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COMMISSION STAFF WORKING DOCUMENT

ON THE IMPLEMENTATION OF NATIONAL BROADBAND PLANS

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ON THE IMPLEMENTATION OF NATIONAL BROADBAND PLANS

1.   BACKGROUND AND AIM

In its Broadband Communication[1], the Commission stressed the importance of all Member States having an operational broadband plan with defined national targets aligned on European broadband targets, as well as a balanced set of policy measures to incentivise investment in fast and ultra-fast internet, specifically based on reliable and thorough implementation of the EU regulatory framework for e-communications, consistent implementation of the Radio Spectrum Policy Programme[2], adequate cost reduction measures and coherent application of the State Aid Broadband guidelines[3]. In support of these plans, the Communication included a commitment to review national broadband plans as part of its Digital Agenda governance.

This paper examines the current state of play with respect to the implementation of national broadband plans in the EU-27 countries, Croatia, Norway and Switzerland. It attempts to foster the sharing of best practices with a view to providing further guidance to Member States on how to succeed in applying effective measures to achieve both national and Digital Agenda broadband targets. The information presented was elicited in particular from dedicated questionnaires and national broadband plan workshops organised in autumn 2011 as well as additional input provided by countries as part of the Digital Agenda High Level Group process.

Section 2 looks at the targets set for national plans as well as institutional aspects. Section 3 assesses private and public broadband investment activities. Section 4 summarises national approaches to facilitating broadband investment. Section 5 explores national strategies to stimulate demand for broadband and digital services. Section 6 draws conclusions and outlines the next steps.

2.   NATIONAL BROADBAND PLANS: TARGETS AND STRATEGIC AND INSTITUTIONAL ASPECTS

2.1.   Overview

The Digital Agenda for Europe (DAE)[4] called on all Member States to devise and make operational by 2012 national broadband plans which meet the level of ambition of the broadband targets set out in Europe 2020. To date, 22 Member States have national

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1   COM (2010) 0472 final,
        http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC0472:EN:NOT.
2   COM (2010) 0471 final, approved by the European Parliament and Council on 15 February 2012;
            http://register.consilium.europa.eu/pdf/en/11/st16/st16226.en11.pdf
3   http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52009XC0930(02):EN:NOT.
4   COM (2010) 0245 final/2, http://ec.europa.eu/information_society/digital-agenda/index_en.htm.

broadband plans (some of which are under review) and the remainder are in the process of drafting their plans. This section will review the substance of national plans with respect to national and DAE broadband targets and examine some strategic and institutional aspects related to implementation.

2.2. Targets of national broadband plans

There are wide variations in the targets set by Member States, partly reflecting the range of different starting points. So far, five have subscribed to the entire set of DAE (broadband) objectives; a few others have indicated their intention to do so. Convergence for full basic broadband coverage is greatest around the 2013 target.

2.2.1. Basic Broadband

Eight Member States (Denmark, Finland, France, Luxembourg, Latvia, Malta, Netherlands and the United Kingdom) have already achieved full coverage for basic broadband services and a further 17 have set a corresponding quantitative target, or are about to do so. There is a range of definitions of 'basic' download speeds from 512 Kbps to 4 Mbps. In many cases the timing is more ambitious than the DAE deadline of 2013; however, not all plans envisage full basic coverage by that date. At this point, closing coverage gaps remains an issue predominantly for rural areas[5]. Annex 1 provides an overview of national targets.

On the basis of national broadband plans a lower bound can be estimated for the availability of basic broadband by 2013. Assuming that all Member States reach their basic broadband coverage targets and that those countries which do not have a quantitative basic broadband coverage target for 2013 remain at their 2010 coverage level, nearly 99 % of the EU population should benefit from basic broadband coverage by 2013. On the demand side, three countries (Austria, Belgium, and Romania) have defined penetration targets for basic broadband.

2.2.2. Next Generation Access (NGA)

Approaches to ultra-fast networks vary more widely than basic broadband. They can be clustered into three groups of countries:

(1)   those for which the primary challenge is basic broadband coverage and high speed connections are of secondary importance;

(2)   those for which basic coverage is complete or almost complete and a gradual upgrade to speeds between 30 and 100 Mpbs is envisaged;

(3)   those which already have highly-developed networks and are aiming for full transition to NGA with connections of 100 Mbps or above in the near future, thus overshooting the Digital Agenda for Europe 2020 target.

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[5]   On the issue of availability and the role of high-speed networks in rural areas, see also Commission Communication "Better access for rural areas to modern ICT", http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0103:FIN:EN:PDF

So far, 21 Member States have defined quantitative coverage objectives for the deployment of NGA with download targets ranging from 25Mbps to 1Gbps and with coverage footprints between 75 % and 100 % of households or population (see Annex 1). Upload speeds receive virtually no attention. A rare case is Luxembourg with an ultimate NGA target of 1Gbps/0.5Gbps (download/upload) by 2020. Plans are currently being revised in several Member States.

In setting NGA targets, several Member States focus on what is achievable by 'optimised' market forces. They acknowledge the need to 'improve the market', which may require limited public funding, but are not prepared to countenance large-scale public intervention. The most quoted reason seems to be that there is not sufficient evidence of market failure, as there are not many applications which would require NGA bandwidths in the foreseeable future. In support of this argument they point to low take-up rates in areas where ultra-fast connections are already available. These countries tend to fix high-speed targets in line with what they predict the market will supply, although some indicate that they would be ready to revisit their approach in the event of a substantial change in supply and demand parameters.

In terms of demand for NGA, only five countries (Cyprus, Hungary, Italy, Lithuania and Portugal) which have fully subscribed to the DAE targets have integrated take-up targets into their broadband plans. The fact that so few have entered into commitments reflects the belief that demand will follow supply and, hence, a policy that leads to the desired supply is all that is needed. Again, a number of Member States question the rationale for ultra-fast broadband subscription targets, claiming there is little evidence of market failure and no visible externalities associated with a connectivity subscription as such. This group tends to disregard, or disagree, that widespread usage of high-speed connectivity may be a precondition for the development of new applications which are not necessarily known today or that already today the simultaneous use of numerous existing applications may push current bandwidths to their limits.

