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UNIVERSAL SERVICE POLICIES IN THE CONTEXT OF NATIONAL BROADBAND PLANS

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FOREWORD

The Working Party on Communication Infrastructures and Services Policy discussed this paper at its meeting in December 2011. The Working Party agreed to recommend the paper for declassification to the Committee for Information, Computer and Communications Policy (ICCP). The ICCP Committee agreed to the declassification of the paper in March 2012.

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UNIVERSAL SERVICE POLICIES IN THE CONTEXT OF NATIONAL BROADBAND PLANS

MAIN POINTS

Broadband networks, or more specifically the services and applications they support, are increasingly critical for economic growth, global competitiveness and a better life. While these networks are rolled out and technologies evolve there is a need to review universal service regimes so that they continue to fulfil their role. This report therefore discusses the main areas in which national strategies to expand broadband networks affect universal service objectives, proposes criteria to rethink the terms of universal service policies, and shares the latest developments across a selected group of OECD countries.

The notion of universal service in telecommunications was established immediately after the liberalisation of the sector. The common view was that guaranteeing affordable access to a minimum set of predetermined services for all would help prevent social exclusion and maximise the economic benefits of existing telecommunication networks. No common concept of universal service was ever adopted across the OECD. However, to articulate universal service goals, most OECD countries imposed an obligation to provide service on one or more carriers.

The economic and social objectives that served as the original foundation for universal service in telecommunications remain valid today but acquire a new dimension with the expansion of high capacity networks and the evolution of social needs. Economic incentives are insufficient to extend broadband networks and their services beyond a certain point, but there are broader economic and social justifications that support the provision of telecommunication services for all at a certain level. In this context, strategies to articulate universal service goals are changing. Legally enforceable universal service obligations remain a core instrument in many countries. However, OECD countries increasingly rely on a host of additional demand and supply instruments to achieve the maximum possible availability, affordability and accessibility of telecommunication services. These additional instruments are not always legally enforceable and include, among others, political commitments, national plans, and aspirational goals to expand broadband for all; computer and Internet literacy plans; or standard setting measures to ensure e-inclusion.

A re-evaluation of the scope of universal service aims to establish whether some of the services currently guaranteed through universal service obligations no longer need to be supported through this means, and vice versa, whether other services fulfil essential needs and should be supported through enforceable obligations or through other policy instruments. The inclusion of broadband service in the scope of universal service obligations is currently a core issue and there is no common position on the subject. OECD countries share a vision about the socio-economic role of broadband networks and services and they are committed to attain their greatest practical national coverage and use. However some countries view a universal service obligation on broadband as the adequate instrument to articulate their goals and others consider that an obligation may discourage market-driven investment and innovation.

Governments should follow a systematic process to decide which tool is the most suitable instrument to achieve their universal service goals in regards to broadband. The decision-making process should clearly define the specific features of the service under consideration, determine whether broadband is essential for full participation in society, establish that market mechanisms are insufficient to ensure that service is available and affordable for those without it, assess the option of imposing a universal service obligation relative to other policy alternatives, and evaluate those alternatives in light of broader policy objectives and other on-going programmes. In the end, the ever-present question will be how best to economically expand broadband coverage and use, to the greatest practical extent, with the minimum distortion on competition, as opposed to imposing a particular policy instrument.

As mobile telephony becomes ubiquitous, OECD countries may consider the role of wireless technologies in universal service policies. In some cases, the inclusion of mobile telephony in the scope of universal service obligations could lead to better coverage and reception. Conversely, costs could be hard to justify, especially in large, sparsely or unpopulated areas. Countries with high population densities and extensive, advanced wireless networks are more likely to consider the universal service obligation option. Wireless broadband may come to play an important supporting role to fibre networks. Wireless already provides broadband connectivity to remote areas. Furthermore, mobile connectivity is eroding the justification for fixed-line subsidisation through universal service obligations by reducing the costs and expanding the functionalities of public payphones. To ensure that the potential of wireless technologies is fully unleashed, countries will need to ensure that telecommunication policies are technology neutral, and that enough suitable spectrum is made available to expand coverage and to support bandwidth intensive services.

Where universal service funds (USFs) exist, they were designed to cover relatively small gaps derived from fulfilling universal service obligations over existing networks, not to deploy new infrastructure. Where fulfilling universal service goals requires network deployment, countries will sometimes need to supplement private investment. To do so, countries face the option of reforming existing USFs or creating new funding mechanisms. USF reform requires fundamental changes to the funding mechanism and may face substantial opposition. In those cases where reform is undertaken, mechanisms should ensure that the USF is sufficient, flexible, technologically neutral and efficient. Timing for reforms should be carefully considered to prevent any potential negative impact on private investment.

New broadband networks introduce uncertainty regarding the costs of fulfilling universal service policies. Price and cost structures of broadband networks differ from those of the public switched telephone network (PSTN). Therefore it is unclear how many people will be unable to afford services on broadband networks or what will be the cost per connection. Current subscription prices for PSTN telephony may serve as rough estimates, but will need to be adapted to account for broadband network characteristics. The difficulties estimating costs may be compounded during the transition to next generation access (NGA) networks. Decreasing traffic will likely increase the costs of maintaining PSTN networks and voice-only customers may require assistance to prevent discontinuity in service and topurchase adequate equipment. Furthermore, investment will be needed to design reliable and efficient systems to transmit emergency communications over VoIP. Transition may therefore cause a temporary spike in funding requirements.

To maximize the benefits of NGA networks and telecommunication technologies for people with physical disabilities, countries will need to develop specific policies and consider the potential role of universal technical standards. Measures could be taken early on in the state of development of new communication infrastructures and encompass design, development and fabrication processes of applications and equipment to ensure that developments do not go down a path that creates new barriers and forces the disabled to play catch-up. That being said, new technologies, such as text-to-speech functions on computers/e-readers, or voice prompted “search and query responses” on smart-phones offer tremendous opportunities to empower users that face challenges in one or more areas. These technologies

are sometimes driven by commercial imperatives and in other cases they are developed in response to requests from certain communities. Both these drivers need to be acknowledged in the formulation of government policy. In addition, historical differences in the treatment for content (*e.g.* value added tax) delivered through different media (*e.g.* books and newspapers vs. electronic devices) need to be considered in terms of the ability of electronic devices to foster inclusion.

The Annex provides a description of universal service policies in selected OECD countries.

INTRODUCTION

The expansion of high-capacity wired and wireless telecommunication networks and the widespread adoption of IP-based services are some of the most far-reaching developments in telecommunication markets in recent years. Such networks and the services they support are regarded by OECD policy makers as a critical foundation of sustainable economic growth and prosperity. This was reflected in the 2008 Seoul Declaration for the Future of the Internet Economy, where Ministers committed to ensure that broadband networks and services are developed to attain the greatest practical national coverage and use.

Looking ahead, there is an expectation that widespread deployment of multipurpose broadband infrastructure will cause a dramatic change in telecommunications. Voice services will become one of many applications provided over broadband networks. Wireless technologies will establish themselves as an important complement to fixed voice and Internet services, and in some cases a substitute. High-speed connections will support applications that enable new forms of civic engagement, greater educational opportunities, deliver healthcare, manage energy consumption, and access, organise and disseminate information.

Existing PSTN infrastructures will be gradually replaced with advanced fibre-based networks that will become the main platform for voice, data, and video communications. Several OECD countries are already developing plans to migrate traffic from circuit-switched infrastructures to next generation access (NGA) networks and have determined dates to start decommissioning their legacy networks. In others, fibre is being deployed deeper into networks with the final “local loop” being provided over a range of technologies that increasingly also include fibre. As this new context unfolds, broad overarching policy goals such as making services available, accessible, and affordable will mirror long-standing objectives for existing universal service policies. However, the shift to new broadband infrastructures raises a number of issues regarding traditional approaches to meet these objectives. Instruments to fulfil universal service goals may need to be reconsidered depending on the scale of investment required to meet universal service objectives in each case, the opportunities that new commercial and technological developments create, and factors specific to each country such as geography and population density.

As a result, the shift towards broadband networks requires a fundamental rethinking about the scope, funding, and other arrangements pertaining to universal service. The primary objective of this report is to stimulate thinking on these issues and to propose a set of criteria to do so in a systematic manner. In addition, this report aims to share cross-country experiences and approaches.

Specifically, the issues addressed in this paper are:

- Re-evaluating the concept and scope of universal service;
- Examining the role of wireless technologies;
- Funding universal service objectives;
- Transitioning to multipurpose broadband networks;
- Leveraging NGA networks to provide inclusive service.

CONCEPT AND SCOPE OF UNIVERSAL SERVICE

The rationale and scope of universal service

Universal service in telecommunications generally entails the availability of a basic set of communication services at an affordable price throughout a country. The concept is similar but different from that of universal access, which seeks to guarantee access to telecommunications infrastructure, sometimes on a shared basis, but does not necessarily concern itself with the availability of services, their affordability or accessibility for those with disabilities. At a minimum, universal service guarantees a reliable access to a public telephone network at a fixed location that enables voice communication at an affordable price, free outgoing calls to emergency services and special and/or equivalent services for the disabled. Historically, this guarantee was instrumented through a set of obligations imposed on carriers. While the concept of establishing a basic set of communication services is based on economic and social considerations,¹ the concept of universal service has an important policy dimension. As a result, generally accepted economic and social arguments translate into a shared set of basic principles for universal service, although there is significant variation across the OECD in the definition and the scope of universal service.

Two of the economic factors taken into account when considering universal service include its direct effects on users of telecommunication services and on the broader economy. When a user joins a telecommunication network, existing subscribers benefit because they can now communicate with that user. In large part, markets act to internalise network externalities as has been evident with the development of mobile services. Moreover, revenue is generated when existing subscribers communicate with those users that join a network. For that reason, traditional universal service policies were often justified based on social externalities associated with having a telephone service (*e.g.* ensuring widespread availability of the ability to call emergency services) as much as network effects.² In addition, the expansion of services may have broader effects throughout the economy such as boosting productivity, supporting economic growth, increasing the competitive edge of local industries, reducing energy consumption and increasing quality of life. These outcomes are often predicated on the role of telecommunications in promoting regional and rural development, facilitating the consolidation and advancement of higher-value added activities, enabling remote work schemes and outsourcing/offshoring, and making administrative procedures more efficient. However, these economic benefits are often difficult to quantify including in relation to universal service.

It has long been considered that being connected to telecommunication networks is necessary to avoid social exclusion and for people to participate fully in society. Access to telecommunication services is often viewed as a threshold for the exercise of social and political rights, participation in the economy and in social and cultural activities that enrich quality of life. Affordable access to basic communication services irrespective of level of income, geographical location and physical ability are also considered a crucial component leading to greater social equality. These considerations lead some to conclude that universal service or its components are a basic right. A significant part of the recent debate on universal service revolves around the extent to which the inability to access or use a given telecommunication service is likely to create social exclusion. Factors that can be taken into account include current technological developments, whether the private sector is in a position to enable affordable access to such service and under what conditions it can do so.

Economic and social considerations are widely reflected in national legislation for telecommunication services and recent national broadband plans across the OECD:

- The United States' National Broadband Plan states that "broadband is a foundation for economic growth, job creation, global competitiveness and a better way of life". This statement is linked to

a specific universal service objective contained in the plan: to ensure that everyone can have affordable access to robust broadband services and the means and skills to subscribe to it if they so choose.

- In Japan, the Telecommunications Business Law of 1984 states that one of the basic criteria for determining the scope of universal service is the indispensability in the life of every person.
- European Union Directive 2009/140/EC recognises that “the Internet is essential for education and for the practical exercise of freedom of expression and access to information” which under European legislation are considered fundamental human rights. This statement *de facto* elevates the status of universal telecommunications service to a fundamental right protected under the European Convention for the Protection of Human Rights and Fundamental Freedoms. Directive 2009/136/EC develops the point by making data connections capable of supporting access to online services part of universal service.
- In Switzerland, universal service to telecommunications is guaranteed by the Swiss Federal Constitution (Art 92) which imposes on the Confederation the obligation to ensure the adequate, universal and reasonably priced provision of postal and telecommunications services in all regions of the country.
- In the United Kingdom, Ofcom defines universal service as a safety net that ensures basic services. The latest comprehensive universal service review specifically mentions that there are both equity and social grounds for universal service. “It provides services to help vulnerable customers and customers in remote and rural areas, whom the market might not otherwise choose to serve, allowing them to take full part in the economy and society. In addition all citizens benefit by having a larger telephone network; they can contact and be contacted by more people. Cheap communications also enhance economic growth”.³

Economic and social justifications translate into a broadly shared set of goals for universal service in telecommunications.⁴

- *Availability*: that the level, price and quality of service is equivalent wherever a person lives or conducts business so that residing in a rural or remote area does not affect a person’s ability to access communication services.
- *Affordability*: that maintaining and using the service does not place an unreasonable burden on consumers, particularly vulnerable or disadvantaged consumers.
- *Accessibility*: that a person with a disability can use the service so that a person’s level of physical and mental ability does not exclude them from access to communication services.

Common economic and social justifications have not led to the universal adoption of the universal service concept, although, of course, all countries have as a goal the widest practical availability and take-up of telecommunication services. OECD countries like Mexico have no specific legislation for universal service. Among the majority of OECD countries that have defined universal service there is no “standard” definition either, creating a certain degree of ambiguity. For instance, in the European Union, Directive 2002/22/EC,⁵ implicitly speaks about universal service as a set of obligations that member states may impose on designated carriers to ensure that a minimum set of services defined at the European level are available to all users. As a result of this approach, under the national legislations of many member states, the term universal service has become synonym to universal service obligations. Meanwhile, other policies that pursue widespread availability of more advanced or additional telecommunication services are referred

to using a variety of terms such as “universal service commitments” in the United Kingdom, or “universalisation of services” in Spain.

Part of this ambiguity is historically embedded; when universal service regimes were first created, they took the form of enforceable obligations in many OECD countries. However, as OECD countries have increased their reliance on other types of policy instruments to articulate and implement universal service goals, ambiguous terminology may cause problems. To prevent misunderstandings, the current report will use hereon the term “universal service policies” to refer generally to all instruments that seek to promote telecommunication services beyond the point reached by market dynamics alone, with the ultimate goal to make them available and affordable for all, regardless of the form they take. As such, universal service policies will include non-enforceable commitments, aspirational goals and industry standards among others. The term “universal service obligations” will be used specifically to refer to legally enforceable obligations that guarantee the availability and affordability of predetermined telecommunication services for all and which may be imposed on one or more designated carriers.

Box 1. The concept of universal service across the OECD

The concept of universal service varies considerably across the OECD. Even within the European Union, where the principal parameters of universal service are defined at the European level, there is variation in the way member states specify services at the national level and the manner through which their provision is guaranteed.

Australia

The universal service obligation is the obligation placed on universal service providers to ensure that all people in Australia, wherever they reside or carry on a business, have reasonable access on an equitable basis to a standard telephone service for the purpose of voice communication, payphones and prescribed carriage services. The universal service obligation is complimented by the customer service guarantee (CSG), priority assistance (PA) and network reliability framework (NRF). Since 2009, Australia is committed to the roll out of the national broadband network (NBN), a wholesale-only, open access network delivering broadband to all Australian premises.

Canada

The Canadian Radio-television and Telecommunications Commission (CRTC) has mandated that subsidies be provided to carriers providing telecommunications services in areas with high operating costs, the majority of which are in rural and remote areas. Currently, these services include: a) local telephone service, access to dial-up Internet at local rates and access to the long distance network and to operator/directory assistance services; b) enhanced calling features, including access to emergency services, voice message relay service, and privacy protection features; and c) a print copy of the current local telephone directory upon request. All telecommunications service providers that generate more than USD 10 million of revenue annually, subject to certain conditions, are required to contribute a proportion of their eligible revenues to a regulatory fund, from which subsidies are distributed to local service providers that meet universal service eligibility requirements in high cost areas. In 2011, the CRTC established an unregulated, aspirational minimum broadband service objective that it believes should be available to all people in Canada by 2015.

