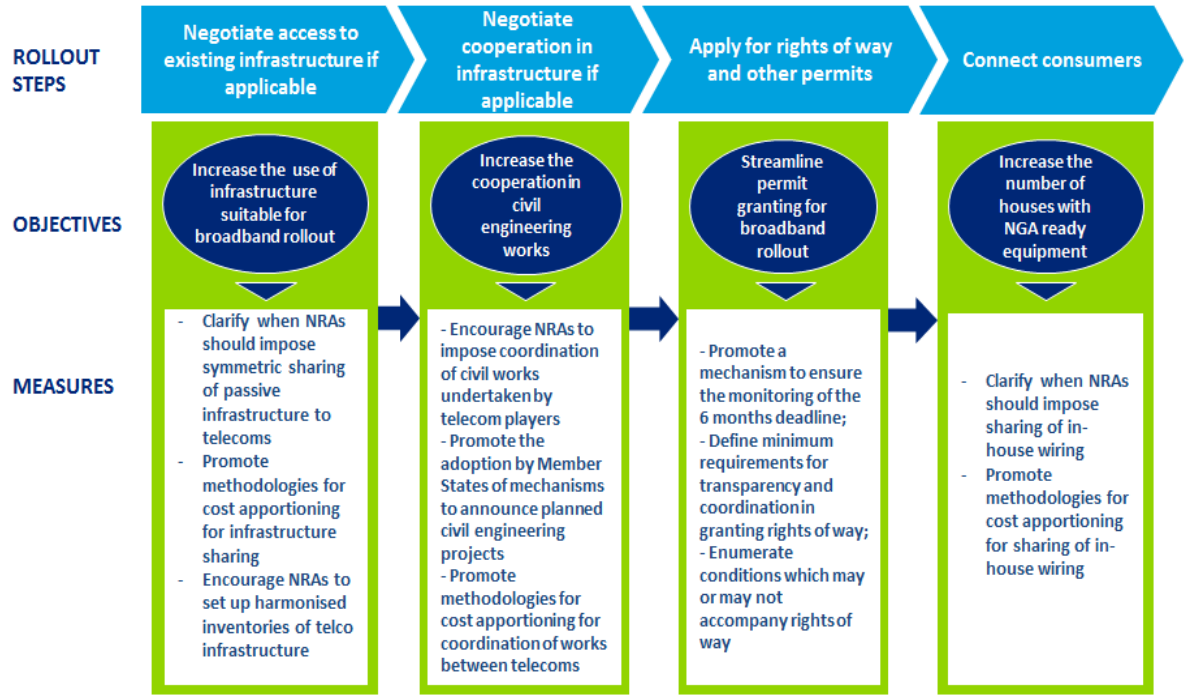

Figure 11 - Option 2: Promoting measures to reduce the costs of broadband rollout

In order to increase **sharing of existing infrastructure and coordination of civil works, and based on the powers granted by Art. 12 Framework Directive to NRAs,** the Commission would:

- Identify cases where NRAs should impose symmetric sharing of physical infrastructure of electronic communications providers (e.g. opening of ducts belonging to all providers of electronic communication networks regardless of their market position for access by competitors), within the limits of the specific public interest objectives listed in the Directive.
- Encourage NRAs to set up inventories of electronic communications physical infrastructure and to harmonise specific features of those inventories, where implemented; Member States or NRAs could be guided to seek convergence and render interoperable these inventories with metadata created following the Inspire Directive, in order to facilitate use of physical infrastructure.
- Encourage NRAs to impose coordination of civil works undertaken by electronic communications players, within the limits of the specific public interest objectives listed in the Directive.
- Promote the adoption by Member States of mandatory mechanisms concerning the early announcement of planned civil engineering projects for undertakings providing electronic communications networks (including the timeframe and possibilities for negotiations);
- Promote methodologies for cost apportioning for physical infrastructure sharing (including for deployment, maintenance and damages cost) and coordination of works between electronic communications undertakings, as this issue emerged as a critical success facture, as well as a major potential pitfall during the public consultation (see

French example on defining detailed rules on apportioning of costs and standard contracts for co-deployment and sharing agreements).

In order to streamline permit granting for broadband rollout**, and based on provisions of Art. 11 Framework Directive,** the Commission would:

- Promote a mechanism to ensure the monitoring of the 6 months deadline, by *inter alia* benchmarking between Member States and between Municipalities or regions within Member States;
- Define minimum requirements for transparency and coordination in granting rights of way;
- Promote the electronic submission of requests for rights of way as well as the electronic publication of the decisions for benchmarking purposes;
- Enumerate conditions which may, or may not accompany rights of way, with a view to ensuring a non-discriminatory regime and recommend Member States to publish permits in order to ensure transparency and non-discrimination.

In order to increase **the number of houses with high-speed ready equipment, and based on the powers granted by Art. 12 to NRAs,** the Commission would:

- Clarify cases and conditions under which in-house infrastructure should be shared.
- Actively promote equipment of buildings with high-speed ready physical infrastructure.
- Incentivise Member States to include in-house equipment in their broadband plans.

Please refer to Figure 9 for the relation between these actions and the operational objectives.

In order to ensure strong, coherent and mutually reinforcing results, a **single instrument** is proposed under this option. Building on the idea that all the problem areas need to be tackled to maximise effectiveness, the Commission would issue a **Recommendation on cost reduction measures, under Article 19**[54] **of the Framework Directive**, setting up implementation details concerning Articles 11 and 12 of the Framework Directive.

A Recommendation under Article 19 of the Framework Directive has the benefit that the National Regulatory Authorities have the underlying powers to implement it, conferred by the current regulatory framework. The major disadvantage of this instrument is that the powers are limited in several ways (to rights of way *sensu stricto*, to sharing of in-house infrastructure only, etc.). Alternatively, a Commission Recommendation pursuant to Articles 288 and 292 of the TFEU could provide guidance concerning new building project and other elements not included in the scope of the regulatory framework, e.g. permits other than rights

[54] According to Article 19(1) of the Framework Directive, the Commission is empowered to issue a recommendation following an advisory procedure in the context of the Communications Committee when it finds that divergences in the implementation of the regulatory task specified in the Directives may create a barrier to the internal market. Article 19(3)a of the Framework Directive also envisages the possibility to adopt decisions where inconsistent application of Article 15 and 16 creates a barrier to the internal market. Unlike the measure proposed in this policy option, however, this decision could only deal with asymmetric measures imposed on SMP operators.

of way, and could extend the scope of this initiative to the physical infrastructure of non-telecom operators. Yet the effectiveness of such an instrument could be put into question, given that the NRAs do not have the necessary legal powers to implement it.

Adopting a Recommendation under Article 19 is beyond doubt a more ambitious option than continuing with business as usual, although it is limited to electronic communications providers and current regulatory tools. It would indeed promote a more intensive and coherent application of those existing tools/provisions throughout the EU. Nevertheless, once a Recommendation is adopted, the Member State might still deviate from it, albeit by providing a reasoned justification.

4.3. Option 3 – Enable efficiency gains across sectors

Unlocking the potential of cross-sector cooperation to achieve higher savings and efficiency gains

Under this option, the Commission would **propose measures to unlock the potential of cooperation across sectors on physical infrastructures and to ensure the spreading of more ambitious cost reduction solutions across the EU.**

Concretely, the following measures would be proposed:

- **'Addressing persistent barriers to use existing physical infrastructures suitable for broadband rollout'**

A general right to offer and to use the existing physical infrastructures suitable for the deployment of broadband under fair terms and conditions, regardless of whether they are owned or used by electronic communications network providers; This general right to use would be different from the existing obligations imposed under the regulatory framework, that will continue to apply where appropriate[55]. This option would have broader scope by imposing an obligation on non-SMP operators and on other utilities, while favouring commercial negotiation, in order to accommodate the concerns expressed in the public consultation. Such a right would remove regulatory barriers preventing any utility from negotiating the commercial exploitation of their infrastructure by sharing it with electronic communications network providers. Under this option, access should be granted under fair terms and conditions subject to justified reasons for refusal based on the unsuitability of the infrastructure, security and availability reasons, or the availability of alternative physical access solutions by the infrastructure owner, where commercial negotiation fails. A **dispute settlement mechanism** would be also envisaged, in order to provide for the possibility to review any refusal. The setting of cost oriented prices is not envisaged, but can be imposed e.g. by SMP regulation on incumbent telecom operators. By default, the existing dispute settlement body in the telecom sector could play this role. Solutions relying on similar premises exist already in Lithuania and Portugal. Germany is developing relevant legislation.

A right to access transparent information regarding existing physical infrastructures suitable for broadband rollout, regardless of their owner (e.g. telecom or non-telecom operators, private or public undertakings); Information would be provided on a "need to

[55] Including duct sharing, as envisaged by the NGA Recommendation, *cit.*, points 13-17.

know" basis, in order to respond to security concerns, as raised by some stakeholders in public consultations. Ideally, this would translate into a right of electronic communications network providers to access information **on available physical infrastructure through a single information point.** Information would regard ownership, geographical references of the physical infrastructures as well as their main characteristics. In addition, an obligation for public sector bodies holding such information to make it available to the single information point within a certain period of time will ensure the availability of the information. This obligation would be coupled with an obligation of network providers to provide such information on request from the single information point, as well as with a right of EC network providers to have access to on-site visits for more detailed surveys under reasonable terms and conditions would be granted on request. As a safety net, in case information is not available at the single information point, a direct right would be recognised to electronic communications providers to access information of any network operator, under proportionate, non-discriminatory and transparent terms. Resolution of disputes regarding in-site surveys or access to information would be entrusted to a dispute settlement body, by default, the NRA. Organisational modalities of the access to this infrastructure would be left to Member States taking into account concerns of some stakeholders in the public consultations. In particular, Member States could build on existing initiatives, if any. This measure builds on the experiences of Germany and other Member States that have already addressed these issues to some extent (BE, CZ, DK, FI, FR, IT, LU, NL, PL, PT, RO, SI, SE, UK).

The details of the **approaches proposed to mapping are further described in Sub-options 3a and 3b**.

- **'Addressing barriers to coordination of civil works'**

Specific rights and obligations aiming at enabling an increased coordination of civil engineering works, regardless of whether the party undertaking works is an electronic communications network provider, a local authority or any other utility; More concretely, such measure would **entail a right to negotiate co-ordination of civil engineering works coupled with a right to access information on planned investments implying civil works**. In order to promote a forward looking planning of civil engineering works, the possibility of notifying multiannual or annual infrastructure deployment would be given to the network providers. Organisational elements would be left to Member States, so to allow for the most efficient use of existing structures with a view to keeping the costs low and avoiding administrative complexity, as expressed in the public consultation. For example, in some Member States the coordination of civil works is linked with the inventory of physical infrastructure (FR, PT). In practice, when a company would intend to deploy in a certain area, it would enquire whether other parties might have similar plans, which could lead to a mutually advantageous situation and potential savings. Such a system would respond to concerns related to sharing strategically sensitive information, and thus minimise cases where companies are "free riding". The other solution to avoid "free riding" is to make sure that an access seeker who wants to use infrastructure resulting from civil works to which he could have contributed (but refused to), is granted access at a price which reflects the delay in investment and the reduced risk.

With **specific regard to civil works financed with public means**, additional measures facilitating co-deployment would be provided. In particular, the transparency obligation

would be coupled with an obligation imposed on undertakings deploying infrastructure financed by public means to **accept, on a transparent and non-discriminatory basis, timely co-deployment requests from any potential undertaking** that intends to deploy physical infrastructure suitable for high-speed electronic communications networks, provided that this does not entail additional costs for the public operator, and without prejudice to state aid rules[56]. **Dispute settlement** would be triggered in case of failure of negotiations only in the case of works financed with public funds.

- **'Addressing burdensome administrative procedures'**

Increased transparency and timeliness as regards permit granting procedures, coupled with safeguards aimed to ensure non-discriminatory, transparent, objectively justified, and proportionate requirements and/or conditions; Ideally, each Member State would appoint an authority, which would act as a point of contact between the competent (decision-making) authorities and providers and would facilitate coordination among the authorities concerned in the permit granting process. In practice, this "single information point" could provide any information concerning the conditions and procedures applicable to the deployment of civil engineering works, including applicable exemptions, centralise requests for permits and dispatch them to the competent authorities. The information point would provide tools to monitor the permit granting procedures and the applicable deadlines. Legally, electronic communications network providers would be recognised a direct right to a timely permit granting decision, while any condition attached to it should be based on objective, transparent, non-discriminatory and proportionate criteria. In particular, conditions and fees imposed should be linked to the impact of civil engineering works to be authorised, their application should be adequately reasoned and the criteria for the determination of conditions and fees of permits should be defined in advance, including any exemption of categories of works or infrastructures from the scope of specific permit procedures. Yet, the authority would not have the right to overrule decisions of other competent authorities. Greece has recently introduced legislation going in this direction.

As the solution proposed above could be implemented with **different degrees of ambition**, the concrete proposals to reach the objective of streamlining administrative procedures involved in permit granting are **further developed in Sub-options 3a and 3b.**

- **'Addressing high barriers to deploy in-house equipment in existing buildings' (2.4.4.)**

An obligation to provide **new buildings as well as old buildings that undergo major renovation works with high-speed-ready in-building physical infrastructure (e.g. sufficient space in mini ducts)**, while ensuring technological neutrality, and an obligation to provide new or majorly renovated multi-dwelling buildings with a concentration point located in or outside the building. This is based on the analysis that such works would entail marginal costs when a building is raised or majorly renovated, compared to retro fitting. This would allow an easy and cheap laying or upgrading of cabling later on, covering vertical

[56] From a state aid perspective, see Community Guidelines for the application of State aid rules in relation to rapid deployment of broadband networks ("Broadband Guidelines"), OJ C 235, 30.9.2009, p.7 (currently under review), as applied in e.g. state aid cases N 383/2009 – Germany – Amendment of the State aid broadband scheme N 150/2008 – Broadband in the rural areas of Saxony and SA.34732 – Italy - BULGAS – FIBERSAR –NGA Sardegna (not yet published).

wiring. Furthermore, a right for every electronic communications network operator to terminate its network to the concentration point would be foreseen. In order to reach the subscriber, a right for electronic communication operators to negotiate **access** to the in-building equipment, where it exists, and to the private premise, in the absence of any infrastructure, should also be foreseen.