2.3. Technology mix and role of competition

Most national broadband strategies stress the importance of a technologically neutral policy stance. In practice, this has two major implications. First, economic considerations suggest that a specific technology should be used where it is the most efficient way of delivering a given quality of service. This notion should serve as a guiding principle for public intervention. Many governments acknowledge that wireless solutions, including satellite technologies, are indispensable for full basic coverage. By the same token, some emphasise the superiority of fibre solutions for delivering and guaranteeing very high bandwidths, as this would allow regions which are lagging behind to leapfrog. Second, the principle of technological neutrality requires avoiding distortions of market choices between different, competing technologies. These two implications of technological neutrality do not only apply at a single point in time, but to the entire investment path. As broadband solutions are subject to technological progress, the current performance of a given technology is not always a good indicator of future performance (especially wireless). The upshot of this is that policy makers should be aware that investment decisions which are based solely on assessments of current performance may create lock-in effects which may limit future flexibility to adopt another solution, potentially more efficient, arising as the result of technological innovation. However, governments can also support efficient investment decisions by carefully assessing options to mitigate risk

in relation to future technological solutions and by avoiding any ambiguous communication in their interaction with market players which may potentially compound technological uncertainty.

Member States generally welcome competition between different technologies, and also share the perception that competition between providers of electronic communication services is a key factor in driving investments in network upgrades and roll-out (e.g. in Belgium, Germany, Netherlands and the United Kingdom), at least in areas where network investments are economically viable in principle. Some cite developments in their respective markets as supporting evidence.

2.4. Institutional set up

Broadband planning is an issue that requires input from different lines of responsibility within government and more broadly public administration. It has an impact on many more, if not on the entire public sector. However, as the internet and broadband are relatively new issues, departmental responsibility tends not to be clear. This can lead to problems in the implementation of broadband plans. Even where a leading institution does have a clearly defined responsibility, there are usually a large number of parties involved in the execution of the plan, often including state and regional governments and administrations, local authorities, municipalities and the private sector. National Regulatory Authorities (NRAs) are increasingly involved in the process, in particular in developing civil infrastructure registers, in spectrum management or by providing advice on state aid compliance. In addition, it is important that NRAs, which are required to 'promote efficient investment and innovation in new and enhanced infrastructures'[6], take the DAE targets into consideration when devising, reviewing and consistently implementing regulatory measures.

Another relevant institutional aspect is administrative capacity at local and regional levels. Insufficient expertise on the part of the responsible authorities in planning, managing and implementing publicly (co-)funded projects can compromise the effectiveness of measures and severely inhibit the timely mobilisation of available budgets, as in the case of structural and rural development funds, and hinders broadband investment.

Institutional structure therefore plays an important part in the effectiveness of broadband planning and, consequently, in its implementation. An efficient administrative structure can better target scarce public money and overcome coordination problems, such as when the lead institution is neither responsible for administering the funding (often the case with EU funds) nor has sufficient own funding at its disposal. It is essential to coordinate the measures taken by central government, local authorities, NRAs and other relevant authorities, including authorities in charge of spectrum management.

Examples: The Czech Republic, Bulgaria and Cyprus set up an advisory group or committee of relevant stakeholders from the public and private sector, such as ministries, regional bodies, industry and academia (Bulgaria, Cyprus). The Italian Government set up a coordination roundtable with regions and municipalities and tried to strengthen their

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[6]   Article 8 (5)d) of Directive 2002/21/EC (the Framework Directive).

commitment by concluding framework agreements with individual regions. In France, a global governance process was created for the national broadband strategy including all stakeholders (e.g. administrations, operators, NRA). The NRA was closely involved in the development of national broadband measures and assisted central government in constructing NGA funding schemes. Spain and Belgium have also implemented a collaborative model involving autonomous communities at regional level, local entities, public and private institutions and enterprises. Latvia's consumer protection authority is represented on an advisory board which assists central government in overseeing the country's publicly-funded construction of passive and backhaul infrastructure, such as by providing opinions on access prices and conditions.

2.5. Monitoring

All Member States can benefit from being able to monitor their progress against each other from the statistics made available via the Digital Agenda Scoreboard[7]. This is supplemented by national monitoring to detect deviations from national plans and ensure that timely action is taken.

Many Member States have at least basic monitoring of broadband coverage and penetration and do this by producing national broadband speed maps. A broader notion of monitoring comprises a thorough assessment of the effectiveness and suitability of the measures chosen and a set of recommendations designed to serve as a guideline for further improvements. Several governments consider monitoring of this kind to be an internal task which is to be performed on a permanent basis. However, only a few countries have so far commissioned an independent, external body to carry out an extensive evaluation of their entire strategy on a regular basis.

Examples: Germany subjects its national broadband strategy to an annual strategic review, which is carried out by an external consultancy and includes an in-depth progress assessment and proposals for corrective measures. Denmark also plans to undertake an independent strategy review by 2017. Spain requested the OECD to conduct a Peer Review of Plan Avanza, the country's strategy for the advancement of the Information Society.

3. INVESTMENT STRATEGIES AND PUBLIC AND ALTERNATIVE SOURCES OF BROADBAND FUNDING

National broadband plans and their measures are closely intertwined with observable investment strategies in the respective national markets. There are several categories of players behind current investment plans and activities, including federal governments, local authorities and municipalities, incumbents, cable operators, regional telecommunication providers, mobile network operators, utilities and public-private partnerships.

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

3.1. Private sector investment

3.1.1. Fixed networks

In general, migration to NGA is taking place at a moderate pace. Most incumbents are upgrading to VDSL[8] with some small-scale FTTB/H[9] trials or roll-outs. Only a minority have sizeable fibre investments at this stage or plan a complete copper switch-off. Exceptions can be found, such as in Portugal, where the incumbent envisages boosting its FTTH footprint to 1.6 million households, or Cyprus, where the incumbent has unveiled plans for 100 % FTTH coverage by 2020. In France, the incumbent and a major competitor have concluded an agreement that helps to avert duplication of fibre networks. The agreement covers the connection to fibre by 2020 of 11 million households in their combined geographic footprint in less densely populated areas, complementing fibre projects in conurbations and raising total expected fibre coverage to 60 % of households by that date. In Slovenia, an alternative operator, initially offering services based on local loop unbundling (LLU), seriously channelled the incumbent with geographically broad fibre network deployment, which led to parallel deployments of ultra-high speed broadband in several urban areas.

An example of a successful joint venture can be found in the Netherlands, where a private investor and the incumbent have jointly covered some 13 % of the Dutch territory in less than two years.

For most cable operators, upgrading of existing infrastructure is to DOCSIS 3.0[10] and there is little or no extension of their coverage with coaxial cable networks. The few which do invest in new passive infrastructure, such as a major cable operator in Portugal, typically deploy FTTH.