European Union

Universal service is a minimum set of services of specified quality which is available to all users regardless of their geographical location, and in the light of specific national conditions, at an affordable price. According to Directive 2002/22/EC, as amended by Directive 2009/136/EC,⁶ these minimum services consist of: a) a connection to the public communications network at a fixed location and at an affordable price. The requirement is for the provision of local, national and international telephone calls, facsimile communications and data services. Data connections should be capable of supporting data communications at rates sufficient for access to online services such as those provided via the public Internet; b) access to at least one comprehensive directory and at least one comprehensive telephone directory inquiry service; c) public pay telephones and other public voice telephony access points; d) access to the European emergency call number 112 and other national emergency numbers free of charge from any telephone, including public payphones, without the use of any means of payment; and e) suitable measures to guarantee access to and affordability of all publicly available telephone services at a fixed location for disabled users and users with special social needs. Member states shall determine the most efficient and appropriate approach for ensuring the implementation of universal service, whilst respecting the principles of objectivity, transparency, non-discrimination and proportionality.

Germany (a transposition of European Union legislation)

Universal services are a minimum set of publicly available telecommunication services of specified quality to which every end-user, irrespective of his place of residence or work has access to at affordable prices, and whose provision to the public as a basic service has become indispensable. The regulatory authority has the power to impose obligations on carriers to secure the provision of universal service and service features but may choose not to do so for all or part of its territory if these or comparable services are deemed widely available. Where universal services are not adequately provided by the market, the regulator shall announce its intentions to impose obligations to provide universal service, unless a carrier declares itself willing to provide universal service without compensation.

Japan

Universal service in Japan responds to three basic premises: a) indispensability: services are essential for the life of every person; b) affordability: the provision of services at prices that everyone can afford; and c) availability: the provision of service everywhere without regional variations. The scope of universal service currently includes subscriber telephone lines (a fixed connection to the network through either traditional copper lines or through optical IP phones with price levels equivalent to

traditional subscriber lines, public telephone boxes, and emergency calls. Designated universal service carriers are responsible for the provision of these services. In addition, Japan is committed to delivering ultra-high-speed broadband to 100% of households by around 2015. This commitment falls outside the responsibilities of designated universal service carriers.

Korea

Universal service is the basic telecommunications service that any user may receive at an appropriate charge anytime and anywhere within Korea. Since its introduction in 2000 universal service has comprised local telephone calls, public telephone service, and emergency call services. Designated carriers must also offer services at specific discounted tariff schemes to eligible low income and disabled subscribers. Universal service does not include the obligation to provide broadband access. However, Korea has introduced additional regulatory requirements to guarantee broadband access for all, especially in less densely populated areas.

United Kingdom (a transposition of European Union legislation)

Universal service ensures that basic fixed line services are available at an affordable price to all customers across the United Kingdom. At least one designated carrier shall meet all reasonable requests for a connection at a fixed location to the public communications network although installation costs that exceed USD 5 440 (GBP 3 400) are met by the user. Universal service also includes: a) access to at least one comprehensive directory and telephone directory inquiry facility; b) sufficient public payphones; c) billing, payment and tariff options that enable consumers to monitor and control their expenditure; and d) appropriate tariff options and packages to low income and special needs subscribers. In addition, the United Kingdom established a commitment to ensure that virtually all homes have access to a minimum level of broadband service by 2015. This commitment will not be achieved through a universal service obligation.

United States

Universal service is “an evolving level of telecommunication services that the Federal Communications Commission (FCC) shall establish periodically... taking into account advances in telecommunications and information technologies and services”. Since the adoption of the 1997 Universal Service Order, those supported services have been defined as single party service,⁷ voice-grade access to the public switched network, DTMF signalling or its functional equivalent, access to emergency services, access to operator services, access to interexchange service, access to directory assistance, and toll limitation services for qualifying low-income consumers. In 2011 the Commission modified this definition and specified that the supported service is voice telephony service comprised of specific functionalities. In 2010, the National Broadband Plan (NBP) articulated a universal service goal of providing access to broadband service to all people in the United States. Following the NBP, an October 2011 Order reformed universal service policies to ensure that these objectives are met.

Regardless of the form that universal service policies take, determining the scope and extent of the actual services included in universal service requires an assessment of competing goals and of alternative ways to achieve economic and social objectives. The scope of universal service may have an impact on other national goals such as minimising market distortions, promoting technology neutral competition or fulfilling carbon emission objectives. Governments will normally develop ways to balance these goals by taking into consideration country specific features (Box 1). In addition, due to the redistribution role of universal service (reducing inequalities, preventing exclusion, ensuring equal opportunities for all) governments need to ensure that universal service policies are coherent and complementary to other national programmes that pursue related objectives. Such assessments confer a clear policy dimension to universal service.

There is usually a division of responsibilities found in OECD countries in relation to universal service. Countries tend to attribute responsibility for defining the scope of universal service to policy makers, while implementation is usually undertaken by the regulatory authority. For example, in the United Kingdom, as a European Union member state, the minimum set of services to which end-users have a right to is defined by the Universal Service Directive. However, it is the responsibility of the government to specify the services which must be provided throughout the United Kingdom through its Universal Service Order. Ofcom, the regulator in the United Kingdom, is then responsible for implementing the Order. There are countries where this division of responsibilities differs. In the United States, the

Telecommunications Act entitles the Federal Communications Commission (FCC) to establish the definition of services to be supported by federal universal service support mechanisms. Nonetheless, reforms to the federal Universal Service Fund need to be approved by the United States Congress.

Re-evaluating the scope of universal service

The dynamic nature of the telecommunications sector implies that even when economic and social goals underlying universal service remain unchanged, its scope needs to be adapted and updated periodically. For example, as mobile coverage and effective penetration have approached 100% in the majority of OECD countries, some nations including, Estonia, Iceland, Luxembourg, Sweden, the United Kingdom and the United States, offer or are planning to offer access to emergency services via SMS. Meanwhile, Austria, Denmark and the Netherlands have withdrawn the obligation to provide public payphones, and European Union Directives Directive 2002/22/EC and 2009/136/EC state that there should be no constraints on the technical means by which the basic connection to the public communications network is provided, allowing for wired or wireless technologies (as opposed to the wired-only connections included until recently in many universal service frameworks).

Re-evaluations of this type are referred to as “reactive” because they take place after services have been taken up by the market and operate on commercial terms for a substantial part of the population. In these cases, the scope of universal service is re-examined to support, through a set of enforceable obligations or through other means, services that have become widespread and are considered more adequate to achieve universal service goals, or to exclude support for services for which the market ensures widespread availability, accessibility and affordability, and/or for services which have ceased to be indispensable⁸ and therefore are no longer necessary to support.

In other instances, changes to the scope of universal service are “proactive” because they anticipate the market or stimulate the expansion of certain services and the infrastructures that enable them. The decision of some OECD countries to include broadband in the scope of universal service obligations, and Japan’s decision to consider voice service through VoIP as equivalent to telephony service through a circuit-switched connection fall into this category.

In some cases, proposed changes to the scope of universal service may combine reactive and proactive components. This is the case with debates regarding wireless technologies. Discussions about the inclusion of mobile communications as a suitable means to provide telephony service from a fixed location are clearly reactive because they follow widespread adoption of mobile telephony. Meanwhile, the debate about revising the scope of universal service to include mobility through wireless technologies has a proactive component, particularly in those countries where 3G networks are still being deployed.

Ideally, the first step to reappraise the scope of universal service would be to apply a set of systematic criteria that determine the basis for inclusion of services within universal service policies. These criteria would serve as a frame of reference for any decision to include or exclude a service from universal service. A set of pre-determined criteria would provide clarity on the long-term objectives of universal service, increase certainty among all parties involved, reinforce the credibility of any policy decisions taken, and ensure that they are consistent with other national priorities and ongoing programmes.

- The legislation found in selected OECD countries already determines a set of factors to consider when appraising the scope of universal service: Japan’s basic criterion for universal service status is whether services are indispensable for people’s daily lives (Article 7 of the Telecommunications Business Law). Indispensable services are those broadly recognised as being used by everyone and as being part of the underlying structure of social and economic activities. This requires indispensable services to be affordable for all and available everywhere without regional variation.

- In the United States, Section 254 9 (c) (1) of the Telecommunications Act resolves that the FCC shall establish the definition of services supported by the Federal universal service mechanisms taking into account advances in telecommunications and information technologies and services. The following four factors are to be considered when proposing or deciding which services to include: a) the service is essential to education, public health, or public safety; b) the service has been subscribed to by a substantial majority of residential customers through the operation of market choices; c) the service is being deployed in public telecommunication networks by telecommunications carriers; and d) support of the service is consistent with the public interest, convenience and necessity.
- The Korean Telecommunications Business Act (Article 4.3) establishes that universal service duties will be defined according to the following criteria: a) the state of information and communications' technology development; b) the spread of telecommunications services; c) public interest and security; d) the promotion of social welfare; and e) the promotion of "informatisation".

Agreeing on a set of criteria to evaluate the inclusion of a service in the scope of universal service and enshrining them in legislation can be challenging. Therefore, it is more likely that systematic frameworks for the appraisal of universal service will remain at the level of proposed guidelines. These guidelines would include a series of factors to bear in mind when evaluating the inclusion or exclusion of services in universal service policies. The following framework proposes as set of guidelines based on previous OECD work (Box 2):⁹

Box 2. Guidelines to reappraise the scope of universal service

- Define the specific features of the service under consideration.
- Determine whether the service is essential for full participation in society and in the public interest.
- Establish if market mechanisms are insufficient to ensure services are available and affordable for those without service.
- Assess the option of imposing a universal service obligation relative to other alternatives.
- Evaluate policy alternatives in light of broader policy objectives and other ongoing programmes.

Currently, the most significant question regarding the reappraisal of universal service relates to the inclusion of broadband in the scope of universal service, and whether this should be done through an enforceable obligation or through some other form of policy. This issue is examined using the framework outlined in Box 2 in the following section.

IMPACT OF NATIONAL BROADBAND PLANS ON UNIVERSAL SERVICE

Commitments to expand broadband and national broadband plans

High-capacity communication networks support innovation and economic growth in much the same way as electricity and transportation networks. The foundation for long-run increases in productivity in many sectors will be linked to the availability of high-speed, competitive data networks and the applications they support. Broadband is also the foundation of innovations that could have tremendous impact on strategic sectors such as health services, energy, education and public safety in the long term. Policy makers are well aware of the pivotal role of broadband in enabling economic recovery, stimulating sustainable economic growth and addressing key challenges such as energy efficiency or improving healthcare services for an aging population. To ensure that these expectations materialise, policy makers and network planners need to focus on developing national broadband platforms that can support the bandwidth demands of advanced applications in these and other fields. Such assessment was reflected in the 2008 Seoul Declaration for the Future of the Internet Economy¹⁰ where ministers committed to stimulate investment and competition in the development of high capacity information and communication infrastructures.

To fulfil the commitments adopted in the Seoul Declaration, each country has developed national goals that vary in scope and ambition. Minimally, OECD governments aspire to reach the OECD threshold for basic broadband, though some wish to be “world class” and a few aim to be global broadband leaders.¹¹ An increasing number of OECD governments have recently developed or updated specific strategies to achieve their national objectives. These strategies can be generically called National Broadband Plans (NBPs) and they aim to expand the footprint of broadband networks nationally. In countries with far-reaching broadband goals, the NBP involves the design and construction of entirely new high speed broadband networks, but most other plans simply determine medium term goals that may be achieved through enhancements of existing infrastructures.

The increasing relevance of broadband and the commitment to deploy and enhance telecommunication infrastructure and their usage is already transforming universal service. Despite variation in goals and objectives in each country, NBPs, and more generally, the expansion of broadband networks, raise a number of common concerns regarding universal service:

- Broadband service in the scope of universal service.
- The role of mobile communications in universal service.
- Funding universal service objectives.

These issues will be examined in greater detail in the following sections.

Including broadband in the scope of universal service

As broadband penetration and usage matures, the inclusion of broadband in universal service is becoming a core issue. There is no common position on the subject. A number of countries including the United States, Israel, Finland, Malta, Spain and Switzerland have already taken steps to include broadband Internet service as part of their existing universal service obligations. Other countries like Korea, Japan, the United Kingdom and Australia have developed strategies to ensure broadband “availability for all” through other universal service policies. A third group including, Denmark, Norway, Germany, The Netherlands and Ireland has opted not to support broadband through either inclusion in universal service obligations or other commitments to provide broadband for all.

These positions are anchored in several considerations of pros and cons. In purity, the discussion on broadband and universal service involves responding to two different but related questions. The first one regards the decision of whether broadband should be made available for all. If this question is resolved in the affirmative, then the second question involves deciding what type of instrument should be used to achieve this objective. In practice, countries do not always tackle these two issues separately. As a result, it is not always easy to separate arguments for the expansion of broadband from those more related to inclusion in universal service. Similarly, arguments that caution against universal service status often concentrate on criticising the use of universal service obligations.

Positive considerations

Those in favour of including broadband in the scope of universal service consider that the economic and social externalities are potentially much larger than the costs of funding universal broadband service. They believe that universal broadband service would have a positive impact on productivity, competition and welfare. It is not always easy to separate justifications for the expansion of broadband in general, from those that apply specifically to universal service. Nevertheless, if these justifications are accepted as being reasonable for the expansion of broadband they may also apply to the case for inclusion of broadband under universal service.

Broadband networks allow businesses to rearrange production globally to take advantage of production efficiencies in different geographic locations. For example, high-speed data lines allow companies to place divisions in different geographic locations, which are best suited to their needs. Positive effects on competition derive from higher demand for products and services and from the ability of consumers to make comparisons easily. Proponents of including broadband as part of universal service believe their case is significantly strengthened because doing so will ensure such opportunities are available to all.

Welfare effects can be derived from improved access to and greater efficiency in government services, utility services, education, healthcare and security. Broadband:¹²

- May help to bring about interoperability across different providers of public services allowing them to work together or exchange information electronically. Improved communication access can also facilitate the delivery of basic services as well as potentially simplifying procedures for citizens and businesses.
- Can serve as the foundation for smart utility grids that allow consumers to adjust consumption based on price signals, and distributors to stabilise demand and manage storage capacity more effectively.
- Offers enormous potential to improve health quality, accessibility and outcomes, and to do so in a cost-effective manner via remote consultation and intervention. Benefits can be particularly high

for aging citizens, for those with chronic disease or disabilities, and for those that live in remote and hard to reach areas.

- Could have a significant impact on education by improving access to digital learning resources; encouraging communication among schools, between teachers and pupils, or promoting professional education for teachers. Generalised welfare effects would also derive from improved access to entertainment and cultural resources.

Some argue that for these benefits to materialise broadband service will need to be much more widespread than it is today. Therefore, they argue for the inclusion of broadband in universal service through an obligation as a necessary requirement for the expansion of broadband to areas or categories of users that may otherwise not be able to access or use these services.

A case can be made that greater incorporation of broadband under universal service in more OECD countries would further stimulate innovation and investment in telecommunication technologies, broadband applications and services, as well as in end user equipment. If the funding of universal service took advantage of schemes that invite firms to competitively tender to provide broadband service (e.g. in a rural area), it may stimulate greater efficiencies, savings and innovation in the delivery of services.

Finally, it is expected that universal broadband service would have positive effects on society and the broader economy. This argument can be clearly deduced from the spirit and the letter of the Spanish 2011 Law of Sustainable Economy,¹³ which contains the decision to impose a universal service obligation to provide broadband. The main purpose of this Law is in fact to “introduce the necessary structural measures to create conditions that favour a sustainable economic development”. In a similar vein, but in more specific terms, the United States’ National Broadband Plan points out that including broadband in universal service would make it possible for small businesses to reach new markets and improve their business processes and facilitate the accomplishment of environmental and energy efficiency goals by enabling precise management of energy utilisation.

The case for caution

It has been argued that introducing broadband to universal service, especially when imposing a universal service obligation, might affect competition because the responsible carrier or carriers might artificially strengthen their position to the detriment of those of smaller regional carriers. Along these lines, in a consultation carried out in Spain in 2009, Orange suggested that in a system where universal service costs are financed through industry contributions and frequencies are unevenly distributed, major carriers would be contributing to finance the expansion and improvement of the incumbent’s (Telefonica) fixed and mobile access network. Some of these issues can arguably be solved by adjusting the contribution system. In the Spanish case the regulator does this by balancing the costs incurred by Telefonica in providing universal service obligations with the benefits it obtains by providing it, in line with European requirements. Admittedly, some benefits (for instance brand recognition) are intangible and therefore difficult to evaluate. In Germany, a proposal to add universal broadband service to national legislation was not adopted in October 2011 following criticism from network operators that several regional carriers could have gone out of business as a result of its introduction. Such criticism raises the point that smaller, regional operators and potentially also community based networks could have an important role to play in providing service to areas that are less profitable for large national operators.