The right for any public electronic communications networks provider to terminate its network to a private premise at its own costs would be subject to the agreement of the subscriber, provided that it minimises the impact on private property, for example, when possible, by reusing existing physical infrastructure available in the building or ensuring full restoration of the affected areas.

This Option would not mandate specific technology, as it would be hard to defend it from the point of view of technological neutrality and might also raise competition concerns, as expressed by many stakeholders in public consultations. In addition, it should be possible for Member States to exempt certain categories of buildings from such obligations, with a view to adapting costs of this measure to their geographic, demographic and town planning specificities. For proportionality reasons, this measure does not provide for financing arrangements, as it is the case in the UK guidelines which encourage for sharing costs between the housing and the telecom sector. The financing models can be different and the Member States should have a liberty to choose which of them should be promoted. This measure builds mostly on the experience of such Member States as ES, FR, PT.

While the lack of standards in this area is acknowledged to be a problematic issue, the establishment of standards is a medium to long term process and therefore should take place in parallel and complementary to this initiative, answering the suggestions of many stakeholders in public consultations.

Sub-options 3a and 3b

The nature of the measures envisaged under this Option, in particular the establishment of specific rights and corresponding obligations pleads for resorting to legally binding instruments, if only to create tools to act, legal certainty and predictability for the various parties involved.

In fact, these measures can be best enacted through a Regulation under Article 114 TFEU. Indeed, they aim at removing regulatory barriers that may prevent the creation of a market for physical infrastructures reaching beyond telecom actors and at enabling negotiations among the concerned stakeholders in view of exploiting the cost saving potential stemming from better coordination and cooperation. In this regard, the creation of directly applicable rights and obligations for all the undertakings concerned, as opposed to a Directive that requires Member States to create such rights appears to be better suited to pursue this objective. There are many evidences that providers need to be granted directly applicable rights, which they could invoke before the national courts, not only against Member States, but also against other individuals, such as owners of infrastructure. In addition, contrary to a Directive, which would imply granting additional time for transposition by Member States, and which would allow a significant degree of differentiation in the implementation of the measures, the regulation will rapidly install the basic conditions for network deployment throughout the EU. Thus, only a Regulation could ensure consistent and fast implementation of these cost reduction/facilitation measures across

Europe and would be the only choice suitable to reach in time the Europe 2020 targets[57]..At the same time, the provision to be included in the Regulation would maintain the necessary flexibility for Member States as to the organisational measures to be adopted in order to supplement the rights provided for in EU law, in line with the subsidiarity principle (see also below Chapter 6).

It is however acknowledged that the proposals related to the transparency **of existing physical infrastructure** and to **the single point of contact for permits** could be implemented through different instruments, **equally compliant with the proportionality and subsidiarity principles:**

(A) Either through a fully coherent binding measure, which would however **abstain from prescribing the implementation details of the above mentioned solutions**, so as to leave enough leeway to Member States to accommodate their national institutions and administrative procedures.

(B) Or through a Recommendation describing in detail the desired implementation details, but granting the option to Member States to deviate from those.

Therefore Option 3 is further broken down into **Option 3a**, tackling all the issues through a regulation, and **Option 3b**, combining a regulation with a complementing recommendation when it comes to transparency of existing infrastructure and streamlining administrative procedures related to permit granting.

In practice, when it comes to **transparency of existing physical infrastructures**, Option 3a would enshrine the objective of establishing single information points in a regulation, and would establish minimum requirements and standards for such an instrument. In practice, the regulation would establish all rights and corresponding obligations which are necessary in order to ensure the availability of information on existing physical infrastructure and the possibility for providers deploying broadband to access it. In this respect, the regulation would build on current exercises and pre-existing information in Member States, in order to minimize administrative burden. Option 3b would entail directly applicable rights to information on available infrastructure, reinforced by a right to on-site visits, granted through a regulation, plus a recommendation on establishing single information points. The recommendation would allow organising the publication of information on existing infrastructure, as well as access to it, by recommending Member States to set-up mapping data-bases. While the level of detail of information to be included in the database would be left to the Member States, certain requirements of the mapping exercise would build on the existing obligations and standards in order to ensure interoperability and to avoid duplication of other transparency systems as imposed by the INSPIRE Directive.

[57] The adoption of a Directive has been excluded on the basis of need to provide directly applicable rights and obligations to enable commercial negotiation concerning physical infrastructure suitable for broadband and some common basic rights in the permit granting procedure across Europe, without the need of additional transposing rules by Member States. The adoption of a Regulation would also be more in line with the need for a timely intervention in view of the Digital Agenda objectives. The adoption of a Decision of the European Parliament and of the Council has been excluded because it would impose directly applicable obligations on Member States, but it would not provide rights and obligation for the generality of operators concerned.

With respect to **streamlining administrative procedures**, Option 3a would entail the right of network operators to receive, through a single information point, transparent information on all administrative procedures involved in permit granting, plus a right to transparent, proportionate, non-discriminatory and reasonable conditions or requirements, both granted through a regulation. In addition, it would entail the obligation for Member States to appoint a single information point responsible for monitoring the permit granting process (by default, the NRA). Option 3b would encourage a recommendation on setting up such single access points and would go even further by recommending that Member States establish a single point receiving requests for permits electronically and dispatching them to the competent authorities. Member States would be invited to establish tacit approval of requests which are not handled within the legal deadlines and to exempt categories of civil engineering works. Such measures should be without prejudice to specific deadlines or procedural obligations laid down at national or EU level, applicable to the permit granting procedure.

As far as mandated access to physical infrastructure, coordination of civil works and in-house equipment are concerned, Options 3a and 3b are quasi-identical. This is because a non-binding instrument would not be effective in implementing the solutions proposed regarding rights and obligations on **mandated access to physical infrastructure, coordination of civil works and in-house equipment**. For these problem areas, binding measures are needed to implement the proposed solutions.

These combinations of instruments in sub-options are illustrated below:

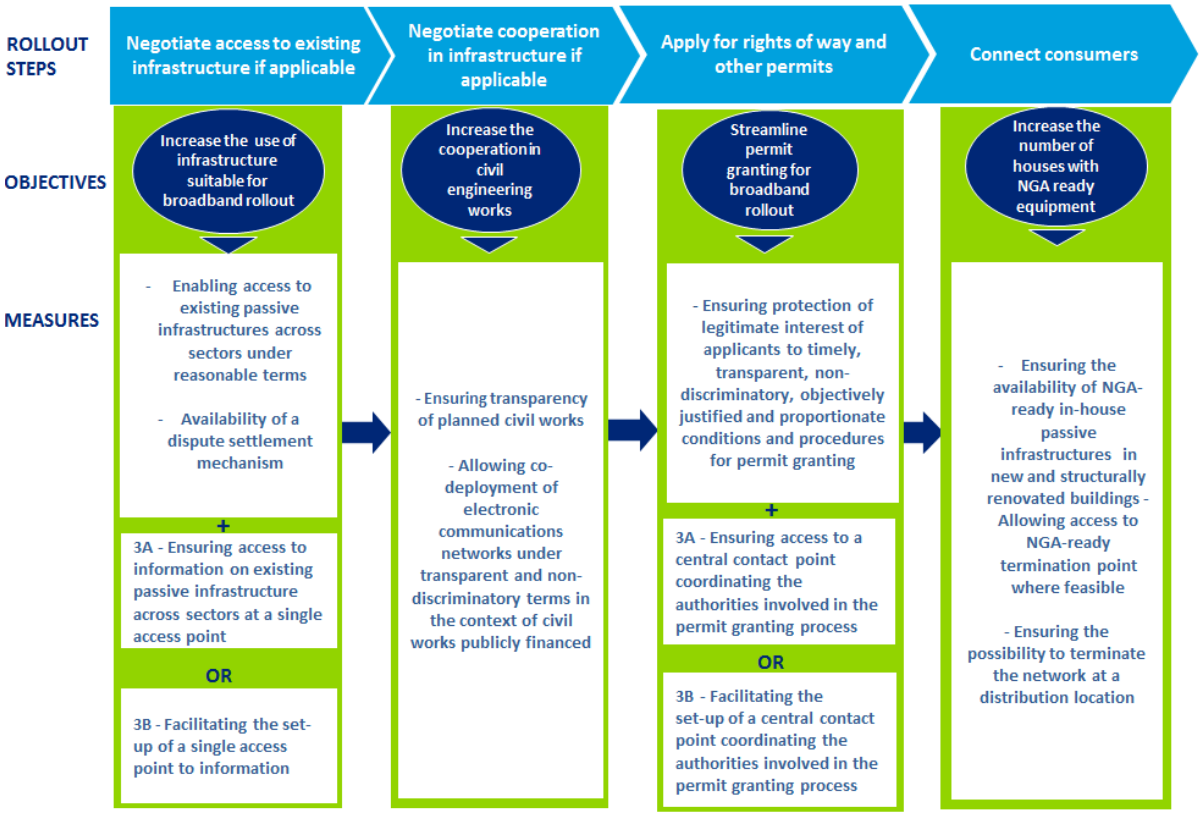

Figure 12 - Option 3: Enabling the utilisation of the existing regulatory framework to reduce the cost of broadband rollout

It should be noted that **a recommendation under Sub-option 3b as concerns transparency and the single information point would not be effective unless the basic underlying rights** are granted concerning access to information on existing infrastructures and non-discriminatory, transparent, and objective and proportionate permit granting procedures.

At the same time, Option 3a (regulation only) grants a large degree of flexibility to Member States as to the organisational and implementation modalities. Also, undertakings would keep a high degree of freedom: use of existing physical infrastructures being left to commercial negotiation, coordination of civil works becoming a real option but not an obligation, etc. Finally, some of these measures would be complementary to and could mutually reinforce some elements taken into account in the assessment of broadband State aid (such as mapping, transparency of planning projects, use and access to the physical infrastructure).

4.4. Option 4 – Mandate efficiency gains

Mandating cost reduction measures throughout the EU and across sectors

This option groups the most ambitious cost reduction solutions proposed in terms of both scale and scope, while striving at the same time for the highest degree of uniformity throughout the EU. Concretely, this option puts together solutions considered to have the highest impact on reducing the cost of network deployment and facilitating it.

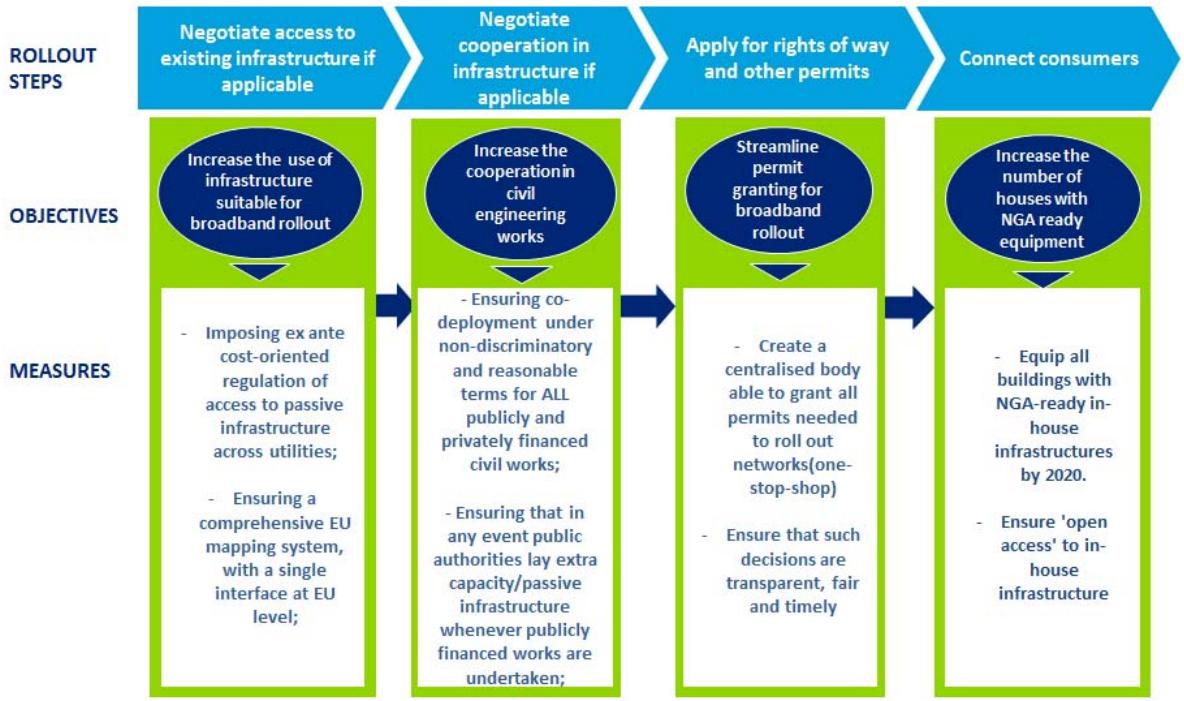

Figure 13 - Option 4: Mandating the full exploitation of the existing regulatory framework to reduce the cost of broadband rollout

More precisely, such measures could entail:

- **'Addressing persistent barriers to use existing physical infrastructures suitable for high-speed electronic communications networks'**

Granting a right to **use existing physical infrastructures suitable for the deployment of high-speed electronic communications networks at cost orientation;** National authorities would be mandated to define *ex ante* conditions to use all existing physical infrastructures, including telecom and non-telecom ones, in view of ensuring cost orientation. This measure would replace existing SMP obligations imposed on electronic communication providers and minimise any divergence in the implementation of the right to use existing physical infrastructures throughout the EU. This system would thus be fundamentally different than the one foreseen under Option 3, which is based on free negotiations with an option for ex post dispute settlement (that could decide on the reasonableness of the request but could not impose cost orientation), and which would not impact existing SMP obligations.