In some countries (the Czech Republic, Denmark, Germany, Switzerland) regional or local players have deployed their own fibre networks in the vicinity or have announced plans to do so. One group consists of well-established regional telecommunications operators which initially entered the market on the basis of regulated access products such as LLU and which now pre-empt the incumbent in fibre investments. While these companies may be affiliated with local utility companies, energy providers which were not previously present in telecommunications markets are also considering fibre-based market entry. This is particularly evident in the Nordic countries, where several entities have recently invested in fibre and now market wholesale, and sometimes even retail, products. For example, a Danish energy provider is planning full fibre coverage of the southern regions of Denmark by 2015. Typically, regional players extend their coverage sequentially from more to less profitable areas in their region. For both established and new telecommunications providers close ties with local communities and synergies with other lines of business, such as the energy branch, play to their advantage. For example, upgrading energy networks to smart grids and related applications will be making the most out of existing backbone communications infrastructure of energy networks, but might also open up economical opportunities to deploy fibre for the provision of

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[8]   Very high bit-rate Digital Subscriber Line.
[9]   Fibre To The Building / Home.
[10]   Data Over Cable Service Interface Specification.

electronic communications services to end users. Furthermore, there are different forms of joint ventures involving local initiatives, network operators or local businesses.

3.1.2. *Mobile networks*

Mobile broadband has recently been growing faster than fixed business. 3G networks are at an advanced stage of deployment. The key drivers of an aggressive shift to mobile solutions are sophisticated, albeit user-friendly, terminals requiring bandwidth-hungry mobile services based on Long Term Evolution (LTE) and LTE Advanced (4G) technology. The main constraint to deployment of next generation mobile broadband is a delay in the assignment of spectrum dividend released by analogue switch-off in some countries (see 4.3). Countries where licences have already been issued typically report a surge in the upgrading of aerials and cells. Soaring mobile data volumes will also reinforce the need to modernise the backhaul of base stations by installing high-speed fibre connections, enabling heavy traffic offloading from radio networks.

3.2. Public sector investment and funding

At the national level, public sector broadband investment is mainly driven by considerations of economic efficiency, with priority given to investment where there is market failure, and is limited by current budgetary constraints across most of the EU. Most Member States see network investment as predominantly a private sector activity and think that the role of the public sector should be complementary to this. However, the volume of complementary public spending falls far short of what is required to fill the gap between currently known private sector investment plans and estimates of the necessary investments for the DAE targets. The Broadband Communication[11] notes that total investment of 'between €38 billion and €58 billion would be needed to achieve the 30 Mbps coverage for all by 2020 (using a mix of VDSL and next generation wireless) and between €181 billion and €268 billion to provide sufficient coverage so that 50% of households are on 100 Mbps services'.

At a time of public spending austerity, a near-term structural overhaul of positions on public broadband funding is not in sight, although some countries are currently reviewing the options. Some Member States are convinced that technological innovation and rising private investment, combined with measures to strengthen private incentives, will deliver the desired outcome.

3.2.1. *Basic broadband*

Closing gaps in basic broadband coverage is the predominant focus of current publicly funded initiatives. The most important sources of funding for these initiatives are either national budgets or structural and rural development funds, or a combination of both. In 2007 to 2013, the European Regional Development Fund (ERDF) provides about € 2.3 billion to ensure access to basic broadband out of a total of € 15 billion for ICT priorities (4.4 % of total cohesion policy funds). Furthermore, a one-time complementary stimulus

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[11] COM (2010) 0472 final,
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52010DC0472:EN:NOT.

was provided via resources set aside for broadband in the European Economic Recovery Plan (EERP)[12].

Some additional funding also comes from subnational levels of government such as states, regions, counties and municipalities. The funds are mainly spent in the form of grants because of the high cost of investment in sparsely populated areas. In some countries, it is up to local communities to take the initiative of applying for funding to subsidise basic connectivity. Elsewhere, national governments have created and managed countrywide schemes to eliminate existing gaps in coverage.

Examples: Ireland took a proactive approach by designing two complementary schemes. First, the 'National Broadband Scheme' (NBS) used ERDF co-funding and a public tendering process out of which a private mobile network operator was selected to provide end-user services with at least 1.6 Mbps in all unserved regions. Following the completion of the NBS in 2010, the 'Rural Broadband Scheme' (RBS) was set up to establish basic connectivity for all individual premises which, for technical or geographic reasons, were still not served by the market or earlier interventions. It is expected to be completed in the course of 2012.

Another approach is to establish a first point of presence in rural communities by rolling out fibre to a centrally located public institution or termination point. Slovakia did this, drawing on ERDF funds from the national operational programme to fund the roll-out of regional optical networks to white spots. This is supplemented by rural funds to build access networks in several communities where private sector investment in this segment is most unlikely.

3.2.2.   Next Generation Access (NGA)

Up to now public funding for NGA plays a rather subordinate role in many national administrations. Most governments are waiting for more clarity with respect to market players' investment plans, the effectiveness of measures to facilitate investment and future demand for NGA bandwidths and services.

NGA strategies encompass a more flexible set of tools for financing which go beyond the use of grants and include financial instruments such as loans or guarantees. This may be because NGA schemes do not exclusively target rural areas which are not served, but also urban or suburban areas where the provision of suitable debt or equity facilities might be sufficient to incentivise additional projects.

Examples: France has established a comprehensive national programme for the roll-out of ultra-fast broadband which comprises a mix of funding instruments. One component is €900 million of subsidies for projects by local authorities to roll out NGA. Eligible technologies will mostly be FTTB/H, but also upgraded copper networks and ancillary wireless solutions. A further €1 billion has been earmarked for loans to private investors seeking to deploy NGA and a third component allocates up to €100 million to research and development of high-speed satellite solutions. Interestingly, the requirement to

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[12]   COM(2008) 0800 final,
         http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0800:FIN:EN:PDF

delineate areas eligible for the different facilities in the programme and the surveys carried out to elicit the necessary information have helped to reveal more details about market players' investment plans.

Portugal invested funds from the European Economic Recovery Plan (EERP) to deploy NGA in 140 rural municipalities. Successful bidders were required to connect at least 50 % of the population in each municipality with a guaranteed minimum speed of 40 Mbps downstream within 2 years. Portugal has also created a € 800 million credit line open to all NGA investors.

Already in 2010, the United Kingdom had earmarked £ 530 million for closing gaps in basic broadband coverage and ensuring that ultra-fast broadband reaches at least 90 % of households.

Austria and Spain are planning partial reinvestment of the proceeds from the digital dividend auction into the sector. Sweden has already done this.