Detractors have also argued that proactive measures to include broadband in universal service, now, particularly through a universal service obligation, could fail to be future-proof, locking in certain technologies or solutions and discouraging market-driven investment in infrastructure that could be more economically efficient. Countries like Spain argue that the risks of market distortion are minimal, provided that public interventions are carefully designed to extend services to users that would otherwise not

participate in the market. Other countries circumvent this issue by establishing goals to expand broadband for all outside the scope of universal service obligations. One of the potential concerns with this approach is that it does not explicitly allocate responsibilities for the fulfilment of these goals:

- Denmark has set a goal to provide all people and businesses with broadband access of at least 100 Mbps by 2020. However, to ensure that this goal is met through a market driven and technology neutral approach, Denmark opted not to include broadband in the scope of universal service.
- Canada's Radio-television and Telecommunications Commission considers that establishing target speeds for broadband is in the public interest. As a result, in 2011 the Commission established an unregulated, aspirational minimum threshold of 5 Mbps downstream and 1 Mbps upstream that it believes should be available to all Canadians by 2015, stating that it will monitor progress towards this goal. The Commission considers that the deployment of broadband, including deployment in rural and remote areas, should continue to rely on market forces and targeted government funding.
- The United Kingdom has set a Universal Service Commitment for broadband that involves plans to ensure that virtually all homes have access to a minimum level of service of 2 Mbps by 2015. The Commitment will be achieved through incentives to private investment and targeted public funding to bridge gaps rather than through universal service obligations.

It is also argued that it might be too early to include broadband in the scope of universal service, especially through obligations, and that the benefits of widespread broadband access and usage, particularly those of high-speed broadband, could be best achieved outside the scope of traditional universal service regimes. Japan, for example, considers that it may be premature to debate the inclusion of broadband in universal service before their broadband plan (*Hikari-no-michi*) is fully implemented and before service take-up has been expanded to the majority of the population. Korea has introduced regulatory requirements on major telecommunication operators to guarantee broadband access to all, but has chosen to do so outside the scope of universal service. The Netherlands considers that including superfast broadband in universal service would disrupt the market and hinder development.

A systematic process for considering universal service status for broadband

Based on the commitments of the Seoul declaration, it is clear that OECD countries recognise the social and economic benefits of widespread broadband availability and use. However, broadband is not a uniform service and different technologies have different features, costs, and performance characteristics. Furthermore, significant differences in the needs of individual countries, their geographic and topographic features and the current features of their networks imply that optimal solutions to expand broadband coverage will have to be customised for each context.

As a result, a one-size-fits-all approach is unlikely to be appropriate for all OECD countries. Instead, they should carefully evaluate their options based on their specific circumstances and objectives. A set of common guidelines can assist policy makers to make these decisions. The approach proposed in Box 2 provides a common framework that countries can use to decide whether, and to which extent broadband should become part of their universal service schemes.

a) What is broadband?

"Broadband" is not a uniform service and it may be based on different technological platforms. We cannot consider broadband unless we know what we mean by the term. Therefore, an early step in considering the inclusion of broadband in universal service is to establish a clear definition.

Even when countries define universal service in terms of access, it is normally preferable to use a definition of accessibility that is determined by the type of service or services that the network is able to support as opposed to the specific technological characteristics of the network itself. This approach is consistent with the idea that what really matter are the functionalities provided to end-users. In addition, this approach gives service providers the flexibility to choose the most efficient and most suitable technology platform in each case (including flexibility to evaluate trade-offs in terms of geographical coverage vs. number of simultaneous users a platform can support). It also prevents a “lock-in” that may distort technological development.

At a minimum, a balanced approach to define broadband functionalities should take into account the marketplace evolution in technology, applications, and services available to consumers as well as social and economic demands. The range of functionalities selected then translates into a set of metrics that aims at performance at pre-determined quality levels. An approach based on specific metrics also facilitates future updates of the definition that reflect the evolution of network capabilities, applications and consumer demand.

The set of metrics used to assess and classify broadband services should be aligned with the functionalities that countries choose to include in their definition. As applications become more sensitive to the quality of data transmission (for instance as sophisticated health applications are considered), policy makers will need to include quality measurements such as throughput, latency and jitter in addition to conventional measures of data transmission speed. When designing these measures some considerations may need to be taken into account such as geography and length of lines for customers of different ISPs, internal installations, extremities equipment, and the performance and localisation of service platforms. In addition, it may also be necessary to include some safeguards if market forces or ex-post solutions are unable to sufficiently protect consumers.

Box 3. What is broadband?

Broadband may be defined as a data transmission capacity associated with a particular speed of transmission and the provision of high-speed Internet access. Broadband provides support to applications such as web-browsing, video services IP TV, and so forth. Broadband can be used as a marketing term to designate “always on” access to the Internet at data transmission rates above a specific threshold. Broadly speaking, broadband infrastructure is the underlying communication infrastructure that is deployed to enable the provision of broadband services, that is, Internet access at a certain speed/bandwidth. By way of contrast, a narrow-band subscription commonly designates a connection to the Internet that does not meet the requirements to qualify as broadband (e.g. dial-up technology, ISDN, slower wireless connections, and so forth).

The technical capabilities of broadband services may be measured by the use of certain metrics. One of them is the data transmission rate that a given technology can enable. Transmissions over a certain threshold are considered broadband as opposed to narrowband. Thresholds are also used by telecommunication carriers to market their services and by governments to establish goals, monitor market developments and create statistical information. Other metrics have an impact on the service capability of broadband connections. Some of them are the delay of the data transmission, the jitter (delay variability), and the type of service provided (e.g. best effort delivery, guaranteed bitrate).

Basic functional broadband

There is no standard threshold for broadband and different governments/institutions have adopted different measures:

- The OECD has used a working definition based on 256 Kbps advertised downstream speed, to refer to broadband service, as this was the baseline advertised speed of the first commercial offers launched by cable and DSL operators. This threshold also allowed for the exclusion of other technologies (e.g. Basic Rate Interface ISDN), which facilitated statistical collection. The OECD Broadband Portal data for fixed and wireless broadband are based on this threshold.
- The European Commission’s i2010 high level group adopted the 256 Kbps benchmark for basic broadband for 2011-2015 to reflect ongoing progress and to facilitate international comparisons with the OECD area. This definition not only affects the collection of European Union statistics, but also becomes the baseline for the European Union’s *Digital Agenda* initiative to provide broadband for all by 2013.
- The International Telecommunications Union (ITU) Standardisation Sector defines fixed broadband Internet subscription as high-speed access to the public Internet at downstream speeds equal to, or greater than, 256 Kbps, and wireless subscriptions as satellite, terrestrial, fixed wireless, and terrestrial mobile wireless subscriptions with advertised download speeds of at least 256 Kbps.
- The United States decided to adopt the minimum speed threshold proposed in their National Broadband Plan in 2010. The Plan recommends speeds of at least 4 Mbps downstream and 1 Mbps upstream. These are considered by the FCC to be the minimum speeds required to stream a high quality - even if not high definition - video while leaving sufficient bandwidth for simultaneous basic web-browsing and e-mail. The FCC is currently reviewing its definition of “advanced communications capability”.

Despite the variation, and with a few limitations (for instance the exclusion of ISDN), all of these thresholds can be delivered through a variety of fixed and wireless technologies including satellite. This makes thresholds for basic or functional broadband technology neutral.

High speed broadband

Several OECD countries and institutions have also established additional guidelines to distinguish between basic broadband and more advanced types of Internet access services. Unlike basic broadband, some of these advanced broadband varieties limit the types of technologies that can be used to deliver the service and are therefore, not technologically neutral (in practice not all technologies can deliver service beyond certain speeds). Specifically, at the current stage of technological development, varieties that involve transmission speeds over 30-50 Mbps can only be reached using fixed fibre or hybrid fibre coax connections.

There is, however, considerable variation in the types of high speed broadband, their definitions and their designations, which can cause confusion. For instance, the European Union’s *Digital agenda for Europe* distinguishes between basic broadband (between 256 Kbps and 30 Mbps), fast broadband (above 30 Mbps and up to 100 Mbps) and ultra fast broadband (above 100 Mbps). Meanwhile, Japan deems ultra-high speed broadband accesses capable of delivering 30 Mbps or more, and Korea calls accesses as providing speeds between 100 Mbps and 1 Gbps “Giga Internet”.

Additional broadband metrics

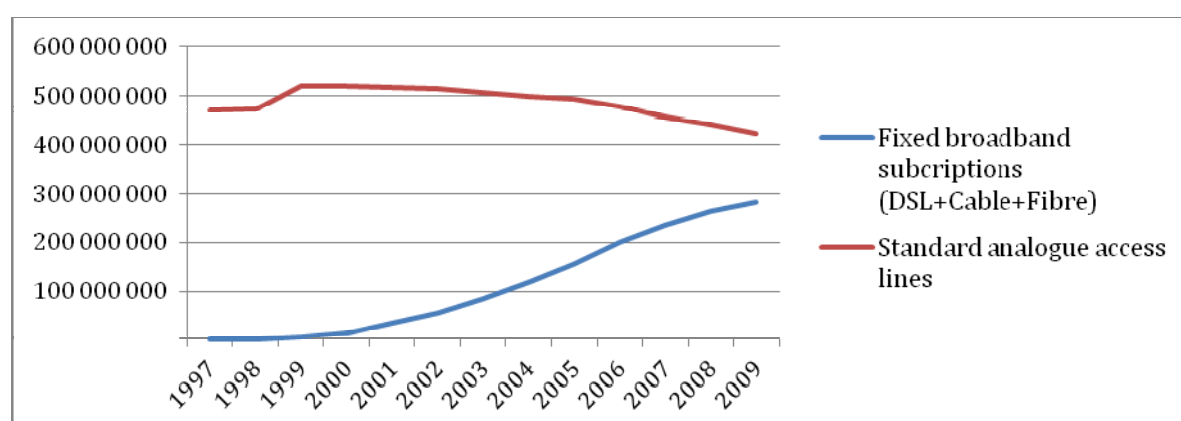
Although data transmission rates are often the only metric used to define broadband, they are not necessarily the most reliable measure of the quality of service provided. Additional metrics such as throughput, latency, jitter and packet loss are more useful in assessing quality performance. Not all Internet applications are sensitive to these additional performance measures. Some applications like e-mail or web-surfing are hardly affected by quality features, while others like video-conferencing or health applications will not operate safely and efficiently unless a high quality of service is guaranteed. Countries that decide to include these functionalities in the scope of broadband services will need to consider the utilisation of additional quality metrics.

b) Is broadband essential for full participation in society and in the public interest?

Is broadband already being provided through the market to a substantial majority of people?

Fixed broadband penetration is approaching maturity levels in many OECD countries where it is increasingly becoming the basic form of communications infrastructure.¹⁴ Although there is no pre-defined threshold level for establishing the “substantial majority”, in countries with well-developed legacy infrastructures, fixed line telephony penetration may be used as a proxy. The number of conventional fixed telephone access paths per 100 inhabitants in the OECD in 2009 was 38, a figure that has decreased steadily since its peak at the turn of the century (Figure 1). In 2010 fixed broadband subscriptions in countries like the Netherlands and Switzerland had already reached 38.1 subscriptions per 100 inhabitants and countries like Denmark (37.7) and Norway (34.6) were close to that mark.

Figure 1: Standard fixed telephone connections vs. broadband connections



Source: OECD Communications Outlook 2011, <http://dx.doi.org/10.1787/888932397872>

Does the service make a significant contribution to the attainment of specific social and economic goals? At present, most countries have not developed specific social and economic objectives linked to specific broadband usage but this could change with broadband increasingly reaching maturity levels. There is little doubt that broadband is likely to play an important role in the delivery of education and health services or the attainment of energy efficient and security objectives. These long-term goals are frequently mentioned in NBPs. As objectives linked to these areas develop, broadband availability is expected to become a necessity for meaningful participation in society. In the future, the criteria used by countries to develop socio-economic objectives linked to broadband may become an important determinant of universal service policies.

Do those without broadband incur important social and economic disadvantages? Broadband is already starting to confer active disadvantage to those who are without this service. Several public administrations¹⁵ have made significant efforts to make the Internet their principal channel of communications with people, often incentivising its use for essential exchanges of information such as filing annual tax returns or renewing driving licenses. Off-line equivalents of these services can already be slower, more difficult to obtain, or more costly. Utility firms in some countries offer discounts to clients that pay their monthly bills online. A 2009 report by Price Waterhouse Cooper commissioned by the Digital Inclusion Taskforce in the United Kingdom¹⁶ concluded that digitally excluded families are missing out on savings of USD 896¹⁷ (GBP 560) per year from shopping and paying bills online. In addition, the study suggested, Internet access at home could boost total lifetime earnings of 1.6 million children in digitally excluded families by USD 17 billion (GBP 10.8 billion). These differences are likely to continue increasing and may be affected by greater use of “cloud computing” as opposed to local storage or the use

of physical devices (*e.g.* software updates via the cloud rather than physical media such as a CD-ROM or DVD).

c) Can market mechanisms alone ensure that broadband is available and affordable for all?

Broadband services may not be available commercially in all areas. Rural, remote and sparsely populated areas, and some urban areas, may be less likely to attract investment or may not receive the same type of service in terms of technology, prices or competitive choice. Geographical, demographic and economic characteristics may thus play a significant role in determining the markets' ability to provide service. Clear and consistent regulation and the promotion of competition can contribute to extend private investment as can the availability of information to all stakeholders (*e.g.* metrics, maps and so forth).

However, even in the best of circumstances, some countries may need to complement private investment with public action to bridge the availability gap. Costs will depend on the objectives being pursued, geographical, demographical, social and economic factors, as well as on the definition of broadband adopted. Special provisions based on income may also need to be made to ensure that broadband is available for less affluent groups. At the same time, the market may be able to assist if the provision of broadband services based on public funding is placed out for tender or other schemes that provide incentives for cost reduction and the efficient delivery of services.

d) What are the costs and benefits of including broadband in universal service relative to other alternatives?

What are the net costs of broadband? The net cost of extending broadband service for all is a key factor in considering whether to include broadband in universal service. One key issue is the balance of costs and benefits. Even where governments do not include broadband in universal service obligations, they are frequently contributing to meeting costs or providing the overall funding for the expansion of broadband services (*e.g.* in rural areas). These costs are specific, immediate, and allocated to responsible actors (carriers or governments). Meanwhile benefits tend to be more diffuse, sometimes long-term, and difficult to quantify. The costing principles, process and outcomes used for funding universal service objectives should be consistent with other funding for broadband (*e.g.* transparent, subject to audit and regularly disclosed). Net costs will vary depending on the technology used to provide service and decisions taken on the level of service to be provided. In some cases, the costs of broadband literacy initiatives may need to be factored in.

Costing methodology may present difficulties. Generally, subsidy amounts can be calculated using estimated costs of constructing and operating a network minus an allowance that takes into account the revenues generated by the new service and expected positive benefits in terms of productivity, competition and welfare. However, estimating net costs may present practical difficulties. One of them involves the decision to use historical costs or hypothetical forward-looking estimates. Historical data may not accurately represent the costs incurred by an operator using today's cheapest and most efficient equipment and technology. For example, although many national broadband plans have fixed broadband at core, alternative and/or complementary mobile solutions are increasingly feasible for some services and may significantly alter calculations. Also, hypothetical costs and benefits may be difficult to determine and may vary from place to place and from time to time depending on population density, service take-up and other socioeconomic factors. Finally, calculating the benefits for the designated carrier may be complex because it becomes necessary to factor in intangible benefits such as brand recognition and reputation that are hard to quantify. An alternative is to specify the level of service required and invite tenders so that the market can determine the costs. However, there may be fewer firms in a position to tender in some geographical regions.

A recent study for the European Investment Bank¹⁸ estimating the total investment required to reach the *Digital Agenda* broadband targets showcases the difficulties inherent in the calculation of broadband deployment net costs. The study developed four different cost scenarios based on different interpretations of the Agenda's targets regarding speed goals (actual or theoretical) and type of coverage (to the household or through Internet centres in rural areas). In addition, the four scenarios factor in the costs of different technology solutions and variations in demographic density. Depending on the scenario chosen, the total cost to achieve the Agenda's goals varies from USD 102 to 307 billion¹⁹ (EUR 73 to 221 billion).