The set-up of **comprehensive inventory of physical infrastructures** in view of full transparency and in accordance with clearly defined standards, also with a view to its visibility to market operators across borders; The EU provisions would define the infrastructure included in the scope of the inventory as well as the information to be gathered by Member States, including templates for the submission of information in order to ensure consistency of processing. With a view to avoiding disproportionate obligations, the requirements of the mapping exercise would build on the existing obligations and standards (e.g. transparency systems as imposed by the INSPIRE Directive). In addition to this, a single point of contact would be ensured at EU level, with the possibility to gain access to these mapping systems through an EU body, such as for example BEREC.

- **'Addressing barriers to cooperation in civil engineering works'**

Stronger measures aiming at the coordination of civil works, including both transparency measures already envisaged under the previous option and additional access obligations concerning coordination. First, there would be a general legal obligation for all actors undertaking civil engineering works (both privately and publicly funded civil works) to negotiate and agree to requests for coordination, under reasonable conditions (such as cost and timing). Therefore, under this Option and unlike in option 3, the reasonableness of the request to coordinate could be assessed by the dispute-settlement body for both public and private actors. The dispute settlement body would be empowered to force operators to accept coordination by imposing the terms and conditions, including price. Finally, a general obligation to lay down empty ducts suitable for electronic communications networks would be envisaged in the event of works financed with public money, in view of future use in accordance with State Aid rules[58].

- **'Addressing burdensome administrative procedures'**

The creation of a **full one-stop-shop**, concentrating all the permits (including building permits) needed for the deployment of new infrastructure. In contrast to the solution envisaged under Option 3, the leading central authority would have decision making powers. This would also render conditions for granting permits more uniform and harmonised, as requested by various stakeholders during the consultation process. It would allow furthermore the adoption of standard request forms, standard documentation required, standard time

[58] From a state aid perspective, see e.g. State aid case N 383/2009 – Germany – Amendment of the State aid broadband scheme N 150/2008 – Broadband in the rural areas of Saxony.

scales, etc., all enabling savings and economies of scale for operators seeking to undertake large deployment exercises.

- **'Addressing high barriers to deploy in-house equipment in existing buildings'**

An obligation to gradually ensure the availability of highs-speed-ready in-house technologically neutral infrastructures in **all buildings**, regardless whether newly built or already existing, by 2020; Also 'open access' to in-house infrastructure would be mandated with regard to all types of buildings.

Such measures could only be imposed through binding measures and can be best enacted through a Regulation under Article 114 TFEU, for the same reasons explained in the context of the third policy option.

5. ANALYSIS OF THE IMPACTS OF THE POLICY OPTIONS

5.1. Methodology

This chapter presents an analysis of the economic, social and environmental impacts of the four policy options identified in Chapter 4, aimed at reducing the costs of broadband rollout and facilitating it. As regards possible impacts on fundamental rights, as guaranteed by the Charter of Fundamental Rights, the proposed measures could interfere to some extent with the right to property, right to privacy and the protection of business secrets, right to conduct a business. The scope of these interferences and mitigation measures are discussed under analysis of impacts of options 3 and 4 (Sections 5.6.2 and 5.7.2 below respectively).

The impacts of each policy Option are measured taking into consideration each of the action areas included: mapping and access to infrastructure, civil engineering works coordination, streamlining permit granting and high-speed-ready buildings. The analysis builds on a qualitative assessment supported where available by quantitative data as regards generated savings, costs and benefits of measures of a similar nature. The core data are mainly derived from a study specifically commissioned to provide support for this impact assessment which uses case studies in specific Member States where similar measures have been implemented (See Annex IV).

The **broader economic impacts of each option are reviewed**, focusing on the **expected effects on network investment / broadband rollout**, and on **consumer welfare, growth, competitiveness, and Single Market** (see Section 5.2- 5.3 and Annex VII).

This broader analysis is based on an **assumed positive effect of cost reduction measures on broadband deployment,** which is explained at the introductory part of this chapter (Section 5.2)**.**

The distributional analysis of **the cost and benefits incurred by direct stakeholders** can be found in Annex VIII which presents summary tables and graphs visualising the impacts on direct stakeholders**,** and in Annex IX including more detailed analyses of direct benefits and

costs, including administrative ones. A summary of the analysis by option is presented in Sections 5.4-5.8.

The social and environmental impacts are based on this link between cost reduction measures and network investment. The main effects of broadband investment on the economy, on the society and on the environment are also reviewed by way of introduction (Section 5.3), together with some quantitative examples, to give an indication of the possible scales of these effects in the case of each policy option.

An **overall assessment for each category of impacts** is made taking into consideration, for instance, cases where **significant positive impacts outweigh possible negative impacts**. The business as usual scenario is considered to have overall neutral impacts. All the other options are evaluated through a comparative approach, first assessing the impacts as compared to the business as usual option, then moving to incremental impacts as compared to the previous ones. The impacts are rated as follows below and then summarised and **visualised at the end of the chapter**:

☺☺☺ Significant overall positive impacts

☺☺ Moderate overall positive impact

☺ Limited overall positive impacts

0 Neutral impacts

5.2. Impact of cost reduction measures on broadband deployment

A series of factors determine a decision by a company to invest in network rollout: demand, costs, strategic positioning on the market, etc. For this reason it is not possible to give a precise estimation of the additional investment linked with a certain level capital expenditure (CAPEX) savings. It is nevertheless safe to assume that the proposed measures and related CAPEX savings on investments would **influence positively high-speed broadband deployment**, then generating significant related economic, social environmental benefits (as analysed under Section 5.3). This assumption is supported by evidence in the analysed case studies (LT, PT)[59] and by findings of sector specific studies[60].

In order to give an indication of the potential impact of cost reduction measures on network investment and of the further economic, social, and environmental effects, a study prepared by Analysys Mason on "The socio-economic impact of bandwidth" (SMART 2010/0033) was used. This report looks, on the one hand, at the investment gaps for reaching the targets of the Digital Agenda Europe, under different public intervention scenarios, and, on the other

[59] See Annex IV Chapter 4.4.2 of Analysis Mason "Support for the preparation of an impact assessment to accompany an EU initiative on reducing the costs of high-speed broadband infrastructure deployment (SMART 2012/0013)"

[60] See OECD (2008), "Public Rights of Way for Fibre Deployment to the Home", *OECD Digital Economy Papers*, No. 143, OECD Publishing. http://dx.doi.org/10.1787/230502835656, pag.25 and Analysys Mason study "The socio-economic impact of bandwidth" (SMART 2010/0033), and Analysis Mason "Support for the preparation of an impact assessment to accompany an EU initiative on reducing the costs of high-speed broadband infrastructure deployment (SMART 2012/0013)"

hand, attempts to quantify broader economic impact of high speed broadband deployment under different scenarios.

Starting from the forecast[61] that the private sector will invest EUR 76 415 million in deployment of high-speed broadband by 2020, this report concludes that **substantial public efforts are needed to achieve the Digital Agenda targets.** The report further analyses two scenarios: the *do nothing* scenario[62] and a *major intervention* scenario, where a certain amount of public funding is combined with cost reduction measures. Even under the second scenario (over 57 billion EUR public funding combined with soft cost reduction measures leading to 10% savings) the coverage target for high-speed broadband remains a challenge, as can be seen in the table below, since this would still leave 14.2 million household not passed by high-speed broadband and therefore a significant percentage of households and businesses still unable to access the Internet-based digital services that high-speed broadband makes possible. Socio-economic impacts are then estimated for both scenarios (for details of these scenarios see Annex VII).

Table 1 – Investment scenarios and the achievement of the DAE targets

Scenario	Total NGA investment (EUR million)	Intervention investment (EUR million)	Commercial leverage due to intervention (EUR million)	Households passed by NGA in 2020 (thousands) (% EU27 households)	Households connected to NGA in 2020 (thousands) (% EU27 households)
Do nothing	76 415	0	0	208.592 (93.6%)	92 432 (41.5%)
Major intervention	211 179	57 084	118 203	214 314 (96.2%)	138 915 (62.3%)

The figures above illustrate that increased funding or/and more ambitious cost reduction measures are needed to reach the high-speed broadband coverage target and close the digital divide. It should be noted that the very last percentages of population which are deprived from access to high-speed broadband are the most difficult to address. A certain amount of financial intervention, therefore, remains indispensable (in particular in the most remote areas where the lack of sufficient demand would not make private investments profitable). However, it is clear that cost reduction measures would help in closing the digital divide by reducing investment cost for private operators and allowing a more efficient use of public resources, thereby reaching a larger number of households with the same intervention cost.

Figure 13 below explains the effect of the reduction of the investment costs in areas where public intervention would be required to overcome market failure (i.e. where commercial organisations do not envisage a sufficiently high return on their investment to make the case

[61] See Analysys Mason study; "The socio-economic impact of bandwidth" (SMART 2010/0033), Chapter 9.2. NGA investment and deployment

[62] Scenario analysed in detail in Analysys Mason on "The socio-economic impact of bandwidth" (SMART 2010/0033).

for high-speed broadband deployment). The solid grey line shows the break-even point where income from users exceeds the cost of provision of high-speed broadband: the break-even line shifts down as costs are reduced, reaching levels corresponding to a higher number of households, which were originally in less profitable areas.

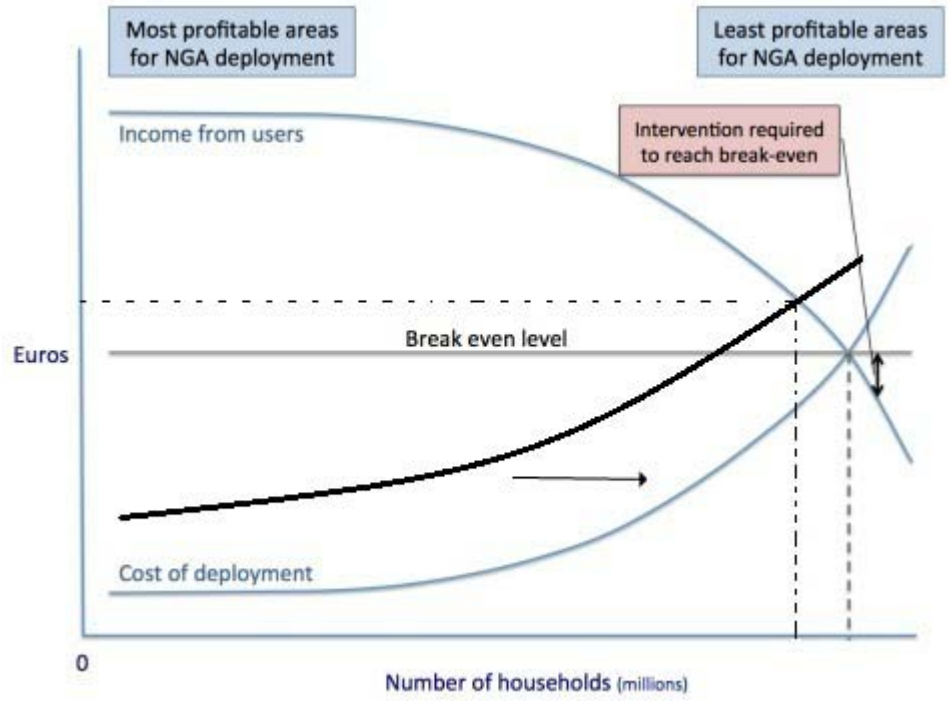

Figure 14 - Demand and supply diagram demonstrating when intervention will be required to deploy NGA (Source: based on Analysis Mason study "The socio-economic impact of bandwidth" (SMART 2010/0033)

This model is confirmed by experiences in Portugal and Lithuania where regulatory measures on access to ducts ensured that it would be economically viable to deploy in areas where the business case would not otherwise make sense. The scale of the impact of cost reduction measures on deployment of high-speed broadband depends however on the exact situation of each Member State (e.g. where sufficient public resources are available to invest in broadband, and where high-speed broadband deployment is led by the incumbent operator this impact would be more limited[63]; the impacts also depend, for example, on the available infrastructure suitable for broadband rollout, on the cost of infrastructure rental, etc.).

Regardless of these factors, cost reduction measures taken together still bring benefits in all Member States to both alternative operators and incumbents.

It thus appears that more solid envisaged cost reduction measures would shift the point where public intervention becomes indispensable further and would render public intervention in those areas more efficient. We can therefore assume that a certain level of impact of cost reduction measures on broadband deployment would always be present; the difference of

[63] See for example Annex IV - Analysis Mason (2012), Chapter 4.4.2

magnitude would then however differ, in relation to the different efficiency and effectiveness of the proposed Options.

5.3. General economic social and environmental impacts of broadband deployment

Several studies demonstrate the benefits of broadband deployment. First, the importance of Internet for the **economy** is well documented. There is in fact a growing body of literature, which identifies broadband as a general purpose technology that is fundamentally changing how and where economic activity is organised. Focusing on 13 countries that account for over 70% of the global GDP, McKinsey Global Institute (2011) estimates that *Internet economy* generates on average 3.4% of GDP (with up to 21% of GDP in some cases), with a great potential for growth still unexploited. Moreover, several studies[64] show a significant and positive impact of Internet on *GDP growth.* The most widely quoted one, Czernich & al (2009) concludes that a 10% increase in broadband penetration results in a GDP growth between 0.9% and 1.5%. The graph below illustrates this correlation.