Estonia, Latvia and Lithuania use structural funds to implement a model whereby public sector investments, or a combination of public and private investments, extend optical fibre backhaul to rural areas and establish points of presence serving as a basis for the deployment of last-mile access networks by private operators. In Estonia, a foundation is setting up a fibre base network as well as fibre connection points so as to give all homes, businesses and institutions the opportunity to connect to a network supporting speeds of at least 100 Mbps ('EstWin project'). The core objective is to increase coverage so that 98 % of households, businesses and institutions are located within 1.5 km of the nearest connection point by 2015. Private operators can lease fibre connectivity at the termination points on non-discriminatory terms and install equipment for access networks. Sweden has set up a 'ducting fund' to support the laying down of passive infrastructure as a basis for subsequent broadband deployment.

In Italy, the National Strategic Project for ultra-fast broadband will rely on both public and private funds; both this project and the national broadband plan for basic broadband will require specific agreements among regions, autonomous provinces, local authorities and central administration. Implementation of this project is expected to start with a first injection of nearly € 0.5 billion of structural funds reserved for regional projects from Calabria, Puglia, Sicilia, Basilicata, Sardegna and Molise.

Finland advises local municipalities on how to incorporate special entities dedicated to deploying NGA in areas not served by the market, e.g. as a joint venture of multiple municipalities or in partnership with private operators.

In some cases where national governments have been cautious about funding NGA, regional and local levels of public administrations have stepped in. A rising number of municipalities and regions are developing their respective concepts for network upgrades, often backed, at least partially, by own funding. Projects include the construction of passive infrastructure for subsequent use by network operators or holistic concepts covering both infrastructure and operation of the network, typically in cooperation with telecommunications providers or utilities. Some local projects are more user-driven, for example in cases where a large percentage of local residents and businesses have collectively taken equity stakes in an entity created to deploy a local fibre network.

Sometimes local or regional authorities have submitted their own state aid notifications on a case-by-case basis, but occasionally central governments have attempted to facilitate regional or local projects by notifying general national state aid schemes covering the majority of cases which may arise at regional or local level.

Examples: Finland has systematically attempted to estimate which areas will be covered for NGA by market forces within the foreseeable future and has designed a comprehensive state aid scheme to roll out NGA to the remaining 5% of households. The intention is to bring connectivity of 100 Mbps within 2 kilometres of each potential end user. Investment costs are shared between the operator selected via the public tendering process, national government and local municipalities and are co-funded by European rural development funds. Users incur the costs of the terminating segment if they wish to connect to the network. Overall, the scheme involves about 800 individual projects to be completed by 2015.

In Sweden, the municipality of Stockholm created a special-purpose entity which relies almost exclusively on private financing to build and operate a fibre backbone and access network. The company is run independently of the municipality and sells passive wholesale products (dark fibre) to downstream operators. Profits are usually reinvested to increase coverage, a factor which simplified state aid compliance.

Germany has obtained clearance of a blanket notification which sets guidelines and establishes legal certainty for any public institution wishing to subsidise the construction of passive infrastructure for NGA ('duct framework').

3.3. Alternative financing

One way to increase the flow of private capital into NGA projects is to use innovative financial instruments such as credit enhancements, project bonds or minority stake in the equity of project companies. These instruments improve the risk-return trade-off of private investors associated with a given NGA investment, making projects commercially more attractive. The Commission proposal for the 'Connecting Europe Facility' (CEF) [13] has taken this approach, the aim being to stimulate similar funding structures from both the private and the public sectors.

Another approach is to ask end users requesting better connectivity to contribute to the fixed costs of network roll out in areas where normal ARPUs (Average Revenue Per User) do not allow for commercially viable deployment, such as in the case of the Finnish broadband state aid scheme, where the construction of NGA backhaul is subsidised while end users pay for installing last-mile segments if they wish to link up to the network (tax deduction of up to €3000 for labour costs per taxpayer). Despite all the externalities associated with an increased subscriber base, a large share of the benefit of each NGA line accrues to the newly connected end users, making them the primary beneficiaries of extended NGA coverage. Thus, some end users are voluntarily sharing part of the investment costs for their last-mile segment, especially as the effects of higher

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[13]   COM (2011) 0665 final,
        http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011PC0665:EN:NOT, see
            also http://ec.europa.eu/information_society/newsroom/cf/item-detail-
                dae.cfm?item_id=7430&language=default.

initial costs of connecting to basic infrastructures (e.g. energy, water, and telecommunication) are usually more than offset by lower property prices in these regions.

4.   MEASURES TO FACILITATE INVESTMENT

Action to facilitate investment is a key to closing the gap between the amount that telecom operators, or other interested parties, plan to invest in network infrastructure and the investments required for achieving the DAE broadband targets. The economic rationale behind measures to facilitate investment is to lower costs. From the perspective of private investors, this brings an increased number of investable broadband projects, while simultaneously optimising the use of existing economic resources. However, the implementation of these measures will also absorb resources and it is vital to balance the cost of implementation against the returns in the form of cost savings for broadband roll-out.

For fixed-line networks it is estimated that the construction of passive infrastructure accounts for around 80 % of total fixed investment costs and reduction efforts should focus on this major cost driver. For mobile networks the critical factor is insufficient availability or inefficient management of spectrum, which can severely inhibit the growth of bandwidth and coverage.

4.1.   Reducing the cost of passive infrastructure: infrastructure sharing and co-deployment

Infrastructure sharing means exploiting infrastructure built for other purposes, such as laying fibre in sewers, ducts for electric cabling or for road traffic surveillance, attaching fibre to the rails of railway lines or using rooftops of public buildings or masts and poles of electricity distribution networks for the installation of aerials. Co-deployment encompasses initiatives directed at coordinating the works of multiple entities (possibly from different sectors) to save on construction costs (coordinated trenching by multiple utilities, for example). Both face problems, such as obtaining information at a reasonable cost, and barriers to access (use of existing infrastructure or participation in joint construction works).

4.1.1.   Infrastructure sharing

A practical first step in infrastructure sharing is to set up a civil infrastructure mapping, that is, a register of existing civil infrastructure which can be used in broadband network roll-out. So far, about half of the Member States have started projects to create such a tool and some are examining the feasibility (Romania). Some are already operational and responding to information requests.

Generally speaking, NRAs have been entrusted with developing the tool, the collection of data and the management of access rights and requests. Approaches differ with respect to which groups of data providers are included. While some authorities try to gather as much data as possible to have information which is as complete as possible, others begin by placing a higher priority on passive infrastructure assets in the public domain. However, projects face some common obstacles:

(1) Problems with eliciting information due to data owners' lack of incentive to contribute. The revised regulatory framework partially solves this problem in that it imposes an obligation on electronic communications network providers to disclose meaningful information on the location of their infrastructure for the purposes of network roll-out. Some countries have extended disclosure obligations to include all relevant infrastructure assets (including those outside the telecommunications sector).