Who is responsible for funding it? In most OECD countries infrastructure providing basic telephony services already exists and most people have a fixed or mobile telephone (or both). As a result, some countries do not consider that designated universal service operators incur an excessive burden in fulfilling their obligations to provide universal telephony services. Including broadband in the scope of universal service obligations may significantly alter these costs as in some cases it will involve rolling out additional infrastructure. This is particularly true when goals involve high-speed broadband. The proportion of users that would require a subsidy will therefore depend on the level of service specified. A base line set of Internet services (*e.g.* VoIP, email, web browsing) may be much less expensive than a service that included applications requiring greater capacity (*e.g.* video). That being said, in some of the most competitive markets across OECD countries there is little difference between the cost of standalone Internet access and a monthly basket of traditional PSTN services. The main challenge is that those areas where subsidies might be required may likely coincide with areas where there is less competition.

Industry contributions across all providers play a role in universal service in some countries. In the future, funding arrangements are likely to require case-by-case analysis to account for the specific circumstances and characteristics of each market. It needs to be noted that requiring industry to bear the full costs of rolling out broadband infrastructure and providing service may, in some cases, have adverse consequences for competition. In countries where infrastructures are privately built and operated, and a single carrier is designated as universal service provider there is a risk that a single telecommunications company (usually the incumbent) might simultaneously become owner, operator of the network, and universal service provider, accumulating quasi-monopolistic power. This is, for example, one of the risks being evaluated in Switzerland, where the Federal Council assumes that Swisscom will acquire a strong position in the high-speed broadband market. According to the Council, market shares of different providers are already quite imbalanced (in favour of Swisscom), and it is apparent that only companies already committed to the market and those which have significant financial resources and cable ducts will likely succeed. To prevent such situations, where public funding is deployed, policy makers should seek to open the market to greater competition, as this is likely to reduce the cost of policies such as universal service in the future.

Some OECD countries are actively pursuing paths that may prevent a single company from acquiring positions of dominance. For example, Australia will enforce structural separation between network ownership and operations, and retail service provision. Australia's National Broadband Network will also be owned and financed by the Australian government until the rollout is complete. Other countries are taking a range of options from structural separation (New Zealand) to functional separation (Japan, Sweden, United Kingdom) as well as tools such as local loop unbundling and end-to-end cross platform competition (*e.g.* competition between cable, DSL and wireless) – or some combination of the afore mentioned market structures. Nevertheless in all these options there will invariably be some monopoly power exerted at the wholesale or retail level if there is a single provider or at best a duopoly.

Switzerland itself encourages shared investment in FTTH networks by more than one firm (usually utility firms) and the simultaneous rollout of several fibre lines which can be owned by or leased to different competitors. However, this option alone may not be sufficient, as it could be the case that multiple fibres are laid but they all remain in the hands of a single company which therefore controls

access to the home connection and may be able to charge an excessive price for releasing the fibres it does not use itself.

Public funding could also play a complementary role to private investment especially if it increases competition in areas that may otherwise only have a single provider. However, public funding for broadband faces competitive, and no doubt worthy, demands on scarce resources. Governments currently engaged in far-reaching austerity programmes may find it difficult to reach consensus on this investment.

Are conventional universal service obligations the best mechanism to provide broadband for all? Even if a decision is taken to provide broadband service for all, universal service obligations might not always be the most appropriate mechanism to implement this decision. Countries have a variety of policy options to expand broadband connectivity and stimulate service take up. A final decision should be appropriate to local circumstances and be guided by an objective assessment of alternatives based on predetermined criteria. The following set of principles intends to stimulate and guide high-level discussion among policy makers. They can also serve to bring clarity about the objectives being pursued with such policy, the inputs required to deliver it and the trade-offs involved. A final decision will require a balance between these principles, some of which raise tensions between each other.²⁰

- *Parsimony*: Given a set of options available to extend broadband for all, the most simple of them may likely be preferable to a more complex solution.
- *Sufficiency*: the mechanism should provide enough support to provide comparable services for all customers covered by a scheme at affordable rates.
- *Neutrality*: the mechanism minimises the potential for market distortions.
- *Focus*: policy objectives are clearly defined and articulated; focused on service characteristics rather than specific technologies.
- *Adaptability*: the mechanism is able to respond to changing technologies and circumstances and continue to be relevant and effective over time.
- *Predictability*: the mechanism enables a competitor or incumbent carrier to determine in advance the amount of support it will receive on behalf of a customer.
- *Accountability*: the mechanism is exercised transparently and subject to appropriate scrutiny and challenge.
- *Effectiveness*: the mechanism is administratively viable and enables objectives to be achieved cost-effectively.

Some of the countries with the most ambitious plans to expand broadband connectivity and service to all are using alternative arrangements outside conventional universal service obligations. Some of these plans potentially impact universal service goals:

- In 2002, the final privatisation of KT was subject to obligations to expand broadband infrastructure to rural areas. Similarly, in 2008 Korea approved the acquisition of Hanaro Telecom by SK Telecom on condition that SK met specific rural broadband service targets. In addition, Korea actively promotes interest and demand for broadband service through dedicated training programmes aimed at specific target groups (the elderly, agricultural and fishery workers, homemakers, public sector employees, teachers, disabled, military personnel, and

prisoners). All of these commitments and programmes fall outside the scope of universal service policies.

- Japan's strategies are focused on its plans to roll out its New Broadband Super Highway (*Hikari-no-michi*), and encouraging service take up by promoting ICT use in education, healthcare and government services. Changes to the scope of universal service will only be considered after the new infrastructure is fully rolled out and service take-up has expanded.
- Australia's plan to extend broadband service through its NBN is being developed outside the scope of the existing Universal Service Obligations and is concentrated on infrastructure development. However, Australia is already transforming universal service funding arrangements to facilitate the transition to the NBN.

e) Is including broadband in universal service consistent with broader policy objectives and other ongoing programs?

Universal service policies aim to reduce social exclusion and provide structural support for sustainable economic performance. These same objectives are also behind other national initiatives such as national infrastructure plans, economic revitalisation efforts, and long-term growth strategies. In choosing between universal service policies and alternative options, and in deciding under which form broadband is included in universal service (in those cases where a government decides in the affirmative) policy makers need to take into consideration the objectives and principles behind these other economic initiatives to ensure certainty and coherence and to reinforce positive effects.

To achieve this goal, some countries frame decisions to include broadband in universal service within broader policy initiatives:

- The United States' National Broadband Plan was developed upon request from Congress to develop a plan to ensure that every person has access to broadband capability. Congress' request explicitly stated that the plan should include a detailed strategy to advance "consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, employee training, private sector investment, entrepreneurial activity, job creation and economic growth, and other national purposes."
- In Spain, the decision to include broadband in universal service in 2011 is framed within the 2009 "strategy for a sustainable economy". This strategy is a response to the effects of the ongoing economic crisis and aims to foster balanced, durable, sustainable growth. The scope of Law 2/2011 of Sustainable Economy, which contains the decision to include broadband in the scope of universal service obligations, aims to "build a growth pattern that conciliates economic, social and environmental growth within a productive and competitive economy that fosters quality employment, equal opportunity for all and social cohesion and which guarantees environmental protection and a rational use of natural resources, in a way that permits the needs of present generations without compromising the ability of future generations to tend to their own needs."

Mobile communications and universal service

Mobile communications have diffused extremely rapidly across the OECD area and technologies have evolved apace (Box 4). In 2009 mobile subscriptions already accounted for 63% of all communication access paths, while fixed telephony paths have been decreasing since 2001. By 2009, mobile telephony coverage in many countries approached 100% and the OECD mobile subscription rate (2G and 3G) was

103%, with a high of 203% in Estonia. This data reflects the fact that mobile telephony is a widespread mass market service. Very high subscription rates such as the ones mentioned in Estonia are normally attributed to a high percentage of prepaid users who have multiple SIM cards and switch between them to avoid the most expensive calls.

The large range of handheld devices currently on offer, and the expansion of 3G and 4G networks are rapidly increasing the range of functionalities available “on the move”, including data and video services. Take up of these advanced services through wireless platforms remains limited but is growing fast. By May 2010, some 38% of mobile phone owners in the United States had a data plan, and in the United Kingdom the number of people using the Internet on mobile phones has almost tripled in just three years, reaching 13.5 million for the first quarter of 2010.²¹

Box 4. Wireless networks

Wireless access standards generally evolve during their lifetime to offer improved performance and capabilities. Each of these “waves” of improvement is generally deemed a “generation”. A new generation involves increases in performance and capabilities compared to its predecessor. Transitions between generations often require carriers to obtain additional spectrum, likely in a new frequency band, and install a new overlay network.

Mobile services using analogue radio technologies are called first generation mobile (1G). In the 1990’s, the analogue networks were replaced with digital ones then labelled 2G. 3G refers usually to the ITU designation for “IMT-2000”. This is a family of standards that includes “evolutionary” technologies that perform at higher standards than 2G but are backwards compatible with 2G technology, and “revolutionary” technologies that require operators to acquire new spectrum. In today’s market, 3G technologies include UMTS, HSPA and HSPA+, CDMA2000, TD-SCDMA, LTE and IEEE 802.16e also known as WiMAX. From an end user perspective, 3G offers an improved experience over 2G through greater bandwidth and speed. The root “IMT” also encompasses “IMT-Advanced” (4G) a group of enhanced performance technologies aligned around LTE-Advanced and IEEE 802.16m technologies. 4G will have capabilities for high quality multimedia applications with significant improvements over 3G in terms of performance and quality of service. 4G advantages over 3G focuses on worldwide practical usability, cost efficiency, user-friendliness, higher mobility and interoperability with other systems.

Widespread coverage and usage of mobile telephony, the increasing improvements in 3G signal coverage and quality, and the fast-growing appetite for mobile broadband services, raise questions regarding the future scope of universal service and role of wireless networks in fulfilling universal service policies.

Re-evaluating the scope of universal service policies to include ubiquitous service

In most OECD countries, the existing universal service framework imposes an obligation to provide a certain set of services to any consumer at a fixed location. In some countries this obligation may even be subject to restrictions. Finland, for example, guarantees a subscriber connection at the user’s permanent place of residence or location, but not in secondary residences. The rapid adoption of mobile services and the growing demand for advanced wireless services is creating expectations that countries could consider revising the scope of universal service policies with the aim of guaranteeing service for the widest practical coverage.

Revising universal service policies to include mobile telephony could have a positive effect for users. In areas that are currently underserved by mobile operators it may lead to increases in mobile coverage and better reception. On the other hand, doubts can be raised about the costs of providing services in sparsely populated areas, who pays for them, and about the range of services that could be offered from all locations (*i.e.* whether it would include only voice telephony or data as well). Furthermore, wireless networks do not always meet the high quality of service standards provided by fixed networks. For example, there are

concerns about wireless coverage in rural areas and poor indoor reception, especially in buildings with thick concrete walls when using high frequencies (e.g. 2.6 GHz band). Additional concerns involve the costs incurred by operators -if they are to pay- to provide ubiquitous coverage in hard to reach areas, where low traffic may not compensate for investment and maintenance expenses. Such additional costs could increase the burden of fulfilling universal service obligations, especially where mobile operators contribute to national schemes, and potentially put a stress on existing universal service funds. Finally, the implications for facilities that enable call location to be identified, for emergency services, need to be taken into account and the costs considered in terms of universal service contributions if operators do not include such capabilities for commercial reasons.

At present, revising universal service policies to include service from any location may not be feasible in all OECD countries. Countries that are characterised by high population densities and extensive advanced wireless network coverage are more likely to consider this option than those with large, unpopulated or sparsely populated areas. Korea, with high population density and widespread affordable 3G mobile service defines universal service as “the basic telecommunications service which any user may receive at an appropriate charge “anytime and anywhere” within Korea”. However, this does not imply that all OECD countries with high population densities and advanced mobile networks will want to include mobile access in their universal service policies. Some would argue that once 3G coverage is universal or quasi-universal, it becomes unnecessary to include it in the scope of universal service policies because the market already fulfils that function. This is possibly the case in Japan, where 3G coverage is widespread, but mobile telephony is not included in the scope of universal service obligations. Even in those cases where 3G coverage is still growing, an early change in the scope of universal service policies could cause unnecessary market distortions. This might be the case in the Netherlands and Germany.

The discussion on this topic has been active in the European Union, where a 2010 study conducted by BEREC²² concluded that all countries except Latvia and Lithuania considered that the universal service obligation should be defined in terms of fixed location. BEREC countries expressed concerns about the following issues:

- *Cost relative to benefits*: In large countries with large unpopulated or sparsely populated areas like Sweden, the costs of providing access from any location would exceed the benefits.
- *Range of services*: At the time of the study mobile networks in countries like Finland and Hungary cannot provide functional Internet access nationwide. This would limit the range of universal services that could be offered from any location.
- *Impact on competition*: Germany and the Netherlands stress that market mechanisms alone might be able to provide mobile telephony service from any location. As a result, changes in the scope of universal service might be unnecessary or have adverse effects on competition.
- *Quality of service*: Denmark and Poland consider that mobile services do not yet meet the quality parameters set out for universal service obligations in their legislations.
- *Affordability of service*: Denmark points out mobile services may not be available at the same price level as equivalent fixed services.
- *Emergency services*: Ireland points out that there could be problems locating calls issued through VoIP.
- *Social tariffs*

Role of wireless networks in fulfilling universal service policies

Fixed lines will likely continue to play the primary role in telecommunications as broadband networks are rolled out. The ongoing expansion of advanced wireless networks capable of supporting voice and data communications is unlikely to alter this. As multimedia mobile subscriptions grow and new data-intensive applications become available, wireless platforms will likely rely on fixed networks to do backhaul “heavy-lifting” and prevent network congestion. Furthermore, notwithstanding rapid advances in technology, wireless platforms will continue to have limited capabilities relative to fibre networks. As OECD countries develop objectives linked to the capacity of new broadband networks (for example, using them as a platform for the delivery of public healthcare services), these limitations could have broad implications.

Despite these caveats, wireless broadband technologies will have an important role to play in the future of universal service policies particularly for traditional services and some new services. Wireless technologies are already being used as a solution to offer both voice and broadband connectivity in remote areas. As this arrangement becomes widespread it could erode the justification for traditional fixed-line subsidisation via universal service funds. Wireless technologies could carry signals to areas previously out of range and where advanced fixed networks could prove too costly for operators under existing market conditions. For example, with wireless technologies such as WiMax individual households in areas with very low building density could have receiver equipment for voice and data and wireless networks could be used as backbone infrastructure to distribute the signal from town centres.

Finland’s National Broadband Strategy moves in this direction. The plan, approved in 2008, aimed to provide wired or wireless broadband connections averaging download speeds of at least 1 Mbps to every permanent residence, firm or public administration body by 2010. In addition, by the end of 2015, the plan expects “practically all” (more than 99% of the population) permanent residences, firms, and public administration bodies to be within two kilometres of an optical fibre or cable network permitting connections of 100 Mbps. This local loop could well be provided via a wireless connection.

Wireless connections also feature prominently in discussions regarding the role of public payphones in universal service policies. Widespread service availability and mass mobile service take-up has significantly reduced the use and profitability of payphones. In some countries like the United States this has led to a significant decrease in the number of available payphones from a peak of 2.1 million in 1999 to fewer than 750 000 in 2009.²³ Other countries like Denmark, Austria and the Netherlands have recently withdrawn payphones from the scope of universal service obligations. In those countries that choose to keep payphones as part of universal service policies, wireless technologies could help make payphones a cost-effective option. Payphones connected to wireless broadband networks as opposed to conventional fixed networks could have costs and service advantages. Where wireless networks are already in existence it would be unnecessary to install and maintain an extra line. Furthermore, wireless payphones could offer Internet services to help recoup maintenance costs at no extra expense.

Wireless networks could also have implications for universal service provision in urban areas where they are a complement to fixed networks, and potentially, an alternative. Where broadband wireless is a complement to a fixed connection, the success of local wireless broadband will depend on an environment that facilitates digital planning, innovation and adequate spectrum availability. Policy makers should continue to support technology neutral policies that do not discourage innovation in wireless technologies. Unlicensed spectrum (*i.e.* through unlicensed hotspots and community-based wireless ISPs) can help unload traffic from licensed networks. However, to fully realise the potential of advanced wireless technologies in terms of speed, latency and efficiency, new and additional spectrum allocation will likely be needed to ensure larger bandwidth. Spectrum allocation agencies need to examine existing allocations to see where space can be made for new broadband wireless services. Consideration should also be given to reforms that facilitate spectrum trading and leasing. To the extent that wireless technology innovation is

likely to be deployed first in highly profitable urban areas, the success of advanced wireless platforms in areas where it competes with fixed networks will likely determine its potential to provide high-quality connectivity in rural and hard to reach areas potentially reducing the “digital divide”.