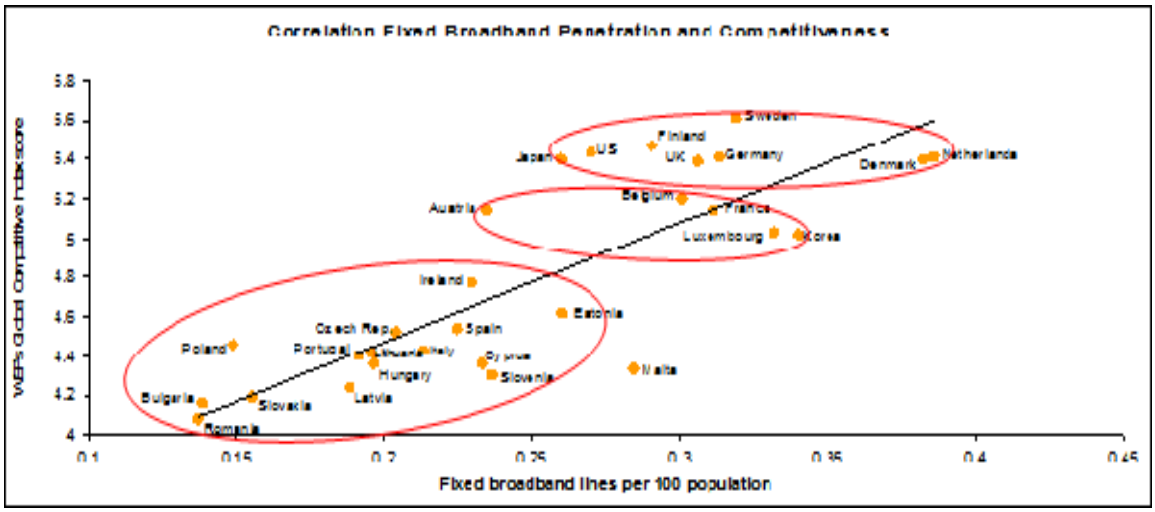

Figure 15 - Correlation between fixed broadband penetration and competitiveness

This growth can be explained as follows. Internet is considered to give **a competitiveness boost to enterprises:** a survey of The McKinsey Global Institute (2011) shows that SMEs with strong web presence *grow twice as fast and export twice as much* as the ones with minimal or no web presence. High speed Internet increases *productivity*, with gains ranging from 5 to 20%[65]. It also provides a platform to support *innovation* across sectors, stimulating a virtuous cycle in the development of the digital economy: it allows new services to take off and fuels a growing demand for bandwidth. Services such as high definition video conferencing, cloud computing, smart services, and even social media have changed the way business is done today. Broadband has been also found to have a positive impact on the development of *new businesses*. This results from the network effects of connectivity: when a

64 Koutroumpis (2009), Thompson and Garbacz (2009), The Allen Consulting Group (2003), The Impact of Broadband on the Economy: Research to Date and Policy Issues April 2012, ITU (2012)

65 Micus (2008), and Strategic Economic Solutions (2007) and Zhen-Wei Qiang, Rossotto and Kimura (2009).

large enough number of households are connected to broadband, the incentive to develop new businesses around information search, advertising and electronic commerce increases.

There is evidence that broadband rollout is also **a net job creator**: as any infrastructure project, it acts over the economy by means of multipliers, generating not only direct but also indirect jobs, via positive spill-overs in a variety of sectors. In a research on this topic, Tech4I2 and Analysys Mason (2012) reviewed six recent studies[66] and concluded that the indirect jobs created are even more numerous than the direct ones[67]. For example, in line with Liebenau et al.(2009) in the United Kingdom the impact of investing USD 7.5 billion to achieve the target of the "Digital Britain" Plan is estimated to generate 211,000 jobs-year (Total jobs), including 76,500 direct and 134,500 indirect and induced.

As evidenced by the ITU study (2012), there are specific economic effects of broadband that are not necessarily captured by economic growth or employment creation. This is the case of **consumer surplus**: broadband helps people to save money, largely through online shopping for goods and services. Greenstein and McDevitt (2009) estimated a consumer surplus of USD 7.5 billion generated between 1999 and 2006 by broadband adoption in the United States.

The use of broadband can further significantly reduce the cost of providing **health and social care services (e.g.** by allowing senior citizens to live longer in their homes) and/or improve the outcomes (e.g. through remote diagnosis and monitoring). Access Economics (2010) estimates that the net benefit of the widespread adoption of tele-health in Australia could be between AUD2 billion to AUD4 billion per annum (EUR1.39 billion to EUR2.78 billion in July 2010). Such savings are clearly connected with the widespread availability of high-speed broadband infrastructure, as lower bandwidth would in most cases not suffice to support these services.

Widespread broadband can facilitate improved **education** at lower costs, in particular in more remote or sparsely populated areas (e.g. through distance learning, in particular video conferencing and access to online information, see Educause, 2008).

- Literature also confirms a specific role of broadband in **crime prevention**, improvements to the police response to crime, improvements to the judicial process, and improving the ability of other agencies to respond to emergencies.

Based on the estimation that investment in broadband produces a 20:1 benefit ratio[68], the OECD concludes that the cost savings in just four sectors of the economy (transport, health, electricity, and education) would justify the construction of a national FTTH network[69].

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66 Crandall et al (2003), Atkins et al (2009), Katz et al (2008), Katz et al (2009), Katz et al (2010), LSE Enterprise (2009); Liebenau (2011).

67 This is also confirmed by the study concerning American Recovery and Reinvestment Act, 2009, which shows the investment of USD 6.390 billion38 will generate 37,283 direct, whereas the indirect and induced jobs can create respectively 31,046 and 59,500 jobs. http://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_Impact-of-Broadband-on-the-Economy.pdf

68 Shearman, 2011.

69 Network developments in support of innovation and user needs, OECD, 2009.

Broadband has also significant **community benefits** as demonstrated by Kim et al. (2010). Broadband helps in connecting consumers, businesses and governments, thereby facilitating social interaction. It supports good governance (among others, by making community leaders more accountable), makes e-government possible, strengthens the social capital and increases civic engagement.

Finally, broadband **reduces the isolation of regions** by connecting customers, businesses and governments, making it easier for rural businesses to grow, improving life quality in rural areas, making it then easier for more remote locations to attract and retain their residents.

A further number of studies[70] investigate the benefits of broadband on improved **environmental sustainability.** It appears that a wide adoption and use of high-speed broadband would enable the proliferation of smart buildings, smart grids[71], would reduce travel needs, etc. all resulting in a significant reduction of carbon emissions. For example[7273], the introduction of smart grids only could reduce carbon emissions by 12% by 2030 with main levers being the integration of renewable energy sources and electric vehicles. McKinsey Global Energy and Materials (2009) found that broadband-enabled smart-grid services and devices could yield more than USD1.2 trillion in gross energy savings.

Based on the above we could therefore conclude that an increased broadband availability brings significant economic, social and environmental benefits[74]. This review is aimed at presenting the typology of potential impacts of this initiative, in qualitative terms. These benefits would materialise to different extents under the various policy options, given their different effect on the increase of broadband deployment as well as some of their particularities (e.g. the options creating room for cross-utility cooperation would certainly have more positive effects on the environment).

To give an indication of the magnitude of socio-economic impacts of the cost reduction measures envisaged by this initiative, reference is made again to the study prepared by Analysys Mason on "The socio-economic impact of bandwidth" (SMART 2010/0033), which assess the main benefits linked to the two scenarios described in Annex VII, where the second scenario includes cost reduction measures leading to 10% savings.

Table 2 - Benefits of high-speed broadband in the EU27 countries, by scenario (Source: Analysis Mason on "The socio-economic impact of bandwidth" (SMART 2010/0033))

70 Fuhr and Pociask (2007), Davidson, Santorelli and Kamber (2009), McKinsey Global Energy and Materials (2009).

71 Smart Grids: electricity network that can cost efficiently integrate the behaviour and actions of all users connected to it – generators, consumers and those that do both – in order to ensure economically efficient, sustainable power system with low losses and high levels of quality and security of supply and safety. A Smart Grid employs innovative products and services together with intelligent monitoring, control, communication, and self-healing technologies.

72 ICT Applications for the Smart Grid: Opportunities and Policy Implications", OECD Digital Economy Papers, No. 190, OECD Publishing.

73 The Smart Grid: An estimation of the Energy and CO2 benefits, 2010, Report by Department of Energy's Pacific Northwest National Laboratory.

74 For an extensive review of socio economic impacts of broadband see review in Analysys Mason on "The socio-economic impact of bandwidth" (SMART 2010/0033).

Scenario	Total NGA investment (EUR billion)	Input–output benefits (EUR billion)	Jobs created (million)	Consumer surplus benefits (EUR billion)
Do nothing	76.4	181.2	1.35	26.5
Major intervention	209.3	569.4	3.94	31.9

The table shows that significant benefits arise from investment in broadband deployment, in relation to cost reduction measures. While it is not possible to connect directly the two scenarios with the analysed policy options, this study will be used to make a few quantitative estimates of the impacts generated by each policy option.

5.4. Impacts of the option 1 "business as usual"

Monitoring and exchange of best practices including guidance

Option 1 as presented in detail in Chapter 4.1 would consist in promoting the adoption of good practice measures. As explained in Chapter 2.6 and in the impact analysis below, even if individual good practices address some of the inefficiencies and can have good cost benefit results and positive impact where implemented, the specific measures considered under this Option (mainly support on exchange of good practices), due to the voluntary approach, are not expected to produce sufficient economic, social or environmental impacts in the light of the objectives defined in Chapter 3. See table below for evidence of analysed case studies presenting strengths and weaknesses and cost and benefits of good practice measures for identified inefficiencies.

Table 3 Analysis of strengths and weaknesses and cost and benefits of good practice measures for identified inefficiencies.

INEFFICIENCIES	BEST PRACTICES	STRENGHTS	WEAKNESSES	COSTS	BENEFITS
Persistent **barriers to use existing physical infrastructures** suitable for high speed network rollout 2.4.1 Inefficiencies addressed by **increased transparency** of physical infrastructure (Database of physical infrastructure)	- Germany - introduced cross sector mapping of all infrastructure deployments in the country - Belgium (Flanders) and Poland - launched wider mapping exercises (GRB and GBDOT) in addition to the database providing information about infrastructure owners has been implemented in Flanders (KLIP) - Portugal - implemented a CIS database including info on available capacity of ducts of the incumbent	(+) Encourages deployment in shared ducts (+) Reduces damage to existing cables/pipelines and civil disruption (+) Cost limited by the fact that utility companies likely to have detailed and accurate knowledge of deployments	(-) Could be costly to implement, if infrastructure owners do not have information and duct surveys are required and might create additional costs for access seekers (-)Information on infrastructure location could be perceived as sensitive (commercial and security concerns, systems are however often USER ID and password protected)	- Cost for setting up the system e.g. cost of setting such atlas may vary from relatively law amounts 1-2 million (German Infrastrakturatlas and Portugal CIS database implemented by the two NRAs) to 75-77 million (for the Flamish mapping and Polish GBDOT) for complex systems that are however satisfying wider spatial planning purposes (INSPIRE Directive)	- Increased infrastructure sharing, including cross utilities - Significant savings linked to reduction of damage to existing ducts and cables could equate the cost of implementing infrastructure atlas in 3 years (AM estimation) (+) possible synergies with platforms for announcement of planned investments, dig alert systems, electronic permit granting submission systems
Inefficiencies addressed by **mandated access** to physical	- Portugal and Lithuania - mandated access to physical infrastructure	(+) Makes some deployments economically viable leading to increased NGA coverage as demonstrated by LT and PT measures (+) Low	(-) Little business interest on behalf of non-telecoms undertakings (-) May lead to disputes	- Negligible cost for the implementation to the government or the NRA (defining rules for sharing and setting up appropriate dispute settlement mechanisms) - Costs for the operator (cost for the ground surveys if	- Capex savings on investments (potential cost savings up to 75% for the network parts when no digging is required) - duct rental revenues for

infrastructure		implementation cost (+) Increased competition		needed, Access price/duct rental cost, possible disputes costs)	infrastructure owners - reduced permit granting costs
INEFFICIENCIES	**BEST PRACTICES**	**STRENGHTS**	**WEAKNESSES**	**COSTS**	**BENEFITS**
Barriers to coordination of civil engineering works 2.4.2 Addressed by **database/transparency measures of planned civil works**	- Finland co-digging portal Johtotieto , Sweden Lendingenskolle dig alert system that could be developed in a planned investments announcement database to ensure transparency of planned civil works - Belgian KLIP and Netherlands KLIC system of electronic submission of planning applications compulsory for any organisation wishing to carry out excavations - France - transparency and access to civil works	(+) Enable co-deployment and reduces the cost of new deployments (+)Platform implementation and running cost could be relatively low (+) Reduces damage to existing cables/pipelines and civil disruption	(-) Rollout plans may be commercially sensitive (-) Benefits mainly limited to the areas where new infrastructure is being deployed	- Cost of creating and running the technological platform (ex Finnish Johtotieto cost 200.000 EUR with an on-going yearly cost of 100.000 EUR and Swedish system serving damage prevention purposes cost EUR 1.8 million to implement between 2007-2010 and approx. 700.000 per annum to run) - Belgian KLIP cost 500.00 to implement and 250.000 per annum. A small administrative fee is charged for submitting a planning application using the KLIP	- Capex savings on co-investments (potential savings up to 60% depending on number of actors involved) - Reduced planning and tendering and permit granting costs - Savings during planning and deployment process (AGIV estimates that the Belgian KLIP system saves operators and authorities EUR 29.5 million per annum)
INEFFICIENCIES	**BEST PRACTICES**	**STRENGHTS**	**WEAKNESSES**	**COSTS**	**BENEFITS**
High **barriers to deploy in-house equipment** in buildings 2.4.4 Addressed by high-speed infrastructure for	Spain - obligation to equip all new and refurbished buildings with common infrastructure Fance- access obligations related to shared connection point and in house wiring of all	(+) Encourages operators to cover more apartment buildings (+) Encourages high-speed broadband deployment and	(-) Benefits mainly limited to the areas where population leaves in multi dwelling units (MDUs) (-) high-speed broadband take up continues to be slow	- Costs for physical infrastructure and wring ranging from EUR 300 to EUR 1000 per end users apartment. -Incremental costs of up to 2.5% of construction works for installing	- Cost savings on pre-equipping building ranging from 20% (France)to 60% (Spain) - Accelerated revenues for increased take-up

new and refurbished buildings	new buildings	competition	(-) Measure dependent on the success of the construction sector and consequently impact might be limited	in building telecom infrastructure	

5.4.1. Economic impacts: 0

The exchange of best practices regarding physical infrastructure mapping and sharing, coordination of civil engineering works, rights of way, and in-house wiring and further guidance on Articles 11 and 12 of the Framework Directive would stimulate the utilisation of the possibilities offered by the current regulatory framework and might furthermore raise awareness on measures adopted in Member States sometimes going beyond the regulatory framework.