(2) Security and competitive interdependencies. Concerns about the security of the information disclosed are considered to inhibit the development of infrastructure mapping. It is argued that there is a need to protect sensitive information, either on grounds of public safety or for commercial reasons. However, demands for tighter security can be excessive and unduly restrict infrastructure mapping projects. These difficulties can be alleviated by the sophisticated definition and management of access rights, redacting confidential details and limiting disclosures to the subset of information that is necessary for the tool to be useful. Information withheld for tactical reasons, to thwart investment plans by competitors in downstream markets for example, can be curtailed by the application of the regulatory framework.

Assembling a wealth of data on existing infrastructure is only a first step and added value is ultimately derived from the successful conclusion of sharing agreements. Thus, equal importance should be attributed to the question of access. This is straightforward if it benefits the telecom investor and brings incremental profits for the owner of a sunk investment. As long as the owner is not in a competitive relationship with the access seeker (e. g. a utility), voluntary access can be expected to materialise, provided transactions costs can be contained. Moreover, access to all passive infrastructure of the incumbent operator with significant market power in broadband markets can be imposed as a regulatory remedy by the NRA. In addition, subject to certain criteria, under the new regulatory framework it is now also possible to mandate symmetrical sharing of facilities, as long as the owner is an electronic communications network provider. The sharing of wiring inside buildings can be mandated regardless of its ownership.

However, as a general rule, infrastructure sharing is more difficult when the owner is outside the reach of sector-specific provisions or has limited incentives to grant access, either because the entity is not profit-maximising (e.g. public sector) or because the transaction costs of handling the requests are too high for idiosyncratic factors, such as when the number of requests is too small in relation to the core business to justify setting up proper routines and processes. The situation is complicated further if the access provider is itself subject to regulation in a different sector such as energy or railways, in which case the additional revenue may have to be forfeited, at least partially.

Examples: Portugal has enacted rules extending non-discriminatory access to all public and private infrastructure of use in the installation of electronic communications networks. Germany will shortly be adopting statutory provisions obliging all owners of relevant infrastructure to make an access offer upon request; this offer is binding for all public infrastructure and non-binding for private infrastructure. An arbitration procedure is in place to settle disputes.

4.1.2. Co-deployment

In many cases co-deployment is less well-developed than infrastructure sharing because the benefits may be less visible and implementation is more complex due to the heavy demands on information and its rapidly changing character. The continuous updating of information tools is essential.

Examples: Luxembourg is developing a national construction works register to provide an online repository of all engineering works along with indications of costs for co-deployment. Portugal and Belgium have adopted statutory obligations to provide prior notice of construction works and to allow interested parties to participate in them. The Telecommunications Industry Association in Denmark operates a voluntary coordination scheme for rights of way and trenching which is estimated to have facilitated joint construction activities in about 10% of cases so far. Finnish national and regional authorities have published a best practice guide for the joint construction of networks. Some countries have chosen to co-deploy empty ducts in some public construction projects and offer them to operators on commercial terms. In Finland, for example, since 2009 ducts for fibre cables are laid alongside all newly built transport infrastructures. The National Roads Authority in Ireland is also deploying ducting when building new national roads. Legislation has been enacted to allow the National Roads Authority to make these ducts available to telecom operators.

4.1.3. Overhead lines

Overhead lines[14] have been used in rural areas in particular. Attaching fibre to (newly erected and existing) masts and poles can substantially cut roll-out costs in areas where these are very high. In many countries there are restrictions on overhead deployment or strong opposition to it, but even in some of these countries overhead copper lines are still common in very rural or remote areas. Replacing these copper wires with fibre may raise fewer objections, as it does not involve any change in the status quo.

Examples: The United Kingdom has mandated access to the mast and pole network of the incumbent and Sweden is trying to promote the use of overhead ducting. In Portugal, the definition of infrastructure subject to non-discriminatory access obligations encompasses all masts and poles irrespective of ownership.

4.2. Facilitating investment planning: coverage mapping, planning powers and standards

4.2.1. Nationwide broadband mapping

Nationwide broadband mapping[15] is useful to end users, to public policy makers targeting public intervention and monitoring progress, and to operators in investment planning. A prerequisite is complete and accurate information.

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[14] Aerial wiring using masts, poles or other suitable installations.
[15] Nationwide map of retail broadband coverage at different speeds.

The quality of the data is crucial, as is the degree of detail in its presentation. Databases mostly rely on a survey of telecom operators in a given area, sometimes on surveys of households, combined with estimates and plausibility checks of insiders. Accuracy can be greatly enhanced if the output of different sources is merged or if maps can be overlaid. Most mapping tools are available on the internet. Hungary and Germany have recently introduced functionalities which enable users to drill down to sufficiently small plots (e.g. squares of a few hundred metres or street level). The value of mapping tools for operators is maximised when they can be combined with the information stored in civil infrastructure registers. Some Member States intend to combine the instruments at a later stage.

4.2.2. *Planning powers, rights of way*

Building permits and rights of way can be costly in terms of time and resources. Delays compound construction risks and can render projects unprofitable. Streamlining of administrative processes and increasing legal certainty can bring benefits but, so far, there is little trace of these in national broadband plans.

Examples: One of the sub-groups of the Irish Government's Next Generation Broadband Taskforce (NGBT) is examining how best to remove barriers to the roll-out of the physical infrastructure needed for Next Generation Broadband. The barriers identified involve the process and costs surrounding planning applications by network operators and applications to carry out road works associated with telecoms infrastructure. Some countries (e. g. Bulgaria) have set a maximum period of six months for issuing construction permits for electronic communications infrastructure.

4.2.3. *Coordination, development of standards*

Lack of clarity in technical specifications can add to uncertainties and occasionally lead to costly failures. These can be reduced through industry dialogue on, or coordination of, common standards.

Examples: Portugal has enacted several provisions governing the size, type and use of ducts installed in newly erected buildings to facilitate the deployment of fibre in-house wiring. Spain has recently revised and updated the existing rules on common infrastructure for telecom services inside buildings in order to facilitate NGA deployments[16].

4.3. Spectrum policy

At this point the most pressing issues in the arena of spectrum policy are the assignment of mobile broadband spectrum in the 800MHz (digital dividend) and 2.6 GHz bands as well as initiatives to increase efficiency in the use and management of existing bands, particularly better conditions for spectrum trading and sharing.