Spectrum allocations currently being designed in some OECD countries are expected to play a vital role in the future of broadband wireless networks. In the European Union, the lower 800 MHz band is being freed-up as countries switch from analogue to digital television and is considered ideal for widespread and indoor coverage. Several European countries have made or plan to make allocations in this lower band. License conditions include defined coverage goals in sparsely populated areas.

- The United Kingdom plans to auction spectrum in the 800 MHz and 2.6 GHz bands in the fourth quarter of 2012. In its consultation document published in March 2011 Ofcom proposed to include a coverage obligation in one license for the 800 MHz to deploy an electronic communications network that is capable of providing mobile telecommunications services with a sustained downlink speed of not less than 2 Mbps with a 90% probability of indoor reception to an area within which at least 95% of the UK population lives. Ofcom also indicated it was considering the possibility of retaining the power to partially revoke the awarded licenses where the spectrum is needed to meet a specific public policy goal (such as the provision of broadband in rural areas), the spectrum is unused, and the licensee is unable to or unwilling to provide the required service even when offered appropriate funding. Ofcom received a number of responses to these proposals and is expecting to publish a further consultation on these and other issues around the end of 2011.
- In a similar manner, allocations in the 800 MHz band in France will be subject to obligations to provide certain levels of coverage at departmental level. These obligations will be aligned with existing obligations to provide coverage in metropolitan areas. The auction strategy also foresees priority deployment areas in low population density areas that are currently underserved by wireless operators.
- In Spain, the allocation of the 800 MHz band involves the obligation to provide coverage to 90% of people in populations of less than 5 000 inhabitants at minimum speeds of 30 Mbps by 1 January 2020.

Finally, policy makers need to carefully consider the impact of universal service policies regarding wireless on the architecture of future infrastructure rollouts. Governments should weigh in the risk that if obligations to roll out fibre-based wireline infrastructure to outlying areas are eliminated, carriers will have fewer incentives to roll out infrastructure supporting very high-speed Internet access in the future. This could contribute to an increased stratification between rural and urban areas as fibre networks evolve and urban/rural speed differences exacerbate. Under this argument, the future iterations of the digital divide may focus on those with access to fibre connectivity and those without. One alternative to address this issue is to involve community members, especially in remote areas, in the discussion of the pros and cons of different technical solutions in the short, medium and long term, and in the final decisions adopted. On the other hand, the development of fixed and wireless infrastructure is viewed as being complementary in almost all cases. For wireless networks to perform in an efficient manner they need to be supported by fibre backbone networks. For some uses preference could be given to fixed networks in order to reduce the demands on scarce spectrum more productively used by those users that require mobility.

Funding universal service objectives in the context of broadband networks

Designated carriers used to fund the costs of fulfilling universal service obligations through cross-subsidies between more and less profitable market segments and by passing on costs to consumers. However, for over a decade, the revenue of fixed-line operators in OECD countries has changed due to

greater competition in the most profitable segments of the market and fixed-mobile substitution. In recent years some OECD countries have introduced compensation programmes (sometimes referred to as universal service funds or USFs). USFs allow carriers to reclaim costs in ways that reflect changes in market demand, the cost of providing services and technological changes.

Box 5. Experiences with compensation mechanisms

Reliance on compensation systems varies across countries:

- Some, like Norway and Germany, do not currently have compensation mechanisms because their former incumbents have voluntarily agreed to provide the service without compensation.
- Others, like the United Kingdom have not adopted a compensation system because they do not consider that the costs of fulfilling universal service obligations impose an excessive burden on the carriers. The concept of burden, according to European Legislation is based on a calculation of net costs that takes account of the costs incurred by the carrier minus the revenues, including intangible benefits. Carriers can be compensated for specific net costs provided that the burden is recovered in a competitively neutral way. Generally, net costs that fall outside normal commercial standards will be considered an unfair burden. However, the application and interpretation of this concept is left to member states. In the United Kingdom, Ofcom estimated in 2005 that the costs for BT were around USD 80-112 million (GBP 50-70 million), while benefits were around USD 96 million (GBP 60 million).
- The Netherlands has not adopted a USF, although it will consider the option of creating a funding mechanism to compensate carriers for providing specific service for people with disabilities.
- On the opposite end of the spectrum, the United States' Universal Service Fund is a key component of that country's universal service regime and compensations have risen steeply: between 2001 and 2010, the component of the Fund that supports telecommunication service in high-cost areas has grown from USD 2.6 billion to USD 4.3 billion.
- Experience is diverse among other OECD countries that have USFs. For instance, France established a compensation system in 1997 and has used it since, Switzerland and Denmark have systems but no compensation claims have been filed to date, and Japan adopted a system in 2001 but did not activate it until 2006.

The evolution towards broadband networks raises questions about USFs. Where they have been established, USFs were generally designed to compensate relatively small gaps in the costs of providing services over existing switched networks, not to fund the roll out of costly infrastructure sometimes going into the billions of dollars, or to facilitate the transition from PSTN to new networks. Furthermore, because of the uncertainties about package costs in these future networks, it is unclear how many people will be unable to afford them, and therefore will need to be subsidised. This makes future calculations of fund needs challenging.

Infrastructure deployment and universal service funds

The rollout of broadband networks creates a dilemma for policy makers. Although private investment is pivotal for infrastructure development, in some cases it will need to be supplemented with alternative funds. Where USFs exist, some governments face the following main alternatives: reforming existing USF mechanisms to allow them to support infrastructure development or creating alternative funding instruments specifically designed for this purpose.

Far reaching reforms of USFs aimed at transforming them into the main mechanism to supplement private investment in infrastructure can be difficult:

- Reforms may involve lengthy deliberation and approval processes because changes will be likely to require broad consensus among policy makers. Under the current “austerity” climate, such plans may face important budget constraints.
- Infrastructure rollout is, for the most part, a single event as opposed to the recurrent costs incurred annually by carriers to fulfil their universal service obligations. Therefore, some may argue that a single funding mechanism that aims to fulfil both purposes may require a higher level of complexity than two separate solutions designed to support infrastructure rollout and universal service obligations.
- Some countries may simply consider that it is not appropriate to use USFs or equivalent mechanisms to support infrastructure development because this falls outside the goals of universal service policies. This is the case in the European Union, where member states are not permitted to impose on market players financial contributions that relate to measures which are not part of universal service obligations. Individual Member States remain free to impose special measures (outside the scope of universal service obligations) and finance them in conformity with Community law but not by means of contributions from market players.²⁴

These reasons may lead countries to separate funding to support the rollout of broadband infrastructure from funding dedicated to compensate carriers for fulfilling their annual universal service obligations. A number of OECD countries are already taking this route. For the most part, separate infrastructure programmes are developed outside the scope of universal service obligations. These strategies generally involve combinations of public funds and money raised through the financial markets. A detailed review of these plans is outside the scope of this report. However, the Appendix provides highlights of these programmes in a selected group of OECD countries.

Dedicated infrastructure deployment funds may nonetheless have direct implications for existing USFs. In Australia for example, plans to build the National Broadband Network (NBN), have led to the development of a revised universal service obligations’ funding arrangement to better complement the NBN’s operations. In addition, the NBN has been designed so that wholesale communication services over the NBN are offered at nationally uniform wholesale prices. The Telecommunications Legislation Amendment (National Broadband Network- Access Arrangements) Act 2011 contains provisions that support this outcome. As wholesale prices are the largest component of retail pricing, Australia expects that these measures, together with strong retail competition, will translate into affordable retail prices.

Australia is also concerned about the migration of traffic to its new network. To this aim, NBN Co will pay Telstra for each active location it disconnects from its copper and cable (HFC) networks. On 23 June 2011 the Australian Government entered into an agreement with Telstra to deliver universal services and other public interest telecommunications services. As part of this agreement, the Australian government will provide funding to assist in the migration of voice-only customers to the NBN. Overall, the Australian government will provide USD 52 million²⁵ (AUD 50 million) per annum for fiscal years 2012-2013 and 2013-2014 and USD 103 million (AUD 100 million) thereafter annually towards funding agreements for universal and public interest services. Those funds will be supplemented by a new industry levy. To facilitate the smooth transition to the new levy arrangements the government and Telstra have agreed to interim funding arrangements for the first two financial years to provide certainty to industry. This interim arrangement will mean the aggregate levy contribution that is made by telecommunications firms other than Telstra will, for the first two years, remain at the amount that non-Telstra contributors are assessed as being required to contribute under the USO and NRS schemes for the 2011–2012 period.

Alternatively, some countries may decide to transform their existing USF to enable them to supplement private investment in new networks in those areas unlikely to be covered by private investment. In such cases, the USF will need to be overhauled to be able to subsidise costly infrastructure

deployment in addition to compensate for the provision of services that are too costly for carriers to assume on their own.

Countries in this situation should consider the following aspects when reforming their USF:

Proportionality

The funding mechanism should provide sufficient means to achieve stated objectives. One of the main reasons for reform is precisely the inability of relatively small funds to compensate carriers for raising costs of fulfilling universal service obligations. In those cases where USFs are expected to supplement private infrastructure investment, costs can go up to several billion dollars. A suitable reform of a USF will need to make a careful assessment of the objectives it wishes to accomplish and develop appropriate mechanisms to raise such funds. Potential sources of funding include:

- A direct levy on all consumers of communications services (for example, a fixed amount that appears directly on the bill). Funding from the proceeds of the digital dividend or spectrum fees.
- Government funding via general taxation revenue.
- Contributions from public bodies and private entities whose objectives are tied to universal broadband service in areas such as education, health, security or energy.

Adaptability

Rules defining USFs should be flexible enough to accommodate a variety of technical standards and their evolution as conditions change. Adaptability is necessary to prevent the USF from becoming an obstacle to future technological innovations, and to minimise the need for constant adjustments. Frequent revisions could not only be politically difficult to achieve, but also undermine the predictability needed by investors and telecommunication operators.

The need to ensure that rules defining the USF adapt over time may cause tensions with the need to secure a predictable system for long-term investment decisions. A way to manage tradeoffs could be to ensure that there is sufficient flexibility within the USF framework so that its implementation can adapt to changing circumstances without the need to adapt the framework itself.

Efficiency

Guidelines for reimbursements of USFs need to be periodically evaluated to prevent wasteful and inefficient allocations as market and technology conditions evolve. To improve programme accountability, countries could establish reasonable and clear performance goals and measures in terms of universal service objectives. Carriers benefiting from USFs should provide sufficient level of detail on the specific elements covered by funding to allow the administrator of the fund to evaluate their request and to monitor performance.

Efficiency was a key factor in the recent USF reform undertaken in the United States. To this effect, the approved proposal ties funding to recipients to four specific performance goals:

- Preserve and advance voice service.
- Increase deployment of modern networks capable of supporting necessary broadband applications as well as voice service.

- Ensure that rates for broadband service are reasonably comparable in all regions of the nation and that rates for voice services are reasonably comparable in all regions of the nation.
- Limit universal service contribution burden on households.

Timeliness

The moment at which changes to USFs are introduced may have an important impact on outcomes. Subsidies and interventions should avoid distorting existing investment incentives and therefore incentives to innovate. This could be the case if USF changes are announced too early in terms of network development. On the other hand, interventions might be more costly and possibly less effective if they are announced after situations of market dominance have already consolidated. When interventions take place after the consolidation of “digital divides” along geographical or social and economic lines, social costs might be difficult to evaluate and may have long-term consequences.

The timing and implementation schedule of any USF reform is crucial. Generally, implementation should be staged over a sufficient time horizon to minimise abrupt disruptions that could generate uncertainty among investors. The implementation schedule should be public, clear and transparent and provide sufficient objective information to enable all those affected to anticipate the context for future decisions and to make long-term investments with confidence.

Neutrality

Funding should minimise obstacles to competition and encourage private investment in efficient, state of the art technologies. This principle is coherent with the aims of the other criteria and should serve to inform them.

The market is expected to play a fundamental role in deciding which technological solutions eventually prevail and in providing the majority of resources to rollout broadband infrastructure. USFs are considered useful instruments to achieve policy objectives in a timely fashion and to compensate carriers for providing services where it may be too costly to do so. Nonetheless, USF mechanisms should be designed to minimise their impact on private investors.

In addition, funding mechanisms need to be structured in a way that, as far as possible, does not concentrate the impact of the financial burden on end-users. This can be done, for instance, by spreading contributions as widely as possible.

The United States is one of the OECD countries that decided to use its USF to support the transition to broadband networks. On 6 October 2011, the United States approved a comprehensive reform of its two existing universal funding mechanisms: the Universal Service Fund and the Intercarrier Compensation (USF and CCI). The purpose of this reform is to: a) modernise the two mechanisms to support broadband infrastructure deployment; b) require accountability from companies receiving support; and c) use market-driven and incentive-based policies that maximise the value of scarce programme resources for the benefit of consumers.

Until now, the USF was designed for a world of voice minutes and separate long-distance and local telephone companies. This system rewarded carriers for maintaining outdated infrastructure rather than migrating to IP networks and it created opportunities for arbitrage that caused long and costly litigation. To transform this regime, the FCC has projected a two-stage process that will be completed over five years. Immediate reforms aim to increase the efficiency with which funds from the existing programmes are allocated and used. Long-term reforms propose the substitution of the two pre-existing mechanisms by a single programme; the Connect America Fund (CAF). The CAF will provide ongoing support to maintain

and advance broadband deployment in areas of the country that are uneconomic to serve, and where voice service will be provided as an application over broadband networks. Options are currently being discussed to structure the CAF. Under one proposed option, the CAF would have two components, one focused on fixed voice and broadband service (which could be wired or wireless) and one focused on mobile voice and broadband service. Under a second proposal, all support could either be awarded through a competitive, technology-neutral bidding mechanism, or right of first refusal could be offered to the current voice carrier of last resort in each part of the country. A third option suggests a hybrid model that would eliminate distinctions between rural and non-rural carriers.

Calculating compensations for voice services in broadband networks

New broadband networks introduce additional uncertainty regarding the calculation of universal service costs and may raise the need for economic support. As traffic transitions from circuit-switched connections to broadband, the costs of maintaining the existing PSTN networks will rise. This creates a need to establish transitional guidelines to accelerate traffic migration and potentially to supplement existing funding mechanisms to cover these additional costs. Furthermore, as price structures of broadband networks differ from those of conventional networks it is unclear how many people will be unable to afford services on broadband networks at market prices. A first step in determining the economic support needed will be to establish new thresholds to define affordability, to determine the level of service via broadband networks that is envisaged, and to define the broadband quality and data transmission speeds required to provide such level of service as this is a major cost differential.

New broadband networks create uncertainty about the future calculation of the costs of fulfilling universal service obligations. A fundamental goal of universal service is to ensure affordable access to voice communications. However, differences between cost and price structures of conventional telephone lines vs. IP-based equivalents introduce ambiguity about what constitutes a threshold for affordability of voice services in an NGA. As a result, it becomes difficult to estimate how many users will require a subsidy and how much each subsidy will cost. Current subscription prices for circuit-switched telephony may serve as a starting point to establish an affordability threshold because IP telephony is expected to provide replacement services. Straight comparisons however, should be taken with caution. Prices for conventional telephones may not always factor in the costs of infrastructure that was laid out decades ago through public monopolies. Furthermore, circuit-switched call rates used to be based on distance and were calculated on a per-minute basis. Meanwhile, IP-based subscription prices tend to be higher to reflect installation costs but call tariffs are typically flat nationwide and generally lower than conventional and historic call tariffs.

At the current time, when household penetration of service through NGA networks remains low in some countries, it may be difficult to anticipate cost calculations fully and therefore to estimate whether compensations will remain at levels which are close to the current ones. Difficulties may be compounded during the transition from PSTN networks. As traffic migrates to NGA networks and PSTN subscriptions decrease, fewer customers will generate less revenue from voice, raising the costs of maintaining PSTN networks. Furthermore, the transition from PSTN is unlikely to take place evenly across customer groups or geographies and it is likely it will take place earlier in affluent urban areas. This could cause rises in compensation needs that require adequate provision. In such cases, existing industry levies might need to be supplemented with government funds.