Member States have full discretion whether to follow the guidance documents or not, and in particular whether to implement measures from one or more action areas. There might also be situations where NRAs might want to follow best practices encountered in other Member States but would lack the legal basis to do so. For example studies confirm that it is typically much more difficult to oblige non-telecom operators to open up their ducts to telecom operators, as in most countries NRA will not have the authority to do this, and thus new government legislation may have to be drafted to implement such measures[75].

Under these circumstances, and as discussed in Chapter 2.6, only a limited take up of these best practices can be expected. Many rights that can enable operators to speed up deployment would not be ensured all over Europe, since we cannot realistically expect, given the current trend, that all European electronic communication network providers would enjoy a general right to offer and to use the existing physical infrastructures including that of utilities, neither a right to transparent information regarding all existing physical infrastructures suitable for high speed network rollout and a right to on-site visits for more detailed surveys. In addition the general right to be informed about planned civil works and to be able to negotiate coordination of civil engineering works would also not be ensured, since many countries are not foreseeing specific initiatives in this regard or are addressing this issue only partially. Finally, also in relation to increasing the number of high-speed broadband ready buildings and related take-up, the right for electronic communication operators to access the concentration point and the right to negotiate access to in-building equipment would not be recognised all over Europe.

Moreover, where measures are implemented, it would be rarely *en bloc* therefore they would not have effects on the entire chain of steps involved in a typical network rollout. From a timing point of view, the spread of best practice throughout the EU, through this voluntary/soft approach, could only occur in the long term therefore not supporting the achievement of the Digital Agenda targets and the Europe 2020 Strategy.

The **cost benefit ratio of these measures would depend, among others, on the take up of the measures and on the implementation details in each region or Member State**.

Where implemented, the **main direct effects** would be on telecom physical infrastructure owners, on companies seeking to deploy broadband networks and on the administrative bodies implementing the measures.

[75] Analysis Mason "Support for the preparation of an impact assessment to accompany an EU initiative on reducing the costs of high-speed broadband infrastructure deployment (SMART 2012/0013)".

As regards *companies seeking to deploy broadband networks*, their advantages are limited (due to the limitations of the current regulatory framework) but undeniable. The WIK model[76] shows moreover that such practices present advantages for *infrastructure owners* having to grant access too, provided that this access is granted at fair prices. More precisely, this study suggests that incumbents can also reduce their costs by infrastructure sharing, since the related earnings can increase the profitability of their high-speed broadband rollout, thus they can reach profitability at a lower level of market share, thereby improving rather than undermining their investment cases.

As regards implementation and administrative costs**,** it can be assumed that states or regions taking up these measures will minimise / optimise their costs in function of the already existing institutions, mechanisms, and structures. As indicated across sections 2.6 and 4.1, according to the information available to the Commission a number of EU Member States have already started to implement infrastructure mapping or are currently working on introducing such solutions (AT, BE, CY, CZ, DE, DK, FI, FR, IT, LU, NL, PL, PT, RO, SI, SE, UK). For these Member States the costs of implementing mapping measures would be marginal or sunk (e.g. the yearly costs for managing those systems including costs for collecting, updating and processing data). Member States that have not yet started a mapping exercise will have to incur bigger costs, once they decide to do so. It should be however noted that a mapping exercise (with the associated costs) may, in any case, need to be performed in the context of the implementation of the Broadband guidelines[77] and of the INSPIRE Directive. Although the mapping requirements are not perfectly overlapping, significant synergies are to be expected, with a de facto effect of decreasing overall costs.

The same reasoning applies to measures which are relatively less expensive to implement. Symmetric access and cross sector access to physical infrastructure would not be applied widely and the right for all infrastructure owners to offer access to their infrastructure would not be recognised all over the EU. We can further safely assume that the overall implementation and administrative costs would be marginal and incremental, since scattered initiatives exist also in the field of coordination of civil works, rights of way, and in-house wiring and given that Member States / NRAs are only expected to pick up new practices to the extent that their cost-benefit ratio seems appealing in their national contexts.

For a detailed analysis of costs and benefits of Option 1 see Annex VIII and IX including implementation and administrative costs and the good practice analysis included in Table 3.

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[76] Dieter Elixmann, Dragan Ilic, Dr. Karl-Heinz Neumann, Dr. Thomas Plückebaum, WIK-Consult Report Study for the European Competitive Telecommunication Association (ECTA): The Economics of Next Generation Access - Final Report Bad Honnef, September 10, 2008.

[77] Some provisions concerning transparency of information on existing and new physical infrastructures as well as on access on these infrastructures are already envisaged by the current draft *EU Guidelines for the application of state aid rules in relation to the rapid deployment of broadband networks*, currently subject to intra-service consultation. Those measures are applicable exclusively to the broadband infrastructure financed through State Aid, but are however requiring Member States to provide for detailed mapping and analysis of coverage of areas benefiting from state aid. In applying the Guidelines, therefore, Member States will have to set up a dedicated central website at national level, concerning on-going state-aid tenders, information on the available infrastructures and conditions for access to existing infrastructures, transparency on the aid granted, including comprehensive and non-discriminatory access to information on the subsidised infrastructure.

As regards possible **broader effects**, given the analysis of the baseline scenario and the evaluation included in Section 2.6, it appears highly unlikely that the soft measures foreseen in Option 1 would spread throughout the EU at a sufficient pace and scale to ensure real cost sensitivities in the network deployment process and to trigger more investments in support of the Digital Agenda targets.

As an illustration, it is forecasted[78] that the private sector will invest EUR 76 billion in high-speed broadband deployment by 2020 if no significant public intervention takes place (the *do nothing* scenario). This level of investment would translate into 93.6% of the EU27 households passed by NGA and 41.5% of connected[79]. This would still leave 14.2 million household not passed by high-speed broadband and therefore a significant percentage of households and businesses still unable to access the Internet-based digital services that NGA makes possible (see Section 5.2).

All in all, the "business as usual" scenario can neither be expected to significantly reduce the costs of broadband rollout all over Europe, nor to have a strong effect on investment. As only **a very limited impact on investment** is anticipated throughout the EU, its **spill-over effects** (mainly but not only on *civil works companies* and *equipment manufacturers*) would also be **limited**. Moreover, the usual **positive indirect economic effects associated with a higher broadband coverage** such as *more productivity and innovation, better chances for SMEs, more consumer choice*, etc. **cannot realistically be expected**.

In addition, under the business as usual scenario, where some Member States might adopt (and certainly adapt) some practices while other will not, it is very likely that the current **fragmentation of rules in the EU will increase**. Over time, this would accentuate the patchwork of practices and regulatory regimes, with significant negative impacts **on the Single Market,** and indirectly on the possibility of Europe to support companies willing to invest cross-border and able to become stronger global players.

5.4.2. Social impacts: 0

The proposed measures, where implemented, would produce a certain but limited further network deployment, an associated (limited) *increase in employment and more high-speed broadband coverage*. This would translate into a modest reduction of the digital divide, of the isolation of regions, etc. (see section 5.3). The measures would also limit to a certain extent public nuisance related to unnecessary duplication of civil engineering works.

Yet for the reasons quoted above, the actual impact on investments and network rollout throughout the EU is estimated to be marginal. It follows then that all the **social effects would be insignificant.**

5.4.3. Environmental impacts: 0

As the transparency and sharing of infrastructure will not improve significantly, the risk of unnecessary civil engineering works, causing soil disruption, waste and pollution will persist. Therefore the impact of this policy Option on the environment is considered **marginal.**

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[78] See Analysys Mason study: "The socio-economic impact of bandwidth" (SMART 2010/0033), Chapter 9.2. NGA investment and deployment.

[79] Euromonitor predicts there will be 222 825 500 households in the EU27 member states in 2020.

5.5. Impacts of the option 2: promoting efficiency gains

Promoting savings/cost reduction within the electronic communications sector: More intensive, coherent and harmonised application of the existing provisions and tools of the telecom regulatory framework

The specific measures considered under this Option (presented in detail in Chapter 4.2) are expected to produce **modest positive economic impacts**, which can subsequently also have some positive effects on the social and environmental situation.

5.5.1. Economic impacts: ☺

Promoting the cost reduction measures described in Section 4.3 through a Commission Recommendation under Article 19 would most likely lead to a more intensive and consistent application of the relevant provisions of the regulatory framework throughout the EU and thus generate higher impacts. Such an instrument would, indeed, have more weight and would allow for providing more support to Member States and subsequently to local authorities, as compared to exchange of best practice and even guidance documents. First, the national authorities have the underlying powers to implement the measures prescribed by a Recommendation under Article 19. Second, while Member States are not obliged to follow such Recommendations, they are nevertheless required to justify a decision not to do so.

Yet, even if more intensive measures are expected to be applied under this policy option than under Option 1, it must be stressed that they remain rather limited in scope – to telecoms infrastructure only (no utilities), to rights of way only (no other permits), and to sharing of in-house wiring only. Therefore the size and scale of the impacts of this Option are also limited.

As regards **the direct effects on the main stakeholders involved**, higher savings would be achieved on the overall cost for deployment if compared to the baseline scenario. These higher savings result from increased efficiency and reduced costs in the planning of infrastructure deployment, increased opportunities for telecom infrastructure access seekers due to transparency and symmetric sharing with better strategic decisions on network development, increased opportunities for coordination of civil works between electronic communications undertakings due to transparency on planned investments, decreased cost for negotiating sharing and co-deployment arrangements due to increase clarity on sharing obligations and possible co-deployment arrangements enhanced by NRAs. Savings in terms of human resources and time devoted to obtaining rights of way and negotiating conditions with authorities and land owners due to minimum requirements in transparency and non-discrimination in granting rights.

It is estimated that the reduced duplication of excavation works would lead to reduced cost for self-digging and quicker deployment of high-speed broadband of potentially up to 60% Capex saving on specific investment projects where sharing would occur (or 30% in case of tower sharing[80]).

[80] Analysis Mason "Support for the preparation of an impact assessment to accompany an EU initiative on reducing the costs of high-speed broadband infrastructure deployment (SMART 2012/0013)".

However the fact that sharing would only regard electronic communications infrastructure would significantly limit the overall savings on the total investment costs. In addition the attractiveness of infrastructure sharing between telecoms would still differ across different Member States, as physical infrastructure rental prices are varying greatly in different MS and as rental prices are very relevant when deciding on using existing infrastructure versus self-digging (the cost of duct rental over 25 years can rise up to 24-42% of the cost of deployment, according to a UK research[81]). Instead, from the point of view of infrastructure owners, the lower the duct rental prices, the higher the disincentives to invest in physical infrastructure.

Similarly, a sectorial mapping system would not be an efficient instrument either for cross sector damage prevention, therefore preventing the achieving of significant benefits. Decreased savings from damage prevention would also affect the cost-benefit ratio for the mapping exercise. Due to the same limitation to the electronic communications sector, savings in the areas of coordination of public works and in-building equipment would not be achieved.

On the positive side, all parties directly affected by this initiative would benefit from the increased legal certainty given by a (rather detailed) Recommendation under Article 19 (e.g. leading to lower litigation costs).

The **implementation and administrative costs** of Option 2 also seem moderate, as all the measures could be implemented by the NRAs, which already have competences and powers in the field and often act as dispute settlement bodies. In that sense, the costs would be incremental. It should be highlighted that these costs are not public costs as such, since NRAs are financed by the industry to a very large extent. A fair system of sharing costs between the private and the public sector (and even among private operators) should be ensured to support the implementation of the more costly elements (e.g. mapping). Yet, unlike in Option 1, a Recommendation would be rather prescriptive, allowing less room for adapting to already existing or planned initiatives and leading to possible inefficiencies and higher sunk costs.

For a detailed analysis of impacts of Option 2 refer to Annexes VIII (impacts on direct stakeholders) and IX (impacts, including implementation and administration costs).

To give a notion of the magnitude of savings under Option 2 (which then determine the rest of the impacts: macro-economic, social and environmental), a rather (conservative) assumption of 5% additional savings is applied on the two scenarios discussed in under 5.2, where investments by 2020 range from EUR 76 billion to EUR 210 billion. Based on this hypothesis, the total amount saved would therefore go from a minimum of 3.8 billion to a maximum of 10.5 billion, depending on the amount of public finance involved. Such additional savings (compared to the business as usual scenario) would not shift the breakeven line significantly, and would thus only have marginal effect on high-speed broadband coverage. It is however not possible to translate the savings into extra investments as such, be

[81] At present the situation is extremely diversified for ex. monthly charges for access to incumbent owned ducts are ranging from 0.01 in Pt to 0.85 in AU, while the cost oriented price appears to be less than EUR 0.30 per meter monthly. For an analysis of duct and poles rental prices see for further analysis Analysis Mason Paragraph 4.4 of "Support for the preparation of an impact assessment to accompany an EU initiative on reducing the costs of high-speed broadband infrastructure deployment (SMART 2012/0013)"

it from public or private actors, therefore it is not possible to make an estimate of the macro-effects of this savings[82].

Therefore, in the absence of public funding, only an **overall moderate positive effect on investment in networks** is expected, with modest welfare gains (lower prices, higher quality of service, increased choice etc.) and with modest benefits for isolated communities (in particular those that would normally not be covered by high-speed broadband services without the re-use of existing physical infrastructure or civil works' coordination arrangements). Under this Option, moderate positive macro-economic impacts are to be expected too, in relation to spill-overs to related industries (equipment manufacturers, civil engineering works companies), and potentially, increased innovation and productivity for all undertakings including SMEs.

Finally, a Recommendation is likely to increase, to a certain extent, consistency across the EU since the implementation of the provisions of the regulatory framework would be further harmonised. Fragmentation of the Single Market would nevertheless still remain relevant since ultimately Member States remain free to implement or not these provision. In particular, a high degree of differentiation in practices concerning civil engineering works coordination mechanisms and rights of way is foreseeable from a local authority to another.

For all these reasons, an overall **modest economic impact is expected under this Option**.