Almost half of all Member States (13) have finished assigning spectrum for mobile broadband in the 2.6 GHz band and a few more have scheduled the release of this

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[16]   New rules adopted by Royal Decree 346/2011 in March 2011.

resource in the course of 2012, pointing to visible progress in this area. Performance with respect to the 800 MHz digital dividend spectrum has so far been less positive. Only seven countries (France, Germany, Italy, Portugal, Spain, Sweden and Switzerland) have completed the assignment of this spectrum to communications operators, whilst others (Austria, the Czech Republic, Denmark, Ireland, the Netherlands, Switzerland and the United Kingdom) will do so shortly. In several cases, however, delays of several years are to be expected.

As yet, a sizeable number of countries have not enacted general provisions to allow and implement secondary trading of spectrum. In this respect, the recently adopted multiannual Radio Spectrum Policy Programme (RSPP)[17] will amount to measureable progress for a series of important blocks of spectrum by obliging Member States to ensure tradability of licences by July 2015, at least for harmonised bands. Some more advanced countries have already gone beyond the provision of simple tradability and have introduced even greater flexibility by admitting spectrum/licence sharing between operators, based on geography for example (Denmark).

The close dialogue between the Commission and the Member States in preparing the adoption of the RSPP may also presage a more coordinated spectrum policy approach in the future, particularly through the inventory process foreseen in the RSPP to foster efficient use of spectrum and free up additional radio resources, bearing in mind the need to identify at least 1200 MHz spectrum by 2015 and harmonise additional spectrum bands for broadband.

Furthermore, good progress can be observed in the preparations for the legal basis for opening up the former GSM spectrum (900 and 1800 MHz) for the use of 3G and 4G technologies.

Examples: Denmark has introduced the possibility of sharing parts of licences, such as parts of frequency bands or based on geographic areas, and is developing a strategy for maximum efficiency in spectrum management aimed at achieving the national broadband target of 100 % coverage at 100 Mbps in 2020. The United Kingdom has announced that by 2020 it will free up at least 500 MHz of public sector spectrum holdings below 5 GHz for mobile communications. Sweden has pledged to make available an equal amount of additional spectrum, but in a shorter timeframe. At this stage, these initiatives represent a laudable effort by a few countries to accelerate progress towards reaping the potential benefits of increased spectrum availability. Nevertheless, it would be even better if the same level of progress could be achieved throughout the entire EU in a more coordinated, as opposed to piecemeal, manner.

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5. DEMAND STIMULATION

Demand in the context of broadband may refer either to broadband line subscriptions or to digital services which rely on broadband networks (including mobile). Demand deficiencies may occur at both stages of the value chain. Services which require very

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[17]   COM (2010) 0471 final, approved by the European Parliament and Council on 15 February 2012, http://register.consilium.europa.eu/pdf/en/11/st16/st16226.en11.pdf

high bandwidth will not be profitable unless there is an increase in subscriptions to ultra-fast broadband connections. Low uptake of subscriptions may mean that the critical mass cannot be reached that would render the introduction of online delivery of a particular service economically viable.

5.1. Stimulating demand for connectivity / subscriptions

As yet, not many countries are engaged in initiatives to raise the take-up of broadband subscriptions. These are usually targeted at promoting the penetration of basic broadband and are often linked to eInclusion. There is evidence that lack of digital engagement is a phenomenon often found in specific societal groups, namely among people who are elderly, on a low income, socially disadvantaged or poorly educated, unemployed or disabled. Some countries also quote signs of low up-take and usage of broadband in SMEs. Typically, the main inhibitor for these groups is not unavailability of access, but rather a varying mix of low awareness and inadequate skills, poor motivation and cost. Public sector initiatives address these aspects more or less systematically. Ireland, for example, has established a working group under the auspices of its Next Generation Broadband Taskforce to investigate ways of reducing exclusion and boosting take-up. Belgium temporarily subsidised hardware and access bundles for low-income employees, and Italy provided funds to mark down subscription prices for the 18-30 age group. Recently, attention has also been drawn to the importance of harnessing intergenerational and intra-family relationships, by encouraging children and teenagers to impart ICT knowledge to their grandparents, for example. Furthermore, it has become evident that attractive commercial audiovisual and entertainment content is one of the pivotal drivers of take-up, underlining the need to remove potential barriers to the development of such offerings by creating a European digital single market[18]. Since the development of networks and digital services is closely intertwined, a functioning European digital single market can foment a virtuous cycle of mutually reinforcing network investments and commercial service innovations, in particular. One important element of the digital single market is the creation of a digital single market for users, particularly involving equal access of vulnerable groups, such as elderly people and persons with disabilities, to on-line services, especially on-line public services.

Examples: Malta subsidised broadband subscriptions for six months for certain disadvantaged social groups. These involved around 7 % of the population 80 % of whom kept their subscription after the end of the subsidy period. Further measures taken by Malta included free Wi-Fi access in all public places, schools, local councils, hospitals and village squares. Latvia equipped all public libraries with broadband access terminals (PCs with WiFi connection and multifunctional printer) and provided training for librarians to enable them to assist users. Take-up of the library broadband facility among users of public libraries is around 90 %.

As yet, none of the Member States is directly targeting the stimulation of NGA subscriptions, although Finland has created a kit of NGA marketing material for use by operators. It is generally accepted that the main barrier to its deployment is the lack of a

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[18] The European digital single market is a prominent pillar of the Digital Agenda for Europe and is one of the key areas of growth potential identified in the European Commission's Annual Growth Survey 2012, http://ec.europa.eu/europe2020/pdf/ags2012_en.pdf

business case. This is because end users are generally unwilling to pay a premium for ultra-fast broadband. Deferring the development of NGA stimulation strategies until such time as these networks are available is not consistent with a forward-looking NGA strategy or DAE targets.

5.2. Stimulating demand for digital services

There are widespread measures aimed at enhancing the development and use of digital services, especially of public services. Much of this comes from policy-driven programmes in the areas of eHealth, eGovernment or eEducation. Although the programmes themselves may be internally consistent, there is often a failure to integrate them into overall broadband plans. Broadband strategies and 'digital services' strategies are frequently treated as two separate branches of policy.

Examples: Poland takes a proactive approach to demand stimulation, using structural funds for systematic enhancement of the amount and quality of online digital content from sources of general interest. These efforts include the digitisation of all kinds of material and archives from museums, libraries and other sources of cultural content such as broadcasts. These activities also involve the digitisation of material held by the National Film Library or participation in the EU screen project designed to share historical television footage on the internet. These initiatives are promising because their objective is to turn communication networks to advantage to increase the availability of public services in general, particularly for people who have been difficult to reach up until now because of their remote location in rural areas. Furthermore, some of the content selected for digitisation is potentially bandwidth-intensive material such as audiovisual content, possibly helping to stimulate demand for higher speeds.