ADDITIONAL ONGOING CONSIDERATIONS

As the footprint of broadband networks continues to expand and service take-up grows, concerns about the delivery of basic services through these new networks and about leveraging their capabilities to improve the quality of service will be further debated. This section therefore introduces a few additional topics and discusses them briefly.

Transitioning to multipurpose IP networks

It is expected that as the footprint of fibre networks expands they will come to substitute traditional circuit-switched infrastructures in the provision of telecommunication services. For consumers, the transition to fibre networks is expected to deliver improvements in terms of choice, availability and quality of services. For industry, the transition is expected to enable and encourage competition and innovation. A few OECD countries are already discussing or drawing plans to migrate traffic away from traditional PSTN networks. Some of them are discussing the decommissioning of circuit-switched networks, a decision that will likely hasten the transition to fibre-based telecommunications.

- As of January 2012 the Australian Competition and Consumer Commission (ACCC) is assessing Telstra's Structural Separation Undertaking (SSU) and Draft Migration Plan. These documents specify how Telstra will progressively cease to supply fixed-line services over its copper and a HFC (hybrid fibre coax) networks in all fiber footprint areas of the National Broadband Network. Disconnection of copper and HFC services will occur on a progressive basis and will be complete by the time the National Broadband Network is concluded in December 2020. In addition, under the Infrastructure Service Agreement NBN Co will incrementally acquire ownership of Telstra's lead-in conduits as well as long-term rights to access and use of other infrastructure, thus reducing the cost to deploy the NBN.
- In the United States, the FCC's Technology Advisory Council (TAC) recommended in June 2011 that the FCC take steps to expedite a transition away from the traditional telephone network with a target date of 2018. The TAC's reason for the recommendation was the strong move away from the traditional telephone network, particularly to mobile-only. The TAC reported that already more than 25% of consumers have forsaken landlines for voice wireless-only service. Furthermore, the TAC estimates that by 2014 there will be nearly as many VoIP lines as landlines (32 million vs. 42 million). The TAC therefore recommends that the FCC start planning now for, and expedites, the transition from PSTN.

The transition to multipurpose broadband networks will have practical implications for how basic telecommunication services are delivered. Accordingly, governments will need to put in place arrangements that ensure a smooth transition and guarantee the continuity of basic universal services for all.

Voice services in multipurpose IP networks will be delivered to end-users through VoIP protocols. Policy makers will need to develop adequate technological solutions to ensure that these connections offer the same quality and reliability of services as PSTN connections. As conversations travel over a broadband connection, any disruption of broadband service, including power interruptions, will make VoIP unusable. As PSTN connections are substituted by IP-based ones and eventually PSTN lines are decommissioned,

this could potentially cause problems, particularly in areas where only one type of connection is available (*i.e.* there is no mobile coverage). Possible solutions may include the installation of secondary power supplies which could be activated during power outages. Certain types of installations (*i.e.* hospitals) may already have such infrastructure.

The development of a reliable and efficient system to transmit emergency communications through VoIP (especially nomadic VoIP) is a key challenge currently being addressed by OECD countries. Suitable solutions need to address technical and institutional issues regarding proper routing of calls to Public Service Answering Points (PSAPs), retrieval of caller location information, reliability and 24/7 availability of service, and quality of access. Some of these issues have not been fully solved to date.

In the European Union, the European Regulators Group (now replaced by BEREC) analysed in detail these issues and developed a common position to be implemented by regulators across the Union.²⁶

- All telephony service providers should be obliged to provide access to emergency services.
- Routing should be provided to the locally responsible PSAPs to the extent allowed by technology.
- Information about the caller's location should be provided to the extent allowed by the technology.
- Telephony service providers should be obliged to provide the emergency response centre with information on whether the call originates from a fixed or a potentially nomadic user. Telephony service providers should be obliged to clearly inform subscribers about any limitations in the services as compared to the traditional telephony service. The information should be provided in comparable ways in different member states, (*e.g.* in the terms and conditions of contract, by means of a sticker on device or clearly visible information in bills).
- Emergency calls should be set up with the priority, quality and availability to the extent allowed by the technology.

In the United States, the Department of transportation is taking a lead role in the research and development needed to bring about NG 911, the emergency communication system that will eventually replace the existing E 911. NG 911 is being designed to eventually combine multiple streams of incoming information for PSAPs from networked devices such as highway cameras, security cameras, alarms or personal medical devices and to include multimedia data capabilities (text, images, and video). However, it is expected that text-based mechanisms will be the primary media type (in addition to voice). There will be a multiyear transition to NG 911, as PSAPs will need to develop the technical and operational capabilities to handle incoming multimedia data.

As countries transition towards IP-based multi-service platforms, it is expected that many people will take up a bundle of Internet services. However, some customers may want to contract only a voice service. As circuit-switched networks are decommissioned in their areas, this will require some rewiring to ensure that customers have access to a telephony port in their homes. Alternatively, the NGA operator could offer voice service only, provided over IP technology. Voice-only customers may also need assistance and adequate information to prevent discontinuity in their service. In some cases they may also need to receive incentives towards purchasing new equipment. Universal service provisions may need to be adjusted in order to accommodate these additional transitional costs.

Timing and scheduling should be carefully arranged to ensure that the migration from circuit-switched networks does not cause interruptions to the service or unnecessarily raise the costs of fulfilling universal

service obligations. Transitions of traffic from large operators are considered crucial as smaller carriers are likely to follow their lead. Where national plans to deploy fibre infrastructure exist, deployment and migration plans will need to be aligned. Co-ordination will ensure that at the time of migration IP-based services are available everywhere PSTN lines are being switched off. Target dates for decommissioning of the PSTN network may be necessary to accelerate the transition and to ensure that no pockets of connections remain on circuit-switched networks beyond the point where low levels of traffic make the maintenance of the network uneconomical.

Eventually, policy makers need to exercise discretion in assessing when voice service through VoIP is considered a suitable substitute to traditional telephony in regard to universal service requirements. In some countries, this will require changes to the scope of universal service obligations to recognise IP-based voice services as equivalent to conventional telephone lines. This was the case until recently in Japan, where the scope of universal service obligations was revised in April 2011 to allow NTT East and West to provide telephone service through either traditional copper lines or through “optical IP phones with price levels equivalent to traditional subscriber lines”. The aim of this measure was to prevent the installation of new PSTN connections in new residential developments and therefore duplicated costs. A similar change might eventually be needed in Switzerland, where the designated universal service carrier, Swisscom, is required to provide a choice of analogue, digital (ISDN) and broadband connections for telephony and data transmission. However in other OECD countries, the current terms of universal service legislation may make such a change unnecessary. This might be the case in France, where article L-35 of the Code of Postal Services and Telecommunications simply imposes the obligation of “providing a quality telephone service”. Establishing an early equivalence between traditional fixed telephony connections and VoIP may foster the rapid expansion of VoIP. According to ARCEP,²⁷ in 2009 42% of fixed telephony users had Voice over Broadband (VLB – *Voix sur large bande*) as opposed to traditional RTC connections.

Leveraging new technologies and NGA networks and ICT to enhance service for people with special needs

In the Seoul Declaration for the Future of the Internet Economy, Ministers undertook to expand access, including through policies that “Recognise the potential of the Internet and related technologies to provide enhanced services to people with disabilities and special needs.”

Organisations representing people with disabilities across the OECD area have been vocal regarding the need to develop a dedicated policy approach that addresses potential advantages of broadband networks to provide suitable access for the disabled. Some argue that such measures should be taken early on in the state of development of new communication infrastructures and encompass design, development and fabrication processes of applications and equipment to ensure that developments do not go down a path that creates new barriers and force the disabled to play catch-up.²⁸ Consistent government attention will be needed to identify and overcome specific barriers early on.

These discussions are in line with the commitments included in the 2007 United Nations Convention for the Rights of People with Disabilities (UNCRDP)²⁹ which was signed by almost all OECD countries. Under the Convention, countries agree to promote the design, development and distribution of accessible information and communication technologies at an early stage so that they become accessible at a minimum cost. Countries also commit to promote research and development of universally designed goods, services, equipment and facilities which should require the minimum possible adaptation and the least cost to meet the specific needs of a person with disabilities. The emphasis on accessibility represents a paradigm shift; whereas previous approaches tried to find special alternative arrangements for people with disabilities, the UNCRDP focuses instead on making society accessible to all on an equal basis.

Although provisions vary by country, universal service obligations to provide access to telecommunication services normally include adapted public payphones for the mobility impaired, text

relay services that translate voice into text and vice versa for the hearing or speech impaired, and tactile elements in telephone keyboards for the visually impaired. However, as receiver equipment continues to evolve rapidly through commercial channels and new services like broadband Internet become part of the scope of universal service policies in several OECD countries, measures will need to be taken to ensure that the benefits of these technologies are truly made accessible to all.

It needs to be appreciated, for example, that new technologies, such as text-to-speech functions on computers/e-readers or voice prompted “search and query responses” on smart-phones offer tremendous opportunities to empower users that face challenges in one or more areas. These technologies are sometimes driven by commercial imperatives and in other cases in response to request from certain communities. Consumer representatives caution that initiatives driven by sectoral interests may not give priority to the greatest needs. Nonetheless, both these drivers need to be acknowledged in the formulation of government policy. In addition, historical differences in the treatment (*e.g.* value added tax) for content delivered through different means (*e.g.* books and news papers *vs.* electronic devices) need to be considered in terms of the ability of electronic devices to enable inclusion.

Among the proposals put forward by disability advocates, concerns regard the following issues:

Accessible mobile devices and services

Some OECD countries already allow the provision of universal telephony service through mobile telephones. A few already offer or are planning to offer access to emergency services via SMS. As the role of wireless technologies in universal service progresses, governments will need to develop measures to ensure that these services are accessible for all.

Currently, not all mobile phones are compatible with hearing aid devices. People with hearing loss or who use either hearing aids or have cochlear implants may simply encounter interference with their hearing aids, dead silence or hear beeps and uneven tones. Solutions to these problems include the development of mandatory compatibility standards for mobile phone manufacturers and display IP-captions that simultaneously translate voice into text.

Mobile receptors should also have tactile means to distinguish keys and audio outputs of the features and functions to ensure that those with vision impairments are able to use them. Some countries already mandate specific provisions to ensure that this is the case but these norms may not always extend to mobile devices. Countries that have expanded or are planning to expand emergency service calls through SMS will need to ensure that simultaneous translation of text into audio and vice versa is available through mobile devices to ensure that these services are also available for the visually impaired.

Accessible Internet equipment and applications

Most OECD countries consider data connections as an integral part of universal service policies. A few countries have specifically included broadband Internet in the scope of universal service obligations while others have extended or are planning to extend broadband service for all through other policies. For those without disabilities, provisions that support affordable access and service are sufficient to ensure access to the vast resources of the Internet. For those with disabilities, it may also be necessary to guarantee that user interfaces and consumer equipment are inclusive.

Fibre-based broadband networks, and their capacity to transfer large amounts of data offer great potential to develop telecommunication applications that deliver basic services (healthcare, education, government services). As governments develop policies that increasingly rely on broadband to deliver these and other services, measures to ensure inclusivity will likely become more relevant. If the needs of

the disabled are left unaddressed, lack of accessibility to these applications could potentially create a schism along usability lines.

Measures to ensure broadband service availability for the visually impaired could include use of assisted technology such as screen readers, alternative keyboards, switches and scanning software used by people with vision impairments. Captions and text explanations could be used to ensure that video functionalities are also accessible to the hearing impaired. Video relay services and video remote interpreting for sign language users could allow them to make and receive telephone calls in almost real time through the Internet. Finally, “easy to use” interfaces, that require simple, basic interactions may be key to ensure that the elderly or those with chronic disease can benefit from future essential applications (*i.e.* healthcare) of which they are likely to be core beneficiaries.

Policy makers will need to decide which of these measures they consider appropriate to guarantee that basic telecommunication services are accessible for all. Governments may need to play a leading role in the development of industry standards for equipment and user interfaces and to contribute to enforcement by equipment manufacturers and website developers. In countries where broadband service has become a universal service obligation, people with disabilities that also combine other characteristics such as living in low-income households, belonging to social minorities, or residing in rural areas tend to have the lowest service adoption rates. Without any type of action, uneven broadband adoption rates risks creating a widening gap in which social and economic lines compound the effects of disabilities. Policy makers may need to devise plans to encourage broadband adoption levels among these groups. Actions may include economic support to make broadband service and adapted terminal equipment affordable for all and literacy programmes aimed at explaining the relevance of broadband-based services and to enable users to become comfortable using the equipment. In some instances countries may want to devise solutions in co-ordination with local authorities to ensure that programmes are tailored to the specific needs of each community.

Some OECD countries have recently taken or are considering measures to bring telecommunications accessibility in line with telecommunication developments. Some countries have developed dedicated legislation and/or industry standards while others prefer to embed accessibility directly into their universal service obligations.

In October 2010 the United States passed the 21st Century Communications and Video Accessibility Act. The aim of this Act is to establish new safeguards for disability access to ensure that people with disabilities are not left behind as technology changes and the United States migrates to the next generation of Internet-based and digital communication technologies.

The Act creates new safeguards for Internet-based communications technologies (equipment, services and networks) to be accessible by people with disabilities, unless doing so results in an undue burden. Where an undue burden may result, manufacturers and providers must make their equipment and services compatible with specialised equipment and services typically used by people with disabilities. In addition, the Act makes consumers with disabilities eligible to receive universal service support through two specific measures. First, it grants the FCC authority to designate broadband services needed for “phone communication” by people with disabilities as services eligible to receive support under existing subsidy programmes. This includes, for example, deaf individuals who rely on Internet-based video relay service or point-to-point video for their telephone communications. Second, the Act grants authority to the FCC to designate programmes that distribute specialised equipment used to make telecommunications and Internet-enabled communication services accessible to individuals who are deaf-blind, as eligible for universal service support. The 21st Century Act also contains measures to improve the accountability and enforcement of disability safeguards. These include new complaint procedures, reporting obligations for industry and the FCC, the creation of a clearinghouse of information on accessible products and services, and directives for enhanced outreach and education.

In July 2011 Ofcom launched a public consultation that sets out proposals for amending current universal service obligations in relation to services for disabled end-users, in particular those with hearing and/or speech impairments. The consultation aims to assess the extent to which requirements for text relay (TR) services continue to meet the needs of disabled end-users. Ofcom is considering whether it is appropriate to require the provision of new services for end-users with hearing and/or speech impairments in order to ensure the greatest level of equivalence as possible under the recently revised Universal Service Directive (Articles 7 and 23a). In the consultation Ofcom set out proposals for improving TR. The Next Generation Text Relay service (NGTR) would be accessible via mainstream consumer electronics such as computers. NGTR would give users the ability to interrupt the conversation giving it a more natural flow by supporting two-way speech with live captions. Ofcom estimates that the total cost of the service would remain within the cap of USD 25 million (GBP 15.7 million) per year set in the current Universal Service Conditions. Ofcom is also proposing the introduction of Video Relay (VR) service. VR would benefit users of British Sign Language (BSL) who find written English difficult and have therefore difficulties using conventional TR services. It would also help meet the equivalence criteria with conventional telecommunication services by enabling natural conversations. However, the costs of VR service would be significant because of the need to employ specialist sign language interpreters. Estimates of annual costs for medium demand would reach USD 67 million (GBP 41.6 million) or a cost per user of USD 3 024 (GBP 1 890), while costs for a high demand scenario could escalate to USD 181 million (GBP 113.4 million) a year. It is also unlikely that there would be sufficient BSL interpreters available to provide a service 24 hours a day, 7 days a week, at least in the short or medium term in particular as it takes several years to train a BSL interpreter to the highest qualification. Therefore, Ofcom is proposing to require the provision of VR service on a restricted basis. As of January 2012 Ofcom was analysing responses to this consultation.