5.5.2. Social impacts: ☺

An overall moderate positive effect on investment in networks is expected under this Option, and, as such, a positive effect on **job creation**. On the other hand, the cumulated effect of the measures would lead to avoiding unnecessary works and thus **reducing public nuisance**.

One step further, investment in networks is expected to lead to an increased broadband coverage and competition. This would lead to modest benefits for communities - which would normally not be covered- and to a **reduced digital divide**. For examples of digitally supported services which are highly relevant from a social perspective such as e-health or e-education, please refer to 5.2.

5.5.3. Environmental impacts: ☺

Increased transparency and coordination of works within the electronic communications sector are expected under this Option, leading a **small positive impact** (mainly due to avoiding duplication of works).

5.6. Impacts of Options 3a and 3b: enabling efficiency gains

Unlocking the potential of cross-sector cooperation to achieve higher savings and efficiency gains

[82] Savings as such would lead to decreased outputs, as in any economic model. Yet savings are assumed to allow for additional investments. It is not possible to evaluate the increased outputs (i.e. the macro-economic effects of savings) given the lack of clarity on the additional investments enabled by these savings.

The specific measures considered under this Option (presented in detail in Chapter 4.3) are expected to produce **significant positive economic impacts**, which subsequently can also have positive social and environmental effects.

5.6.1. Economic impacts: ☺☺☺

Measures envisaged under Options 3a and 3b would have significantly increased impacts, mainly due to the creation of directly applicable rights and obligations for actors beyond the limits of the current regulatory framework.

A **right to use physical infrastructures across utilities at reasonable conditions** accompanied by sufficient **transparency of existing physical infrastructure** would ensure that virtually all infrastructures suitable for broadband rollout can effectively be used. Both the Analysis Mason study and the OECD report confirm that providing the regulator with powers to require the sharing of ducts and conferring full authority to local government to make the ducts of other utilities available for the rollout of electronic communications networks would facilitate investment and help reduce costs[83]. From the point of view of infrastructure owners, that, during the consultation process formulated certain critical points, it is essential that such infrastructure sharing is done at market prices – which are sufficiently high to counter a potential disincentive to invest, but also low enough to enable sharing. Increasing the scope of available infrastructures has a positive effect on incumbent operators, who could profit for example from access to infrastructure belonging to utility companies, whereas under the preceding policy options they would principally be subject to access obligations. Alternative operators would be able to profit from greater access to physical infrastructure which would compensate the additional delay and administrative weight of being subject to a light-touch access obligation. For certain utility companies, such sharing would bring about not solely additional revenues, but also additional competitive advantages (such as a faster deployment of smart grids).

Depending on the chosen Option (3a or 3b) as regards transparency of existing physical infrastructure, the impacts on infrastructure owners are different. Under Option 3b, Member States might choose not to implement the transparency requirements, yet if they do so, they would need to adapt to the model prescribed by the Recommendation. Under Option 3a, a certain minimum level of information must be made available to the public authorities or other parties, thereby creating costs (which might be lower than under Option 3a, but are on the other hand certain in all Member States / not optional).

Network security and commercial sensitivity issues, which were also raised by infrastructure owners, would be addressed by granting access to information on a "need to know" basis.

Option 3 would **unlock the potential for civil engineering works coordination**, given the right of undertakings to seek information on planned investments across sectors, thereby facilitating a change of culture in the long run. Additional opportunities would be created by

[83] Based on a comprehensive overview on the status of rights of way regulation in the OECD countries, the OECD develops recommendations on enhancing rights of way regulation to facilitate deployment of FTTH. In particular, barriers to rights of way which may slow down the pace of fibre rollout in local access networks are examined. OECD (2008), "Public Rights of Way for Fibre Deployment to the Home", *OECD Digital Economy Papers*, No. 143, OECD Publishing. http://dx.doi.org/10.1787/230502835656, pag.25.

the separate regime of access to civil engineering works financed by public means. Since no obligation to negotiate or to coordinate civil works exists for private actors, the costs of the measures in this area are considered negligible.

Furthermore, the establishment of **a single information point** through a legal instrument (Option 3a) would present the guarantee of a comprehensive solution for all permits necessary to rollout networks. The OECD considers that accessibility and quality of general information available are critical for applicants to obtain public right of way permits, and solving existing uncertainty can speed up the pace of high-speed broadband deployment. This particular measure is likely to impact more on new entrants who have fewer legal resources to untangle different procedures[84]. The costs of this measure would depend on the exact arrangements opted for by the Member State in each case. Moreover, if the single information point is established through a Recommendation under the TFEU (**Option 3b**) the costs might be lower (as Member States might choose not to implement the recommendation at all). Nevertheless, the effectiveness of the underlying rights and obligations established by the regulation regarding transparent, timely and non-discriminatory permit granting process could be put into question.

Finally EU rules mandating that all new and extensively reconstructed buildings are equipped to be "high-speed broadband ready" would ensure major savings as compared to retro-fitting existing buildings and easier/faster in-building deployment for electronic communications operators. However, it must be noted that these effects would only be visible in the medium and long run. In addition, additional costs (although minor) would be created for the housing sector.

It is difficult, if not impossible, to make an overall quantification of the **implementation and administrative costs** to be sustained for the entire EU for these Options. The initiative is mainly aiming at **organising access to the relevant information at a single point and making it available for those deploying broadband**. This is particularly valid in relation to the information on physical infrastructure and planned civil works and to the information on permit granting procedures, while, if applied together, could create synergies in itself.

Such costs would be highly dependent on the measures already in place in the given Member States or regions (these costs are very different across Member States[85] as it emerges from the Analysis Mason study and the public consultation contributions and depends on information that is already collected in specific countries and that different kind of infrastructure owners are already collecting and are providing to different authorities and even more on the choice of how much transparency each Member State is willing to implement or is already implementing – see Annex IX, for details on costs), as well as on the choices made by that Member States in implementing the provisions of the Regulation. In addition, important

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84 OECD (2008), "Public Rights of Way for Fibre Deployment to the Home", *OECD Digital Economy Papers*, No. 143, OECD Publishing. http://dx.doi.org/10.1787/230502835656, pag.25

85 For example physical infrastructure atlases costs may vary from relatively low amounts 1-2 million (German Infrastrakturatlas and Portugal CIS database implemented by the two NRAs) to 75-77 million (for the Flemish KLIP GS mapping and Polish GBDOT) for complex system that are however satisfying wider spatial planning purposes (INSPIRE Directive) which goes beyond the minimum requirements laid down in the proposed option and are the expression of precise spatial planning policy choices of different Member States. While examples of costs for databases for the announcement of planned investments vary from 200.000 to 1.8 million.

synergies with other EU initiatives such as the INSPIRE Directive and the broadband Guidelines State Aid Guidelines make it difficult to identify separate costs, since some costs are already sustained in application of those EU rules. Given all this variables and the discretion left to member States, the impact assessment gives examples of costs by Member States but does not provide for an overall quantification of the additional administrative burden to be sustained for all EU Member States for those transparency measures using the Standard Cost Model[86].

For example, as regards transparency of existing physical infrastructure, costs depend on the amount of information that is already collected in specific Member States (either during telecom specific initiatives, for spatial planning purposes, e.g. in the implementation of the INSPIRE Directive or in the context of granting state aid). Also, costs depend on the quality of historical data of infrastructure owners, in particular the form and the level of maintenance. The main concerns about excessive costs of transparency exercises highlighted by stakeholders are dealt with in the following way. Neither **Option 3a nor Option 3b imposes a full mapping obligation**. They are based instead on the principle of ensuring the right for the operator/broadband developers to have access to information on existing physical infrastructure suitable for broadband rollout. In practice, both Option 3a and 3b mainly aim at organising access to this information at a central point and making it available for those deploying broadband. Even under Option 3a, the Member States are left free to ensure this right choosing modalities and structure of inventories that best suit the information systems already existing in their territories.

In addition, significant savings in implementation and administrative costs are possible if these measures are implemented jointly. The costs for the implementation of the transparency of existing physical infrastructure and of the platform for exchanging information on planned investments for coordination of civil works and damage prevention and eventually IT based permit granting systems are partially overlapping. It is up to the Member States to make better use of possible synergies to optimise costs for implementation of databases (equipment, software and management costs), however those potential synergies exist as it is confirmed by the Analysis Mason study since their research shows that those measures are interlinked and it is therefore likely that in some Member States existing systems could be further developed to add the functionality required, while in some cases significant developments would still be needed and some costs would be therefore shared across the measures and possibly combined solutions could be implemented.

Finally, those transparency systems also create potential new savings. As demonstrated by the Analysis Mason Report, cost savings from avoided damage on existing physical infrastructure could alone equate the costs of implementing an infrastructure atlas. For example according to different estimates, these savings can be significant and amount to a maximum of EUR 50 million per year (see Annex VII based on Analysis Mason).

[86] In the absence of a mapping obligation and the wide discretionarily left to MS about the way they could organise access to the already available information, the way they could increase transparency on not available information, the choice of subjects managing databases of physical infrastructure for each Member State and the missing information on the number of cross sector owners of physical infrastructure for all MS, it was impossible to apply the Standard Cost Model in relation to this measure.

It is not excluded that most of the measures could be implemented by the NRAs, which means that many, if not most of the implementation and administrative costs could be borne by the private sector. It is worth noting that no private stakeholder has opposed to such an idea.

For a detailed analysis of impacts on direct stakeholders of Option 3 and implementation and administrative costs refer to Annex VIII and IX based on Analysis Mason study.

In conclusion, this Option presents a clear and strong potential for savings and additional investments. This is due to universal access obligation applicable across sectors (including utility companies and public authorities), enabled by comprehensive transparency obligations. Likewise, symmetric transparency obligations applicable across sectors and specific obligations on public works are likely to lead to higher high-speed broadband coverage. Utility companies might furthermore have a role in the increase of NGA coverage, and possibly, increase competition in the provision of broadband services[87]. Undertakings seeking to deploy broadband networks would furthermore profit from time savings and lower costs in relation to better access to permit granting and to high-speed broadband ready buildings[88].

To give an indication of the magnitude of savings allowed by this Option, an assumption of 20% to 30% additional cost reduction[89] is made to the investment amounts described in Section 5.2. These larger savings are mainly related to cutting down the unnecessary costs related to doubling infrastructure and civil works and confirmed by Analysys Mason. Based on this assumption, the total amount saved on deployment would therefore go from a minimum of EUR 15.2 billion to a maximum of EUR 63.1 billion.

As concerns **broader impacts**, given the directly applicable rights and obligations imposed under this Option and the costs and benefits for the direct stakeholders discussed above, an overall significant positive impact on investment in high-speed networks can be expected. In consequence, a **higher broadband coverage** and **increased competition** can be expected. In

87 European investment in smart grid should reach 56 billion euro by 2020 (cumulative investments 2010-2020) as specified in Pike Research's report, "Smart Grids in Europe" that examines smart grid trends in Europe and forecasts the size and growth of the market for smart grid technologies through 2020 (http://www.pikeresearch.com/research/smart-grids-in-europe). Part of these investments could result in the co-deployment of dual use infrastructure.

88 This is confirmed by best practices example, like the Amsterdam Municipality that is coordinating co-deployment of civil engineering infrastructure through the Amsterdam Smart City platform. The Platform allows providers to submit long term plans for civil infrastructure deployment, so that other interested providers could share the cost of deployment. One right of way is then granted for large areas of the city and for a long period of time. The co-deployment includes the energy DSO and a black fibre provider, while the Municipality also replaces its sewers and ducts for traffic lights. As a result, not only the cost of deployment but also the environmental nuisances are significantly reduced.

89 Analysis Mason estimates that a 20-30 % overall CAPEX saving to the operator can be reached in case of a deployment project where all the measures from option 3 are implemented, as an integrated package of measure as we proposed (infrastructure atlas, access to infrastructure, planned investment announcement, NGA ready buildings). The estimate is based on specific assumptions that 25% of the deployment is in existing ducts, saving 75% in Capex for this part, 10% of the deployment connects the network to new housing developments, and co-deployment with other operators/utility companies is used, saving 15–60% and 5% of the deployment connects the network to pre-wired MDUs, saving 20–60%.

particular, broadband networks would reach areas which would otherwise be thought of as being commercially unattractive, and resources would be freed for further investments.

Due to significantly increased network investment, **positive macro-effects** on the economy would become visible, both in terms of spillovers to related industries (equipment manufacturers, civil engineering works companies), and increased innovation and productivity for all undertakings including SMEs. In particular enabled cross-sector solutions would stimulate innovation, new business opportunities and create synergies between different sectors that are otherwise difficult to achieve in the absence of specific enabling instruments. This could have a positive overall effect on the **EU competitiveness** through faster smart grid and intelligent transportation systems deployment and related energy efficiency gains.

Harmonization measures in the areas of infrastructure mapping and sharing, civil engineering works coordination and access to public works, permit granting rules, and in house equipment as envisaged under this Option would significantly **lower barriers to entry benefiting mainly smaller operators** that are less equipped to deal with complex administrative rules and would thus enjoy from enhanced access and co-deployment rules.

Importantly, such rules would **reduce fragmentation in the EU and as such contribute to the Single Market**, potentially facilitating the activities of pan-European operators which would be able to benefit from economies of scale and lower administrative costs while deploying in different Member States (see Chapter 2.7.1). Most of these impacts would be immediate, while others would occur on the longer term (e.g. the equipment of buildings with highs-speed broadband ready infrastructure). Overall, this comprehensive legislative framework would allow significant economies of scale for cross border operators and therefore support the strengthening of pan-European operators in the face of global competition.

5.6.2. Social impact: ☺☺

This Option ensures significant positive impact on investment and thus also on the labour market. Broadband rollout is a net job creator generating not only **direct but also indirect jobs**, across different sectors of the economy. While direct jobs and some of the indirect jobs are temporary, coinciding with the works, certain indirect jobs are long lasting (e.g. jobs in content provision and in equipment manufacturing). According to research, there is an average direct job creation of 9320 jobs per EUR billion spent[90] while the estimates for indirect jobs are on average higher than for direct jobs[91]. A certain amount of new jobs could also result from innovation in relation to cross-sector cooperation.