In addition, Poland has launched several other initiatives in the area of eGovernment, such as a project to enable online submission of tax declarations. However, Poland also acknowledges that a large part of digital content and services will come from the private sector. In order to foster the provision of private-sector online services, Poland has established a scheme to co-fund the creation of online offerings by start-up SMEs. These activities are complemented by measures to tackle digital exclusion. To this end, structural funds are used to subsidise internet access, computer equipment and training for less well-off people or those with disabilities.

Like Poland, Luxembourg's National Library is digitising its content and archives to make more resources accessible through a central website. In the first stage, historical material (literature, journals and postcards) was converted to help disseminate the country's cultural heritage. In the area of eHealth, Luxembourg runs a pilot scheme to test remote monitoring of heart patients in their homes.

France has adopted a new digital strategy for the period 2012 to 2020 which will place greater emphasis on developing applications, content and use. The existing ICT investment programme provides €2.25 billion to support the use and development of innovative digital services and content in the areas of cloud computing, digitisation of cultural, educational or scientific content and for applications in eHealth, intelligent transport or digital cities.

The Danish Government, Danish regions, and Local Government Denmark have jointly adopted an eGovernment Strategy that envisages the complete phasing out, by 2015, of paper and forms in dealings between citizens and government institutions. For this purpose, a dedicated 'Digital Post' solution has been developed for the secure exchange of all correspondence.

Austria has created an online portal which assembles and presents information on, and links to, all kinds of private and public online services to promote their wider use.

Outside the European Union, in spring 2012 Switzerland will adopt a revised, comprehensive Information Society Strategy. The strategy adopts an integrated approach and covers eight main topics including broadband infrastructure, security and trust, eDemocracy and eGovernment. The overall strategy is complemented by sector-specific strategies, for example in the field of eGovernment or eHealth. The Swiss eGovernment strategy pursues three major goals to be achieved by 2015: (1) businesses interacting electronically with public authorities; (2) public authorities interacting electronically with each other; and (3) electronic handling of cumbersome, frequent or important transactions between citizens and the public sector. In cooperation with the regional authorities the federal government has developed a detailed roadmap which specifies 45 key projects (of which 17 have already been completed) ranging from electronic identity cards to electronic applications for resident parking permits.

Another field of activity in several countries is eHealth. Switzerland is enacting the legal framework and carrying out projects to create electronic patient records which can be made available to all the institutions involved in a patient's medical treatment. Romania and Croatia have made plans to implement electronic prescription services.

As a general rule, using national or EU funds to develop new platforms for commercial services in partnership with the private sector could help stimulate more widespread customer interest and adoption. An instructive example is the Commission's Competitiveness and Innovation Programme[19] (CIP) which, having funded a considerable number of pilot projects to develop technical solutions for the interoperability of existing national public platforms and service infrastructure, may currently be perceived as one of the key enablers stimulating potential demand for digital services by citizens and businesses.

5.3. Building complementary skills

One aspect closely related to successful demand stimulation is the development of training schemes to increase digital and media literacy. Such an approach is critical if broadband take-up and use is to be extended to those sections of European society which have not yet gone online.

Examples: Cyprus has developed lifelong learning programmes which are open to all citizens to enhance digital literacy skills. Ireland has recently initiated a new scheme whereby several groups of stakeholders, including non-profit organisations, communities and service providers, can apply for grants to train new users. Poland is setting up a

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customised digital education programme for the 50+ age bracket and inhabitants of sparsely populated regions.

6.   CONCLUSION

The increasing number of countries with operational national broadband plans and the various ongoing activities to stimulate broadband roll-out at national and sub-national level suggest that progress is being made in this area. An analysis of the different approaches reveals that countries' strategies are necessarily dependent on idiosyncratic factors such as: local geography and roll-out costs; the competitive situation in the national broadband market; the general legal framework; various socio-economic factors; as well as differing attitudes towards the scope and design of state intervention. Consequently, apart from the uniformity imposed by EU legislation and coordination such as the common regulatory and state aid frameworks, national implementation will continue to vary. Hence, it would be unrealistic to expect universally applicable, 'one-size-fits-all' solutions to emerge.

Despite this variety, the similarity of current and future challenges across countries brings out common good practices. Setting up mechanisms for sharing knowledge, monitoring progress and supporting, as well as coordinating, regional and local capacity to plan and implement broadband actions on an ongoing basis can help avoid costly mistakes and facilitate the development and dissemination of new and creative solutions, expanding national policymakers' toolkits and improving the effectiveness of broadband policy in general. Thus, in December 2011 the European Commission released EU guidelines on open, competitive and sustainable investment models for public authorities planning a public sector investment in broadband and NGA infrastructure ("EU guide on broadband investment models")[20]. The European Broadband Portal[21] will continue to support the sharing of NGA good practice and the guide will be updated with a view to turning it into a live toolbox at the disposal of EU public authorities. Moreover, in the proposals for cohesion policy for the period 2014-2020 measures under the thematic objective 'Enhancing accessibility to and use and quality of information and communication technologies' will contribute to reaching the broadband targets. The proposals also call for national NGA plans as an ex-ante condition in order to ensure effective prioritisation and use of EU funding based on market failure and key accepted principles.

The sustainability of broadband plans would also greatly benefit from a more balanced consideration of upload and download speeds and the inclusion of measures supporting demand for ICT as well as measures aimed at aggregating demand for services. Demand side measures concern in particular public but also commercial on-line services, for example through measures to promote e-commerce[22] and to facilitate the development of high-quality digital content services. Stimulating the demand side of the broadband

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[20]   http://ec.europa.eu/information_society/newsroom/cf/document.cfm?action=display&doc_id=889.
[21]   http://www.broadband-europe.eu/Pages/Home.aspx.
[22]   See Communication from the Commission on a coherent framework for building trust in the Digital Single Market for e-commerce and online services, http://ec.europa.eu/internal_market/e-commerce/docs/communication2012/COM2011_942_en.pdf

market would considerably improve the viability of supply-related initiatives involving the building or upgrading of broadband infrastructure and services.

This report and the series of national broadband plan workshops carried out in autumn 2011 are a first attempt to foster a mutually beneficial dialogue between Member States. At the request of several Member States, and in line with the objective of consolidating the single market by intensifying union-wide cooperation, the Commission will perform another analysis of this type by the end of 2013 with special emphasis on NGA on the basis of updated national broadband plans, reporting on progress up to the end of 2012.