Korea has been conducting research on accessibility since 2005 and has one of the most comprehensive policy frameworks regarding ICT accessibility. Although the framework falls outside the scope of universal service obligations, it has a direct impact on the universal accessibility of telecommunication services. Korean policies are classified in five groups: a) developing and supplying assistive technologies for the disabled; b) operating ICT accessibility programs; c) developing ICT accessibility standards; d) conducting research; and e) increasing awareness. The 2007 Korea Disability Discrimination Act sets Web Accessibility Obligations for the 2009-2015 period for different sets of entities (2009 government agencies and their subsidiaries, 2011 universities, colleges and major hospitals, 2013 private institutions, 2015, cultural entities).³⁰ In addition, the 2009 National Informatisation Act³¹ specifically covers ICT access and usage for the disabled and the elderly. The Act mandates government agencies to conform to web accessibility standards, defines ICT accessibility guidelines, provides assistive technology, promotes accessible environments, provides training for the underprivileged and establishes the National Information Society Agency (NIA). The NIA (formerly the National Computerization Agency) aims to identify and support development of national policies and technologies to close the digital divide. As such, NIA develops, tests, evaluates and supervises pilot projects that apply new technologies to the public sector and evaluates and supervises “informatisation” technologies and standards.

Japan has no specific legal provisions pertaining to accessibility but has done substantial work for over a decade on the development of industry standards for web accessibility. These standards are applicable to national and local government agencies, but are not legally enforceable. In 2004 and in collaboration with the International Organisation for Standardisation (ISO) and the International Electro Technical Commission (IEC), Japan released the JIS X 8341: Guidelines for older persons and persons with disabilities-information and communication equipment, software and services. Since then several components of the JIS X 8341 have been issued, covering common guidelines, information and processing equipment, web content, telecommunications equipment and office equipment.

NOTES

- ¹ For further discussion see DSTI/ICCP/TISP(2005)5/FINAL, Digital Britain Report (2009), Carlos Ruiz, M. (2006) “El Servicio Universal de Telecomunicaciones” Revista de Administración Pública ISSN: 0034-7639, n 171, Madrid, September-December (2006), pg. 35-78 and European Commission “Europe 2020: A European Strategy for Smart, Sustainable and Inclusive Growth”, FCC National Broadband Plan (2010).
- ² OECD, Network Externality Premiums and International Telecommunication Traffic Exchange, DSTI/ICCP/CISP(2008)4/FINAL, www.oecd.org/dataoecd/15/48/42583547.pdf.
- ³ <http://stakeholders.ofcom.org.uk/binaries/consultations/uso/statement/statementreview.pdf>.
- ⁴ DSTI/ICCP/TISP(2005)5/FINAL, www.oecd.org/dataoecd/59/48/36503873.pdf.
- ⁵ Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive).
- ⁶ Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on co-operation between national authorities responsible for the enforcement of consumer protection laws.
- ⁷ According to the Universal Service Order, this “means that only one customer will be served by each subscriber loop or access line”.
- ⁸ The ability to support facsimile might be an example of a service which is no longer indispensable, another might be the telegram service. In the future, the ability to support very slow modems for text type for the deaf might become one.
- ⁹ DSTI/ICCP/TISP(2005)5/FINAL, www.oecd.org/dataoecd/59/48/36503873.pdf.
- ¹⁰ OECD (2008) “The Seoul Declaration for the Future of the Internet Economy”, OECD Ministerial Meeting on the Future of the Internet Economy, Seoul, Korea 17-18 June 2008.
- ¹¹ www.oecd.org/dataoecd/22/41/48459395.pdf.
- ¹² See DSTI/ICCP/CISP(2009)2/FINAL 9, for greater detail on the positive externalities of broadband. [www.oecd.org/officialdocuments/displaydocumentpdf/?cote=dsti/iccp/cisp\(2009\)2/final&doclanguage=en](http://www.oecd.org/officialdocuments/displaydocumentpdf/?cote=dsti/iccp/cisp(2009)2/final&doclanguage=en).
- ¹³ Boletín Oficial del Estado (2011) “Ley 2/2011, de 4 de marzo de Economía Sostenible” BOE nº 55, of 5 March 2011.
- ¹⁴ OECD (2011), OECD Communications Outlook 2011. In 2009 there were 37.4 fixed telephone access paths per 100 inhabitants. At the end of 2010, there were 24.9 fixed broadband subscriptions per 100 inhabitants and 41.9 wireless broadband subscriptions. Fixed line telephone access paths have fallen 4% per year since 2007 as lines are being substituted by mobile-only subscriptions, many of which include 3G data subscriptions, and broadband services that include free or cheap Voice over Internet Protocol (VoIP)

call. Broadband has also substituted dial-up connections to the Internet. In 2009 dial-up connections accounted for less than 10% of fixed Internet connections and some countries no longer collect dial-up subscription data as numbers are expected to continue declining.

15 In the United States for instance, tax returns are processed faster for online submissions, and in Spain only broadband users can access the free tax-filing help program. In countries like the United States, some higher education institutions may only accept online applications from prospect students, placing other applicants at significant disadvantage.

16 Price Waterhouse Coopers (2009), “Champion for digital inclusion. The Economic Case for Digital Inclusion”, www.parliamentandinternet.org.uk/uploads/Final_report.pdf.

17 GBP 1 = USD 1.60 throughout (using an average annual exchange rate for January-December 2011), www.oanda.com/currency/average.

18 An assessment on the total investment requirement to reach the Digital Agenda broadband targets. Study prepared for the EIB PJ/INCO/ICT Division by Pantelis Koutroumpis.

19 EUR 1 = USD 1.39 throughout (using an average annual exchange rate for January-December 2011 (www.oanda.com/currency/average)).

20 For further discussion on criteria see: DSTI/ICCP/TISP(2002)4/FINAL, www.oecd.org/dataoecd/4/23/2496799.pdf, and BIS Department for Business Innovation and Skill (2011 January) “Principles for Economic Regulation: Call for Evidence”.

21 OECD (2011), OECD Communications Outlook 2011, PEW (2010b), Chapter 4.

22 BEREC (2010) “Report on Universal Service - reflections for the future”.

23 FCC (2010) “Statistical trends in telephony”, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-301823A1.pdf.

24 Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive).

25 AUD 1 = USD 1.03 throughout (using an average annual exchange rate for January-December 2011 (www.oanda.com/currency/average)).

26 ERG Common Position on VoIP (2007).

27 ARCEP (2011) “Analyse de marché de la téléphonie fixe 3ème cycle 2011-2014”.

28 Simpson, J (2009) “Inclusive Information and Communication Technologies for People with Disabilities” *Disability Studies Quarterly*, Winter 2009, Volume 29, No.1.

29 www.un.org/disabilities/default.asp?id=150.

30 G3ict White Paper 2011.

31 Korea (2009), “Enforcement Decree of the Framework Act on National Informatisation”.

ANNEX - COUNTRY EXAMPLES

Country	Scope of universal service obligations	Funding for universal service obligations	Broadband provisions	Infrastructure funding
Australia	<p>Standard telephone services, payphones, and prescribed carriage services (none currently).</p> <p>The scope of USO is complemented with additional obligations: the Customer Service Guarantee, the Network Reliability Framework and Priority Assistance (for people with life-threatening conditions).</p>	<p>Industry levy based on eligible revenue. Paid by all carriers which hold a valid license and reach the annual eligible revenue threshold (for 2010-2011 the threshold was USD 26 million).</p>	<p>Plans to provide broadband for all are not included in the USO but they are part of universal service policies. Australia aims to connect 93% of homes, schools and businesses with speeds of up to 1 Gbps, and the remaining premises with wireless and satellite connections of at least 12 Mbps by end of 2020 through its NBN.</p>	<p>Outside of USF. Estimated peak funding USD 42 billion of which approximately USD 28 billion will be initially met by taxpayers and USD 14 billion raised through debt and equity instrument</p>
Canada	<p>The basic service objective includes local telephone service; access to dial-up Internet at local rates, access to the long distance network and to operator/directory assistance services; enhanced calling features, including access to emergency services, voice message relay service, and privacy protection features; and a print copy of the current local telephone directory upon request.</p>	<p>The local service subsidy regime compensates carriers when the CRTC approved rate for basic service does not cover the costs of providing the service. This is funded from an industry levy, called the National Contribution Fund, which requires that all carriers that generate more than USD 10 million annually contribute a portion of their eligible revenue.</p>	<p>Broadband is not included in the basic service objective. However, the regulator set in 2011 an aspirational minimum speed threshold of 5 Megabits per second (Mbps) actual download and 1 Mbps actual upload by 2015.</p>	<p>Canada relies on market forces and targeted government funding for rural broadband infrastructure deployment. In 2009 the government committed USD 230 million to expand rural broadband over three years.</p>

Country	Scope of universal service obligations	Funding for universal service obligations	Broadband provisions	Infrastructure funding
European Union	Connection capable of supporting voice, facsimile and data communications, access to at least one directory and one directory inquiry service, public payphones or public telephony access points, free of charge access to emergency services, and measures to ensure the disabled receive equivalent service to that of other users.	When a universal service obligation represents an unfair burden on a carrier, member states may establish mechanisms to compensate carriers for their net costs. Public funds, transparent levies on carriers, or combinations of these two methods, are appropriate. Levies should ensure that the method of allocation amongst carriers is based on objective and non-discriminatory criteria and is in accordance with the principle of proportionality.	<p>Universal service obligations include a data connection capable of providing functional access to the Internet. Member states define the concept taking into account prevailing technologies used by the majority of subscribers and technological feasibility.</p> <p>Outside of universal service obligations, the Digital Agenda programme (within the Europe 2020 Strategy issued in 2010) aims to give every European access to basic broadband by 2013 and to fast broadband (30 Mbps or above) by 2020, with 50% of households receiving speeds above 100 Mbps.</p>	<p>Member states are not permitted to impose on market players financial contributions which relate to measures which are not part of universal service obligations. Individual member states remain free to impose special measures (outside the scope of universal service obligations) and finance them in conformity with Community law but not by means of contributions from market players</p> <p>Outside of universal service obligations. A recent Commission proposal aims to dedicate USD 13 billion from 2014 to 2020 on pan-European projects to fulfil the objectives of the Digital Agenda. Funding would take the form of equity and debt instruments and grants and complement private investment and public money at local, regional and national level and EU structural and cohesion funds. At least USD 10 billion would be dedicated to investment in high-speed broadband infrastructure.</p>

Country	Scope of universal service obligations	Funding for universal service obligations	Broadband provisions	Infrastructure funding
Finland	A connection to the public communications network at the user's permanent place of residence regardless of geographical location, free outgoing emergency calls, directory enquiry services and directories, an Internet connection that provides a minimum speed of 1 Mbps (actual speeds of 750 Kbps over 24 hours and 500 Kbps over five hours are considered sufficient).	Competition is expected to meet universal service objectives.	An Internet connection of 1 Mbps is part of the scope of universal service obligations. Outside the scope of universal service obligations, Finland expects "practically all" (more than 99% of the population) permanent residences, firms, and public administration bodies to be within two kilometres of an optical fibre or cable network permitting connections of 100 Mbps by the end of 2015	Outside of universal service obligations approximately 4% of the population (130 000 connections) will require funding to achieve the governments' broadband goals. Each of the approx. 800 subsidised projects is allocated through a competitive tender to a carrier responsible for the project's execution at least 34% of its costs. Subsidies are expected to total USD 521 million. The state has committed so far USD 92 million, municipalities will contribute approximately USD 70 million and the European Union Rural Development programme will provide USD 35 million. Individual subscribers may contribute through a credit tax deduction of USD 4 170.
Israel	There is no predetermined scope of universal service obligations. Instead two designated carriers: Bezeq, and HOT (the incumbent and a cable company) must offer all of their services nationwide. Carriers must file a project plan with the Ministry of Communications for each new service they intend to provide to establish expectations regarding universal coverage. The Ministry, with advice from an Exceptions Committee, may decide to grant exceptions to the universal service rule for service request in hard to reach areas.	Bezeq and HOT are not deemed to incur an excessive burden in providing their services nationwide. Therefore, there is no compensatory mechanism.	An Internet connection providing a minimum speed of 1.5 Mbps is part of the set of services provided by the designated carriers.	Infrastructure investment in telecommunications is entirely driven by the private sector. However, as of January 2012 Israel Electric Corporation, a public firm, is tendering for a strategic investor to develop a FTTH network based on its passive infrastructure.

Country	Scope of universal service obligations	Funding for universal service obligations	Broadband provisions	Infrastructure funding
Japan	A fixed telephone connection to the network through conventional copper lines or optical IP telephony, public telephone boxes, and emergency calls.	A USF funded through contributions from all fixed, mobile and IP carriers that benefit from connections to NTT East and West installations and whose annual revenues exceed USD 13 million.	Broadband falls outside the scope of universal service obligations. The Hikari-nomichi strategy aims to deliver ultra-high speed broadband (30 Mbps or more) to 100% of households by around 2015.	<p>Infrastructure investment in telecommunication is generally driven by the private sector and facilitated by adequate pro-competition policies.</p> <p>Bringing ultra high-speed broadband to rural and hard to access areas will cost an estimated USD 19 billion. The government considers appropriate to achieve this goal through the construction of publicly-built and privately operated infrastructure. Plans will be led by local governments with support from the national government.</p>
Korea	Local calls, emergency calls, and discount-rate phone service for the handicapped, low income people and residents of remote areas.	All telecommunication carriers whose turnover exceeds USD 27 million contribute to the reimbursement of universal service costs through an industry levy. The universal service carrier may not claim compensation for up to 63% of the actual costs for the provision of local calls. Of the remainder, 10% is considered and indirect benefit for the universal service provider and the rest is excluded as an efficiency incentive.	Broadband is not part of universal service obligations. In 2009 the KCC announced plans to upgrade the national network to offer 1 Gbps service by 2012. Pilot programs in four cities were first launched in 2009.	<p>To support infrastructure development in rural areas since 2008 the government has provided financial support worth USD 27 million annually under the form of low interest rate loans. Generally, Korea follows a matching funds arrangement whereas costs are shared by the government and the interested carriers.</p> <p>In January 2009, the Korea Communications Commission announced plans to initiate the commercialisation of a broadband service that offers up to 1 Gbps service. The plan will cost USD 25 billion over the span of five years. The central government will contribute USD 1 billion with the remainder coming from private telecom operators.</p>

Country	Scope of universal service obligations	Funding for universal service obligations	Broadband provisions	Infrastructure funding
Mexico	No universal service regime. The concept of “social coverage in public networks” aims to extend adequate provision of telecommunication services to public and social services, firms, and the population in general throughout the national territory.	Commitments to extend telecommunication services are funded by the incumbent (Telmex) and by a dedicated federal government budget. Between 2002 and 2010, the “Social Coverage Fund) invested USD 98 million.	Mexico has also made available the National Network for Broadband Development, (transmission capacity up to 10 Gbps) to state governments, universities and research centres with the aim to provide broadband service to schools, medical centres and government premises.	N/A
Norway	A fixed or mobile connection capable of supporting voice, facsimile and data communications, access to at least one directory and one directory inquiry service, public payphones or public telephony access points, free of charge access to emergency services, and measures to ensure the disabled receive equivalent service to that of other users.	The Electronic Communications Act foresees the establishment of a compensation mechanism if it became necessary to help the designated carrier meet unreasonable burdens. Currently, the incumbent, Telenor, has signed a voluntary agreement to fulfil universal service obligations without receiving compensation. The state meets the full costs of fulfilling special societal obligations (emergency and safety services within Norway’s radio area of coverage and services in connection with Svalbard).	Broadband is not part of universal service obligations because needs are adequately met by the market. 99.7% of Norwegian households have connections with speeds over 640 Kbps and 55% of connections provide speeds higher than 25 Mbps.	Infrastructure investment is primarily met through the market. The government’s approach is to incentivise private investment through competition. Public funding is used only in those areas where private investment is uneconomical.