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90 Tech4I2 and Analysys Mason "Support for the preparation of an impact assessment to accompany an EU initiative on reducing the costs of high-speed broadband infrastructure deployment (SMART 2012/0013)" reviewed six recent studies and calculated an average direct job creation of 9320 jobs per EUR billion spent.

91 The estimates for indirect jobs are on average higher than for direct jobs. If national estimates, such as the ones made in France or Germany were extrapolated to an EU scale, rolling out broadband networks throughout the entire territory would amount to some 2.770.000 person-year employments and 152 billion EUR of added value to the EU economy.

Increased infrastructure sharing and coordination of civil engineering works will guarantee **a significant reduction of public nuisance** and related inconveniences for citizens, compared to a completely new rollout. It is not however possible to quantify the reduction of public works linked to the proposed measures, since this will also depend on the results of the negotiating process between owners of physical infrastructure and operators willing to deploy and on the willingness and capacity in a given territory to coordinate civil works.

The new rules concerning in-house installations would require investments to be incurred either by property owners or housing industry. Yet, the related costs would be incremental given the early stage of works. In exchange the value of the property would increase.

While the obligation of network operators to meet all reasonable requests for access to its physical infrastructure could restrict their right to conduct a business as well as their property right, the adverse effects in this respect is however mitigated by the provision that such access should be granted on fair terms and conditions, including price. Furthermore, this limitation must be considered justified and proportionate to the aim of reducing the cost of deploying high-speed electronic communications networks since it would reduce the need to perform civil engineering works, which account for almost 80% of the cost of network deployment.

With regard to the obligation on network operators to provide minimum information on existing infrastructures, safeguards as concerns the right to privacy and the protection of business secrets are provided through the provision of exemptions for the purpose of operating and business secrets.

The obligation on undertakings performing civil works fully or partially financed by public means, to meet any reasonable request for access in view of deploying elements of high-speed electronic communications networks, could restrict their right to conduct a business as well as their property right. However, any such obligation would only apply if it would not entail any additional costs for the initially envisaged civil works and if the request to coordinate is filed as soon as possible and in any case at least one month before the submission of the final project to the competent authorities for permit granting. Furthermore, this limitation must be considered justified and proportionate to the aim of reducing the cost of deploying high-speed electronic communications networks since it would allow electronic communications network operators to cover only part of the cost of the civil engineering works.

The obligation to equip all newly constructed buildings, with a high-speed-ready in-building physical infrastructure could have an impact on the property rights of the owners of the property concerned. This limitation must be considered justified and proportionate to the aim of reducing the cost of deploying high-speed electronic communications networks since it would exclude any need for retrofitting buildings with physical infrastructure.

The right of a providers of public communications networks to terminate its network at the concentration point in view of accessing the high-speed-ready in-building physical infrastructure, could have an impact on the right of property of the owners of private property concerned. Such restrictions are however limited by the obligation on the public communications networks to minimise the impact on the private property and to cover any costs incurred. Furthermore, this limitation must be considered justified and proportionate to

the aim of reducing the cost of deploying high-speed electronic communications networks since it would allow electronic communications operators to achieve economies of scale, when they deploy their networks.

The right of public communications networks to access any existing high-speed-ready in-building physical infrastructure could affect the property rights of the holder of the right to use the in-building physical infrastructure. This restriction is however limited since such access would have to be granted on reasonable terms and as it would only apply in cases where duplication is technically impossible or economically inefficient.

The right to an effective remedy for the parties concerned by the limitations outlined above are guaranteed by the possibility of referral to a competent national dispute settlement body, which should be without prejudice to the right of any of the parties to refer the case to a court.

A significant positive impact on investment could be beneficial for consumers, leading to slightly **increased coverage** and **reduced digital divide.** More citizens would then be able to benefit from innovative services enabled assistive technology, including social and public services (see Section 5.2). **For example, Analysis Mason made an attempt to evaluate** benefits of assistive technology enabled by high-speed broadband for independent living, for the EU27 countries, with total estimated savings in 22 Member States of EUR 1.727 billion per annum[92].

In addition to this further savings and benefits are possible, in support of rural and isolated areas. While it is not possible to exactly quantify these additional benefits (see footnote 23), it is obvious that these effects are higher than under Options 1 and 2.

5.6.3. Environmental impact: ☺☺

Under this Option, a significant increase in infrastructure sharing and civil works coordination arrangements for broadband deployment can realistically be expected. This, together with less damage to existing physical infrastructure resulting from mapping, would lead **to significantly reduced pollution, soil disruption, waste, etc. due to less duplication of civil engineering works.**

The measures suggested under this Option on the infrastructure level would also lead to an increased cooperation among sectors at infrastructure level (broadband could be deployed in synergy with energy and transport infrastructure, sewers, water, etc.). Specifically, with regard to the energy sector, the important role of the electronic communications sector in creating synergies with the utilities for smart grid deployment is confirmed by the work of the Smart Grids Task force[93], which is defining smart grid deployment models, where telecom companies have a significant role to play. Smart Grid opens up unprecedented opportunities for consumers to directly control and manage their individual consumption patterns, providing strong incentives for efficient energy use combined with dynamic electricity

[92] Analysys Mason on "The socio-economic impact of bandwidth" (SMART 2010/0033).

[93] The Smart Grids Task force (SGTF) is to advise the Commission on policy and regulatory frameworks at European level to co-ordinate the first steps towards the implementation of Smart Grids as defined by the Commission Communication COM (2011)202 on Smart Grids. The task force is jointly leaded by DG Energy and DG CONNECT for identifying synergies at infrastructure and services level between both the energy and telecommunication sectors.

pricing and the efficient integration of DER (distributed energy resources). The rollout of broadband will create a platform for traditional energy companies and new market entrants such as ICT companies to develop new and innovative energy services for enhancing the competition in the retail market, incentivise the carbon emissions reduction and provide opportunities for supporting the economic growth. Bringing together both energy utilities and telecom companies will boost the future competitiveness, will ensure access to broadband in isolated areas and will stimulate the rollout of digital energy services. It is estimated that smart grids could only reduce carbon emissions by 12% by 2030[94] with main levers being the integration of renewable energy sources and electric vehicles.

All in all, **given the cross-sector character of the measure, increased synergies could lead to a significant environmental impact, through faster smart grid and intelligent transportation systems deployment and therefore to energy efficiency gains and to CO^2 emissions reductions[95].**

5.7. Impacts of Option 4 mandating efficiency gains

Mandating cost reduction measures throughout the EU and across sectors

This option is expected to produce less positive economic impacts than Options 3a and 3b, and overall positive social and environmental impacts.

5.7.1. Economic impact: ☺☺

Under this option, an EU infrastructure atlas would be required, access to physical infrastructures would be imposed at cost oriented prices, and certain forms of coordination of public works would be imposed (mainly as regards public works). Finally, one-stop-shop on permit granting would be established and all buildings would need to become high-speed broadband ready by 2020. This Option is very clear as regards the scope of its obligations, including obligations across utilities.

The direct impacts can be summarised as follows. Mandating access to physical infrastructures across utilities at cost oriented prices would maximise sharing, but presents a significant risk of disincentives to investment in physical infrastructures, as expressed for example by cable operators in the Public Consultation. The potential for cooperation in civil engineering works is also maximised, but there might be risks regarding the efficient use of public resources and network security. Equipping all buildings with high-speed broadband ready access might also be excessively costly for the housing industry, costs which would be eventually passed to citizens. Despite all benefits related, the measures regarding the one-stop-shop, an EU infrastructure atlas and cost oriented infrastructure sharing seem to add significant implementation and administrative burdens compared to the previous policy option and thus to be very difficult to implement.

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94 The Smart Grid: An estimation of the Energy and CO2 benefits, 2010, Report by Department of Energy's Pacific Northwest National Laboratory

95 See also Methodologies to Measure the Potential of Smart Grids for Green House Gas Reductions, SG4-GHG, Final Report 2012, Study funded by DG INFSO.

To give an indication of the magnitude of the allowed savings in deployment costs under option 4, an assumption of 40% cost reduction is made over the amounts described in Section 5.2. This would lead to savings ranging from EUR 30.4 billion to EUR 83 billion.

On the other hand, this Option would also be the most costly one, including in the respect of implementation and administrative costs. In particular, the administrative costs for the implementation and managing of mapping databases following harmonised EU standards, with a central access point at EU level, would be significant. Although important synergies exist with the INSPIRE Directive and with the Broadband State Aid Guidelines, additional efforts would be required to cover all electronic communications infrastructure in a relatively short timeframe. The costs of defining ex ante cost-oriented prices across industries would also be significant, considering that most Member States do not have regulators which are competent across several sectors. Additionally, the cost for deployment of additional empty ducts for all public works to overcome time discrepancies in civil works coordination would need to be covered by additional public funding. Although this cost is estimated to be marginal, question marks might nevertheless appear on the efficiency of such intervention. Significantly higher costs in human resources, legislative changes and possibly IT investment for the fulfilment of the one-stop-shop on permit granting procedures since various competencies would need to be merged and integrated.

For a detailed analysis of impacts on direct stakeholders of Option 4 refer to Annex VIII and IX.

Moreover, this option can present significant disincentives to invest which might negatively affect the overall broadband deployment. As mentioned in Chapter 3, the general objective of this initiative is to stimulate investment, therefore Option 4, which scores very well on the specific objective of bringing down broadband rollout costs, appears all in all to be rather risky. As a result, the direct economic impacts are estimated to be lower than under the previous policy option. In fact the impacts on network deployment and on competition seem to be moderately positive, while the burden for public authorities high.

On the other hand, this Option presents clear benefits from a Single Market perspective. The existence of a unified, coherent EU mapping system would significantly facilitate access and allow economies of scale in planning investments for cross-border operators. The same argument is valid for a one-stop-shop, which would reduce barriers to entry to national markets. Compared to the "business as usual scenario", but also to the preceding scenario, this policy option would have increased positive effects on the Single Market. The consolidation of the Single Market could allow the EU telecom players to become more important global players and potentially increase EUs competitiveness vis-à-vis third countries.

5.7.2. Social impact: ☺☺

This Option promises **moderately positive impact** on network investment and on high-speed broadband availability. It follows that impacts on **employment would also be, in best case, moderately positive**. A small amount of new jobs could in particular result from innovation in relation to cross-sector cooperation and from additional public works in relation to laying spare capacity. The stronger mechanisms to ensure the use of existing physical infrastructure and cooperation in civil engineering works would guarantee the smallest amount of

unnecessary works and thus significantly **reduce public nuisance.** A particular case is that of the imposed demand for high-speed broadband ready in-house equipment would significantly stimulate the jobs in related areas, but also add significant public nuisance in relation to new potentially unwanted works.

Further effects could arise from an increased availability of the high-speed broadband (which would be higher than in the first two scenarios but lower than in the third policy option): **better access to services, reduced isolation**, etc.

On the other hand requiring that all building should be equipped with broadband ready installations by 2020 would require significant investments by the owners of existing builds. The scale of these investments would depend on the actual state of existing installations. In addition, the property rights of owners, the right to privacy and the protection of business secrets as well as the right to conduct a business would be subject to limitations in much bigger extent than under option 3.

5.7.3. Environmental impact: ☺☺

The stronger mechanisms to ensure the use of existing physical infrastructure and cooperation in civil engineering works envisaged under this Option guarantee **the smallest amount of unnecessary duplication of works and therefore positive impacts on the environment** (pollution, waste, soil disruption etc.).

This Option furthermore **allows cross sector synergies to be exploited** (in particular for faster deployment of smart grids or in the implementation of the INSPIRE Directive). More precisely, given the cross-sector character of the measure, synergies could lead to faster smart grid and intelligent transportation systems deployment and energy efficiency gains. Mapped information on planned investments could be used for spatial planning purposes.

5.8. Summary of impacts

The overall impacts of each policy option – economic, social, and environmental – can be visualised in the graph below:

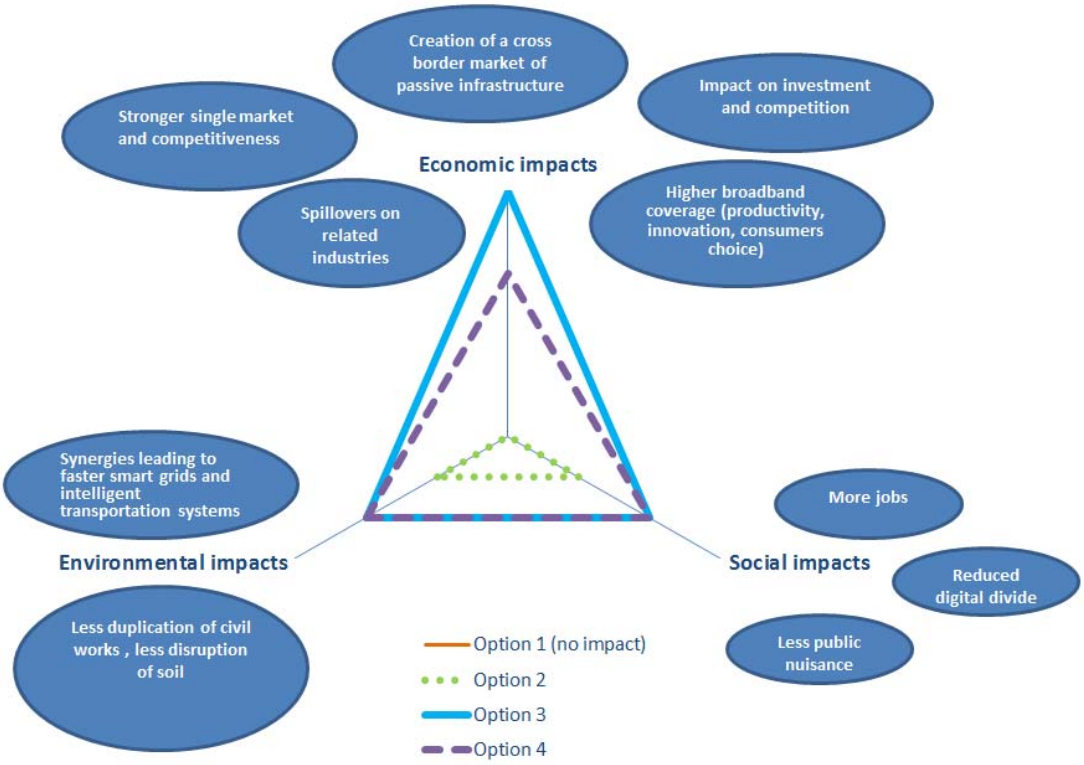

Figure 16 - Summary of main impacts of Option 1 to Option 4

6. CHOICE OF THE PREFERRED OPTION

This chapter gives an overview of the main arguments leading to the selection of policy options, in view of the operational objectives described in chapter 3. A full analysis is available in Annex X (Assessment of the effectiveness, efficiency and coherence). Options have been assessed against on the following criteria:

Effectiveness of the measures: are the measures proposed in the policy options sufficient to attain the operational objectives set?