ANNEX 1: NBP TARGETS

	Targets under review	Basic coverage (1),(2)				NGA coverage (1),(2)			Take-up (1),(2)			Additional info
		speed [Mpbs, dl]	coverage [%]	(planned) completion	latest [%]	speed [Mpbs, dl]	coverage [%]	(planned) completion	speed [Mpbs, dl]	penetration [%]	(planned) completion	
AT		2	100	2010	>99	100*	100	2020		70	2013	*Intermediate target: 25 Mbps for 90 % by 2013
BE										90		Also 50% penetration target for mobile [bb]
BG	x**	2	100*	2015			DAE					*Intermediate target: 95% by 2013 **adoption of targets pending
CH		1 [us]	100		100							
CY		2	100	2011	100		DAE			DAE		
CZ	x	2	100*	2013		30	30**	2015				*Point of access in all populated communities, + min. 10 Mpbs [dl] in cities **Coverage for [hh] + [bs], + 50% of avg speed in cities for rural communities
DE		1	100	2011	98.7	50	75	2014				
DK		0.5	100	2010	100	100	100*	2020				*all [hh] + [bs]
ES		1 [us]	100	2012		30*	98	2020				*implemented by LTE coverage obligations
EE						100	100*	2015				*NGA access point within 1.5 km of all [hh], [bs], institutions
FI	x	1 [us]	100	2010	100	100 [dl & ul]	100*	2015				*NGA access point within 2 km of all [hh], [bs]
FR		0.5 [us]	100	2010	100	100 [min. 50]	*100	2025				*Intermediate target of 70% by 2020
GR			DAE									
HR		2	90	2013		30	50	2015		DAE		
HU			DAE				DAE					
IE	x	1.6	100	2012		DAE benchmark*	DAE benchmark*			DAE benchmark*		*targets to be determined on basis of DAE NGA targets, final decision pending
IT			DAE				DAE			DAE		NGA project to be launched
LT			DAE				DAE			DAE		Feasibility of nationwide FTTX being investigated
LU		2	100		100	1000/500* [dl]/[ul]	100*	2020				*Intermediate targets: 2011: 25/10 [dl]/[ul] for 95%, 2013: 100/50 for 80 % & 2015 for 100 %; 2013: 1000/500 for 25%, 2015 for 50%
LV	x	2	100	2008	100							
MT	x		100		100							
NL			100		100							
NO		0.6	100	2007	99.7							
PL	x	2	100	2013								
PT			DAE				DAE			DAE		
RO	x	1	100	2015			DAE*			DAE		*Alignment with DAE targets planned in 2012
SE		1	100			100	90*	2020**		80*	2015*	*applies to [hh] + [bs], **intermediate target of 40 % coverage by 2015 achieved
SI		2	98	2012		*	90	2020				*FTTH or comparable, intermediate target: 20 Mbps + triple play services by 2015
SK		DAE (1 Mbps)					DAE					
UK			100		100	25	90	2015				*90% of [hh] in all local authority areas, 2 Mpbs for remaining 10%

(1) If no speed is stated, target refers to 'broadband'. (2) Coverage/penetration refers to [hh] or population unless stated otherwise.
Key to acronyms: [dl] = download, [ul] = upload, [hh] = households, [bs] = businesses, [us] = universal service

NBP in place*	24	Quantitative basic target/ basic coverage achieved	28	Fully aligned to DAE [bb] targets	5
NBP being reviewed/ drafted	8	Quantitative NGA target	22	Full basic coverage achieved	9
		Quantitative take-up target	8		

*Sums apply to all countries in the table (EFTA + accession countries)

ANNEX 2: Overview of measures to facilitate investment

	nationwide broadband mapping	civil infrastructure register / sharing initiatives	co-deployment / co-investment measures	Possibility to mandate access to all civil infrastructures	Streamlining of administrative procedures	Development / imposition of standards	Communication & coordination measures
AT		x		x			
BE			x				x
BG	x		x		x		
CH	x	x	x			x	x
CY	x	x	x				x
CZ		x			x		
DE	x	x		x	x	x	x
DK	x	x	x				
ES		x				x	
EE		x			x		
FI		x	x			x	x
FR	x	x	x	x		x	x
GR							
HR		x			x		
HU	x						
IE	x		x				
IT	x	x			x		x
LT	x	x					
LU		x	x	x			
LV	x						
MT				x			
NL	x				x		x
NO	x						
PL		x	x			x	x
PT		x	x	x		x	x
RO							
SE	x	x	x		x	x	x
SI		x					
SK							
UK	x	x			x		
30	15	19	12	6	9	8	11

Table of definitions

1 — broadband mapping: A mapping tool designed to display the availability of retail broadband connections at one or more given speeds meeting the follo… accessible (3) all relevant technologies are included (4) the tool is in the implementation phase / definitive decision for its develop…

2 — civil infrastructure register / sharing initiatives: The country engages in at least one activity designed to promote the shared use of existing infrastructures which goes beyond wha… definitive decision for its initiation has been made. Civil infrastructure registers are only included if they are set up for the purpos…

3 — co-deployment / co-investment measures: The country engages in at least one activity designed to facilitate the joint deployment of whole or parts of infrastructure which g… encompasses joint deployment of infrastructure by a telecom operator and investors from other sectors (co-deployment, e. g. energ… has started or a definitive decision for its initiation has been made.

4 — possibility to mandate access to all civil infra.: The NRA has legal powers to mandate access to infrastructure owned by entities outside the telecom sector (e. g. public domain, …

5 — streamlining of administrative procedures: The country engages in at least one activity designed to reduce the administrative burden of broadband roll-out projects. The activ…

6 — development / imposition of standards: The country engages in at least one activity aimed at eliminating uncertainty pertaining to technical specifications of broadband r…

7 — communication & coordination measures: The country has launched at least one communication or coordination measure intended to improve investment conditions by faci… favourable investment conditions (e. g. roundtables with different stakeholders, awareness campaigns,…)

8 — digital dividend assigned: The 'digital dividend spectrum (790 – 862 MHz) has been assigned to network operators.

9 — secondary trading of spectrum: The country has enacted general provisions to enable secondary trading of issued licences. *Forthcoming RSPP adoption will imp…

10 — coverage obligations in licences: At least one licence for the digital dividend spectrum stipulates minimum coverage obligations based on geographic area or numb… the territory/population expected to be covered by the market. **CH: obligation of min 50 % coverage of total population for licen…