Efficiency, including costs and benefits, of the measures (as described in chapter 5);

Coherence: Is the balance between effects across economic, social and environmental domains ensured? Are they coherent with the overarching objectives of EU policy?

The analysis shows that the significant efficiency gains cost reduction potential cannot be sufficiently exploited and passed on to the benefit of increased network rollout in the current fragmented (baseline) scenario. This finding is also valid if activities facilitating exchange of best practices are carried out and additional guidance provided, as foreseen under Option 1. In view of this lack of effectiveness, such a policy option falls short to achieve any of the desired operational objectives and should not be retained.

Option 2, by promoting a more intensive, coherent and harmonised application of the existing provisions and tools under the current electronic communications regulatory framework would have some (limited) positive effects compared with the baseline scenario or Option 1,

hence some effectiveness. With little costs but also limited benefits, this option would however not deliver the expected efficiency gains. Moreover, this option would not ensure sufficient coherence with the general policy objectives of the EU, as defined in particular in the Digital Agenda for Europe.

In contrast, Option 3 exploits the cost reduction potential to the full by extending the scope of the binding measures across sectors and throughout the broadband deployment steps. At the same time, the rights and obligations provided for would preserve commercial negotiations, an incentive on its own, and would respect the organisational autonomy of Member States (as reflected in the sub-options), hence avoiding unnecessary burdens on stakeholders and Member States. This option may imply additional costs and intervention at national level compared to options 1 and 2. However these costs depend very much on the structures and systems in place in Member States, and in practice significant savings would be made if Member States decide to implement those measures in a flexible way. More importantly, these costs appear to be offset by the significant benefits expected in inscreasingly efficient broadband deployment by operators and better broadband coverage for the society as a whole. Overall, option 3 ensures effectiveness in the view of identified objectives with a very good ratio of costs and benefits and coherence with general objectives of the EU policy (such as the Guidelines for Broadband State Aid and the INSPIRE Directive). Overall, this option appears therefore to be both effective and highly efficient, while ensuring coherence with the general objectives of the EU.

By manding cost reduction measures throughout the EU and across sectors, Option 4 appears to maximise the benefits for undertakings seeking to deploy broadband networks. As such, it appears to be the most effective option. However, it would entail a number of obligations and constraints in practice, which may be unnecessary or disproportionate to the achievement of the desired objectives. Compared to Option 3, Option 4 would add significant institutional complexity including transfers of competences. It would also generate significant additional costs due to specific obligations, such as those concerning in-house equipment. Moreover, business choices might be seriously impaired, with the risk of associated disincentives to invest, leading to fewer social benefits and for the environement, thus impeding the general objectives of the EU and the overall coherence of this option.

In view of the above, it appears that Option 3a is the best option available, given its effectiveness towards the identified objectives, costs-benefits analysis / efficiency and coherence of exploiting the cost reduction potential with general EU policy objectives.

Table 4 - Comparison of policy options by using standard criteria of effectiveness, efficiency, coherence.

	Effectiveness	**Efficiency**	**Coherence**
Option 1	Identified objectives not attained. The expected benefits would affect a limited number of stakeholders in a limited number of Member States. Voluntarily applied best practices would be limited to measures provided under the regulatory framework leaving the potential for savings from cross-sector deployment not exploited.	Some resources would be needed in those Member States that would decide to follow best practices. Yet, despite the presence of several initiatives at local and national level, the specific inefficiencies would not be sufficiently addressed. There are little synergies between national approaches and the best practices are rarely followed by others. The limited coordination achieved by guidance at EU level could only provide some common elements or best practices for consideration by central and/or local authorities when deciding to act. Overall, the impacts of this option would remain negligible, meaning little efficiency of the option.	Absence of economic, social and environmental impacts. No added value comparing to the action undertaken so far by the Commission to stimulate broadband rollout.

Option 2	The specific objective, i.e. to reduce bottlenecks and inefficiencies related to broadband rollout could be attained to some extent with regard to telecommunications providers in those Member States that would put in place propagated measures. In terms of operational objectives, the restriction of the scope to the electronic communications sector only would significantly impair its effectiveness in particular with regard to objective 3.2.1 (increasing the use of existing physical infrastructure suitable for broadband rollout) and 3.2.2 (increasing coordination in civil engineering projects)), as cross-sector deployment would not benefit.	Resources would be needed in those Member States that would decide to take-up measures promoted by the Commission under regulatory framework; The scale of the costs would differ among Member States. The costs could be slightly higher comparing to option 1, depending on the extent in which the recommendations would be followed. The impacts would be uneven across the EU, with positive impacts only in those Member States that would put in place promoted measures and would affect electronic communications operators only. While voluntarily applied recommendation(s) could lead to a more efficient deployment, fragmentation regarding the use of non-telecom infrastructure and the coordination of civil engineering works across sectors would not be improved, which would limit the efficiency of the option, leaving the full costs saving potential of cross-sector cooperation unexploited. The overall efficiency of this option would be limited.	Economic, social and environment impacts would be positive but their overall coherence would remain low, as this option does not contribute much to the overarching objectives as set out in the Digital Agenda for Europe and the Single Market Act II.

Option 3	The scope and scale of enabling measures under this option could ensure effectiveness, with all operational objectives attained, thus satisfying the specific objective while maximising cost savings. Rights and obligations accorded to electronic communications undertakings would allow to overcome existing barriers in a 'business friendly' way. In particular, the establishment of a right to use existing physical infrastructures under reasonable terms, coupled with a dispute settlement mechanism in case of failure, would ensure the possibility to exploit the potential of duct sharing, while preserving commercial negotiations. Moreover, the definition of a minimum set of information coupled with the right to request more detailed information/in site visits would keep the costs reasonable and limit the obligations on operators to what is necessary to ensure the objective. Providing a single information point to the market would make permit granting procedures and conditions more transparent and predictable, while leaving the decision to the authorities closest to the specific aspect to be regulated; finally restricting high-speed broadband ready in-house equipment to new buildings or major reconstruction works, would keep the costs on operators and owners reasonable. Under sub-option 3B, specific operational objectives (3.2.3 streamlining administrative procedures related to network rollout throughout the EU and 3.2.1 concerning the transparency needed to increase the use of existing physical infrastructure suitable for broadband rollout) might not be reached to the same extent in all Member States and at the same pace.	Additional resources would be needed from national authorities, communications providers, utilities and property owners to ensure the expected positive economic impacts regardless of the sub-option chosen. Providing market players with rights and obligations would lead to removing existing regulatory and unreasonable commercial barriers to infrastructure sharing and to coordination of planning civil engineering works, including cross-sector ones, while preserving commercial negotiation, subject to an ex post dispute resolution system aiming at ensuring a fair exercise of those rights. This option would also increase transparency, an important driver of infrastructure sharing, which in turn has an impact on costs, related to broadband rollout. The electronic communications undertakings would also be entitled to get information on transparent procedures and conditions for permit granting; they would benefit from economies of scope and scale in equipping new buildings with high-speed broadband ready infrastructures, whereas consumers could take advantage of such NGA ready equipment. Compared to option 1 and 2, where decisions about implementation of the measures currently available or promoted by the Commission depend on the Member States, a key element of the proposed measures lies in ensuring the cross-sector nature of this measure, which involves all the steps of network deployment. Against this background the efficiency of this option would be very good.	Given the expected impacts of the measures under this option, especially if translated into a binding measure, the coherence of this option with the general objectives of the Digital Agenda for Europe and Single Market Act II as well as other undergoing initiatives, is much more significant than under Option 2 and baseline scenario. All three types of impacts are positive and therefore balanced, despite a predominance of positive economic impacts over the social and environmental ones.

Option 4	In principle, mandating specific solutions would ensure that all identified objectives could be attained in all Member States. As far as transparency is concerned, the setting up of such a system would require significant operational costs for public institutions, information providers and access seekers, since the establishment of a European central point could mean mandating centralised features and a common database format. The imposition of ex ante cost orientation, in particular for access to telecom ducts and co-deployment, while reducing the costs for access seekers, could also undermine the incentives to invest. As such this measure could exceed what is necessary to reduce barriers to deployment. Similarly, the imposition on public actors of an obligation to deploy empty ducts when other infrastructure is laid down could reduce the incentive of private investors to invest in the first place, while waiting for future public investments, and it would entail investments which might not be recouped in the absence of market interest. Moreover permit granting requires local knowledge, which might not be ensured with full centralisation. Finally, generalising the obligation to equip building with high-speed broadband ready infrastructure would generate significant costs on property owners. In view of the above this option would go beyond what is necessary to achieve the envisaged operational objective, while putting at risk the general objective to which this initiative subscribes. Mandating specific solutions would create new obligations and constraints on stakeholders limiting the overall effectiveness.	Significant resources would be needed from authorities, communications providers, utilities, property owners; the Commission would also need to commit resources. This option would ensure the availability of the same information on the infrastructures suitable to host electronic communication networks all over the EU through a single point of contact, favouring in particular cross-border providers. The imposition of ex ante cost orientation regulation in the use of existing physical infrastructures and negotiating co-deployment would extend the regulatory competences already envisaged under the current Regulatory Framework to potentially every physical infrastructure and planned work and without the need of a market analysis, in view of ensuring as much cost reduction as possible. Moreover, in order to fully exploit the synergies of coordination of works financed with public money and to address the timing mismatch in investment decisions, the general obligation to lay down empty ducts suitable for electronic communications networks further aims at increasing effectiveness of the measure. A unique authority at Member State level would address completely the identified problems of lengthy, complex, diluted, and different permit granting procedures at local level in a number of Member States. Finally general obligation to have high-speed broadband ready buildings by a specified date would entail that by the indicated date all the buildings in the EU would have to be NGA-ready in terms of in-house equipment, in-house wiring and termination segments. Due to significant costs and disincentives to invest, however, the impacts overall would be less efficient.	Economic, social and environment impacts would be positive; yet, given some inefficiencies their overall coherence would be more limited than in option 3. Moreover, the risk of being counterproductive makes these measures costs-benefit inefficient also in the wider context and thus, their coherence would be smaller than in case of option 3.

7. MONITORING AND EVALUATION

This chapter presents the monitoring and evaluation mechanisms set in place in relation to this initiative. A choice was made for the lightest possible reporting obligations on the part of industry and national authorities, which at the same time allow to evaluate the extent to which objectives of the initiative are being attained and therefore to evaluate the instrument as such.

As explained in the previous chapter, the most effective and efficient policy option is the enlargement of the current regulatory framework so as to truly **enable** the implementation of such measures throughout the EU. A deliberate choice was made **against mandating** the utilisation of some cost reduction measures. For example, mechanisms need to be in place to facilitate cooperation in civil engineering works or usage of existing physical infrastructure; yet this cooperation is not mandated. At least as far as relationships between industry players are concerned, the obligations imposed via this initiative are, to a great extent, dealing with process (facilitation, enabling), rather than imposing a given outcome.

In principle, this choice has an impact on the indicators suitable to report on the outcome of this initiative: general indicators concerning the costs of deployment can provide a proxy of the effectiveness of the measures proposed *vis-à-vis* the specific objective of the proposal. Yet, on the basis of a relatively conservative estimate provided by Analysys Mason for "a typical Member State" in the context of integrated cost reduction solutions (see for details footnote 26), it is expected that the coherent and systematic application of the set of measures proposed under this initiative can bring down the costs of rolling out high-speed broadband networks by 25%, whereas with regard to specific operational objectives the benchmarks are as follows:

- at least 25% of the deployment takes place in pre-existing infrastructure;

- at least 10% of the high speeds networks are set up in co-deployment;

- as regards administrative procedures, as the main objectives are of a rather qualitative nature, no quantitative indicator is proposed for this specific objective. Progress in this area will be ensured through analysing qualitative indicators such as fair and timely decisions on applications, transparent and reasonable conditions to permits;

- at least 5% of the newly deployed networks reach multi-unit dwellings which are high-speed broadband ready.

The progress corresponding to attaining the **operational objectives** of the initiative (sharing of infrastructure, coordination of works, number of high-speed broadband ready houses, transparency and timeliness in granting administrative permits) will be checked upon through studies and surveys undertaken by the Commission. In contrast, including reporting obligations corresponding to these operational objectives would have significantly increased the administrative burden on companies and administrations.

The indicators for the **general objective** should also not be part of a separate reporting exercise and should be registered by the Commission from available sources, as data on investments are reported already in the framework of the Digital Agenda Scoreboard exercise and could be the subject of additional studies.

Based on all the information acquired through the Digital Agenda Scoreboard exercise and through the dedicated studies, the Commission should then evaluate, every three years, the impact of the proposed instrument, with a view to proposing necessary adjustments, if necessary.

8. LIST OF ANNEXES

I. Main outcomes of the public consultation

II. Minutes of the last IASG Meeting

III. Analysis of baseline scenario

IV. Study Analysis Mason

V. Main discarded policy options

VI Relevant provisions under the current regulatory electronic communication framework

VII. Analysis of the evolution of broadband rollout, the digital divide and the achievement of the Digital Agenda targets by 2020

VIII. Impacts by stakeholders: distributional analysis

IX Analysis of impacts and administrative costs by option

X .Assessment of the effectiveness, efficiency and coherence

XI. Glossary and Bibliography