Country	Scope of universal service obligations	Funding for universal service obligations	Broadband provisions	Infrastructure funding
Spain	A connection capable of supporting voice, facsimile and data communications of 1 Mbps, access to telephone service and at least one directory and one directory inquiry service, public payphones or public telephony access points, free of charge access to emergency services, and measures to ensure the disabled receive equivalent service to that of other users.	An industry levy financed through contributions from all network operators and service providers. The regulator may exclude operators with low turnover. In 2008, exclusions were based on a revenue threshold of USD 9 million. The net cost is funded only if it represents an unfair burden on the designated operator. The allocation procedure must be objective, non-discriminatory and in accordance with the principle of proportionality.	An Internet connection of 1 Mbps is part of the scope of universal service obligations. Besides, Spain's umbrella strategy Plan Avanza has addressed broadband network deployment in the 2006-2010 period.	Spain has dedicated USD 356 million in the form of loans and grants to support infrastructure development between 2006 and 2011. This was divided into different targeted plans.
Switzerland	A choice of three types of connection for telephony and data transmission: analogue, digital (ISDN) and broadband. The broadband connection must be able to provide minimum download and upload speeds of 600/100 Kbps. Swisscom must forward emergency calls and provide location information, provide the minimum number of public payphones allocated to each municipality by (ComCom), provide qualitatively, quantitatively and economically comparable services to the disabled.	Legal provisions establish an industry levy on all telecommunication services carriers. Compensation is divided on a pro rata basis according to the carriers' turnover. To date the mechanism has not been activated.	A broadband connection providing minimum download and upload speeds of 600/100 Kbps is part of the scope of universal service obligations. OFCOM/BAKOM and ComCom led a coordinated approach to deploy FTTH in cooperation with carriers, electricity companies and cable operators. As a result, of most FTTH projects have embraced a multifibre model in which normally four fibre cables are simultaneously installed.	Infrastructure investment in telecommunication networks is entirely driven by the private sector. To date there is no public funding provision. However, the Federal council estimates that closing the FTTH availability gap will eventually require USD 15 billion in public funding or 63.6% of the estimated total cost of FTTH deployment for the country.

Country	Scope of universal service obligations	Funding for universal service obligations	Broadband provisions	Infrastructure funding
Turkey	Fixed telephony services, payphone services, directory services (in print or electronic format), emergency call services, broadband service, and safety communication services for maritime transportation.	Turk Telecom does not currently receive compensation for fulfilling its universal service obligations. However, annual contributions to a universal service fund are collected as follows: 2% of the authorisation fees collected by the ICTA, 1% of net sales revenues of all carriers except mobile ones, 10% of payments issued by mobile operators to the Treasury, 20% of the administrative fines collected by the ICTA, and 20% of ICTA's remaining budget after all expenditures are deducted. Universal service revenues are being applied to projects that aim to expand telecommunications access and services within the scope of Law 5369.	Minimum upwards and downwards broadband speeds of 256 Kbps and 512 Kbps are included as part of the scope of universal service obligations.	N/A

Country	Scope of universal service obligations	Funding for universal service obligations	Broadband provisions	Infrastructure funding
United Kingdom	A connection at a fixed location capable of making and receiving directly or indirectly national and international telephone calls through a number or numbers in a national or international telephone numbering plan, facsimile, and data communications (the current guideline for data communications is 28.8 Kbps) free of charge outgoing emergency calls, access to at least one comprehensive telephone directory and telephone inquiry service, public payphones or other public voice telephony access points, billing, payment and tariff options that enable consumers to monitor and control their expenditure, appropriate tariff options, packages to low income and special needs subscribers, and adequate and affordable facilities for users with disabilities.	Universal service carriers are not deemed to incur an excessive burden in fulfilling universal service obligations. Therefore, there is no compensatory mechanism.	<p>Broadband is not part of universal service obligations. The United Kingdom's aim is for at least 90% of households to have access to superfast broadband and the remainder getting at least 2 Mbps by 2015.</p> <p>Local councils are responsible for developing broadband infrastructure upgrade plans that reflect the needs of their communities, and for stimulating broadband demand with support from Broadband Delivery UK (BDUK).</p>	The government approach is to incentivise private investment, to maximise it and then bridge the gaps where the market looks unlikely to deliver with public funding. To this aim, the government has earmarked USD 848 million.
United States	Voice telephony services, both fixed and mobile, and broadband-capable networks, both fixed and mobile.	Several grant, loan and subsidy programmes the largest which is the Universal Service Fund (USD 8 billion in 2010). All carriers that provide service between states, including long distance companies, local telephone companies, wireless telephone companies, providers of interconnected VoIP, paging companies, and payphone providers, are required to contribute to the federal Universal Service Fund. Carriers providing international services must also contribute to the USF.	The United States aims to provide access to broadband service to all people at an initial rate of 4 Mbps/1Mbps actual download and upload speeds by 2020. These objectives are part of the universal service objective.	The availability gap will be covered through a reformed and modernised system called the Connect America Fund which will replace the Universal Service Fund and provide some recovery for revenues formerly received through the Intercarrier Compensation system.

Australia

The Telecommunications (Consumer Protection and Service Standards) Act 1999 defines the Universal Service Obligation (USO) as the obligation placed on universal service providers to ensure that all people in Australia, wherever they reside or carry on business, have reasonable access on an equitable basis to standard telephone services (STS), payphones, and prescribed carriage services.¹

Telstra is currently the sole universal service provider.² As such, Telstra is obliged to issue a policy statement and separate plans that set out the arrangements for fulfilling the USO. Telstra's Standard Marketing Plan (SMP), which outlines how Telstra will meet its USO obligations, has been approved by the Australian Communications and Media Authority (ACMA). The USO requires Telstra to provide access to STS on request. An STS is a carriage service for the purpose of voice telephony (or an equivalent communications service for a person with a disability) between end-users who are supplied with the same service for the same purpose, whether or not the end-users are connected to the same telecommunications network. The USO is complemented by the Customer Service Guarantee (CSG), Priority Assistance (PA) and the Network Reliability Framework (NRF). The CSG is a safeguard that applies to all service providers, not just Telstra. Telstra is subject to a separate licence condition to offer PA to help people with diagnosed life-threatening medical conditions receive faster connection and repairs of phone services, and to improve the reliability of its telephone services via the NRF.

In November 2010, the Australian Parliament passed the Telecommunications Legislation Amendment (Competition and Consumer Safeguards) Act 2010 (the Act), amending legislation that provides for the making of legislative instruments to enhance competitive outcomes in the Australian telecommunications industry, and to strengthen existing consumer safeguards, including the USO, CSG and PA. Information on these reforms is available on the Department of Broadband, Communications and the Digital Economy's website.

The USO is funded through an industry levy. Each carrier's contribution is based on its share of total industry "eligible revenue".³ Subsidies are determined annually by the Minister based on ACMA's advice and in 2010 they were set at approximately USD 149 million⁴ (AUD 145 million). Approximately 20 carriers reached that threshold. Eligible revenue reporting requirements include all carriers that held a license during the eligible period, except those whose gross telecommunications revenue for the eligible revenue period is less than the amount determined in writing by the Minister, or that are otherwise specifically excluded by the Minister. The ACMA publishes its assessment of eligible revenue each year. For the 2010-2011 period the threshold was USD 26 million (AUD 25 million).

To complement the scope of the USO, although outside of it and with considerable impact on the way Australians access communications services, the Australian government has publicly funded programmes to expand broadband and mobile phone infrastructures in regional, rural and remote areas and among indigenous communities. In addition to these programmes, between 2005 and 2011 the Australian Broadband Guarantee supported affordable access to high quality broadband for residential customers and small businesses in areas where broadband services were not available commercially. Under the 2010-2011 specifications, registered⁵ providers were required to offer at least one standard package providing a minimum 1 Mbps download and 256 Kbps upload data speed and at least 6 GB per month data allowance. The total cost of service to the consumer could not exceed USD 2 575 (AUD 2 500) over three years including installation, connection, and monthly fees. This Australian Broadband Guarantee programme was discontinued on July 2011. NBN Co has been providing an interim satellite service through its retail providers since July 2011. This service initially targets customers without access to a commercial broadband service comparable to that offered in metropolitan areas.

Impending changes to the market structure for fixed line communication and broadband infrastructure are poised to alter USO arrangements. In 2009, the Australian government unveiled plans to roll out the National Broadband Network (NBN), a wholesale-only, open access network delivering high quality broadband to all Australian premises.⁶ The Australian government's objective for NBN is to connect 93% of homes, schools, and businesses with FTTH technology providing speeds of up to 1 Gbps. All remaining premises will be served by a combination of wireless and satellite technologies delivering peak speeds of at least 12 Mbps.

To design, build, and operate the NBN, the Australian government established in 2009 a government business enterprise; NBN Co Limited (NBN Co). NBN Co will be owned and financed by the Australian government until the rollout is complete. Once the network is fully built and operational the intention is to privatise NBN Co following a Productivity Commission inquiry into the NBN regulatory framework and other matters relating to a possible sale. The final decision on any sale will be a matter for the Federal Parliament of the day.

The estimated capital expenditure to build the NBN is USD 37 billion (AUD 35.9 billion). Total peak funding required is USD 42 billion (AUD 40.9 billion) of which approximately USD 28 billion (AUD 27.5 billion) will be initially met by Australian taxpayers while the remaining USD 14 billion (AU 13.4 billion) will be raised through debt and equity instruments. Complete construction is expected by December 2020.

In June 2011 Telstra and NBN Co announced they had entered into Definitive Agreements to support the rollout of the NBN. Final approval of these Agreements is subject to completion of a number of conditions precedent including the Australian Competition and Consumer Commission's consideration of Telstra's Structural Separation Undertaking and Draft Migration Plan and Telstra and NBN Co shareholder consideration. The agreements announced in June provide for:

- *Long term access to key infrastructure and services required for the rollout of the fibre footprint of the NBN.* Under the Infrastructure Agreement NBN Co will incrementally acquire ownership of Telstra's lead-in conduits when NBN Co installs fibre into the lead-in conduit to connect premises to the NBN fibre network. Under this agreement, NBN Co will also acquire long term rights to access and use Telstra's infrastructure including ducts, rack spaces in Telstra's exchanges, and dark fibre links.
- *Disconnection of Telstra's copper and HFC networks and the transition of voice and Internet traffic to the NBN.* Under the Subscriber Agreement Telstra will receive a payment from NBN Co for each active premises that disconnects from its copper and HFC networks. This is based on various criteria, including the number of lines to the premises disconnected, whether or not commercial services were provided on those lines (and if so, the types of services provided on those lines), the time at which the disconnection occurs, and in some cases, whether or not the premises have connected to the NBN. For a period of 20 years from the commencement date of the Definitive Agreements, Telstra commits to exclusively use the NBN Co. fibre network as the connection to provide fixed-line carriage services to premises in the NBN Fibre Footprint. There are some exceptions to this, including for example, where Telstra provided point-to-point fibre services using Telstra's fibre.

Given the broader structural reforms to the industry as a result of the rollout of the NBN, the Australian government is putting in place a public policy reform package to ensure the continuous delivery of basic voice services and to undertake any necessary research to support provision of essential services

(i.e. public alarm systems and traffic lights) during the transition to the NBN. In order to achieve this, the reforms to the universal service obligation will enable a transition from the current regulatory arrangements to an open and competitive contractual model for the delivery of these outcomes. These arrangements include two components:

- Initial agreements with Telstra to maintain the continuity of basic services and assist migration of voice-only customers to the NBN. For this purpose, and in addition to a previously announced commitment to provide funding of USD 52 million (AUD 50 million) per annum for the financial years 2012-13 and 2013-14, and then USD 103 million (AUD 100 million) per annum thereafter, the Australian government will supplement funding in the first two financial years so that contributors to the industry levy with the exception of Telstra, do not face an increase to their aggregate funding contribution.
- *The establishment of a new government statutory agency, the Telecommunications Universal Service Management Agency (TUSMA).* TUSMA will be responsible for the delivery of universal service outcomes and public interest services and is expected to commence operations from 1 July 2012. It will be funded through a combination of dedicated budget funding (see paragraph above) and a consolidated industry levy that will replace the current USO and National Relay Service levies. Specifically, TUSMA will be responsible for managing agreements pertaining to:
 - Delivery of the Standard Telephone Service Universal Service Obligation.
 - Delivery of the payphones Universal Service Obligation.
 - Safety net arrangements to assist with the migration of voice-only customers.
 - Delivery of emergency call services.
 - Development of any necessary technological solutions to migrate public interest services from the copper network.
 - Delivery of the National Relay Service.

The Australian government introduced bills to establish TUSMA and implement consequential reforms to the USO and existing levy arrangements in November 2011. It is expected that these three bills will be debated in the first half of 2012.

The National Broadband Network Companies Act 2011 and the Telecommunications Legislation Amendment (National Broadband Network Measures-Access Arrangements) Act 2011 supplement the general regulatory framework to provide for the NBN and generally came into effect in April 2011.

Under the NBN Companies Act, NBN Co is to remain a wholesale-only operator, thus ensuring full separation from service provision to end customers.

The NBN Access Act sets in place mechanisms to ensure that the supply of services by NBN Co is open access, non discriminatory and transparent. A core provision of the Act is that NBN Co is to offer open and equivalent access to wholesale services to all access seekers, subject to clear oversight by the Australian Competition and Consumer Commission. NBN Co must not discriminate in the supply of services between access seekers, or in activities related to the supply of services, other than in relation to credit-worthiness and non-compliance with terms and conditions. The main purpose of this measure is to provide a level platform for robust retail level competition.

The NBN Access Act also contains provisions to support the Australian Government's policy of uniform national wholesale pricing. NBN Co will provide a uniform national wholesale price for its basic entry-level service (12 Mbps down/1 Mbps up) across fibre, wireless and satellite technologies. In addition, NBN Co will offer uniform national wholesale pricing within technologies: a universal price for all customers receiving optic fibre; a universal price for all customers receiving fixed wireless; and a universal price for all customers receiving satellite. The Australian government expects this will translate into retail prices that will be both affordable and very competitive. While wholesale access is not the only cost for retail service providers, it is overwhelmingly the largest single component influencing retail pricing today.

Canada

The 1993 Telecommunications Act (Article 7) states among its policy objectives: "to facilitate the orderly development throughout Canada of a telecommunications system that serves to safeguard, enrich and strengthen the social and economic fabric of Canada and its regions" and "to render reliable and affordable telecommunications services of high quality accessible to all people in Canada in both urban and rural areas in all regions of Canada". To meet these objectives, the Canadian Radio-television and Telecommunications Commission (CRTC), Canada's telecommunications regulator, defines the obligation to serve and the basic service objective as regulatory measures that are imposed on incumbent local exchange carriers (ILECs).⁷

The primary goal of the obligation to serve and the basic service objective is for all people in Canada, regardless of where they reside, to have reasonable access to basic telecommunication services. The obligation to serve determines the terms of service under which ILECs are obliged to provide service. This includes providing local telephone service to existing customers, and new customers that are both within and beyond the limits of the ILEC's facilities.

The basic service objective was established in 1999 to reflect the minimum level of service that should be made available to all people in Canada. Specifically, the basic service objective describes the elements of basic residential local service that are to be provided by the ILECs. These include local telephone service; access to dial-up Internet at local rates, access to the long distance network and to operator/directory assistance services; enhanced calling features, including access to emergency services, voice message relay service, and privacy protection features; and a print copy of the current local telephone directory upon request.

To fulfil the basic service objective, the CRTC established the local service subsidy regime to compensate service providers in those instances when the CRTC approved rate charged for basic residential local service does not recover the associated costs of providing that service. The local service subsidy regime is designed to target pre-defined high-cost serving areas (HCSA), primarily in rural and remote areas, where costs to provide service are higher than in urban areas. Under this subsidy regime, all telecommunications service providers that generate more than USD 10 million (CAD 10 million) of revenue annually, subject to certain conditions, are required to contribute a proportion of their contribution-eligible revenues to the National Contribution Fund, from which subsidies are distributed to local service providers that meet the basic service objective in HCSAs.

In recent years substantial changes in both competition and technology have transformed the Canadian telecommunications market. Since 2005, local competition in telephone services has increased rapidly as cable companies started to offer telephone services. Cable company offerings have now grown to represent sustainable competitive alternatives to ILEC's telephone services. Competitive service providers are not limiting their service offerings to large urban markets; they have made requests to compete even in the smallest ILEC markets. In addition, the rapid expansion of wireless technologies and

the adoption of mobile services has prompted some consumers, particularly in urban areas, to replace their local wireline service with mobile wireless offerings.

The regulatory climate has also been shaped by the 2006 Policy Direction issued by the federal government. The Policy Direction requires that the CRTC relies on markets to the maximum extent feasible to achieve the policy objectives set out in the Telecommunications Act and that it regulates - where there is still a need to do so - in a manner that interferes with market forces to the minimum extent necessary to meet these policy objectives. As part of this concerted effort to maximise reliance on market forces and to reduce reliance on subsidies, the local service subsidy has decreased over time from approximately USD 938 million (CAD 920 million) in 2001 to USD 179 million (CAD 175 million) in 2010.

In October 2010 the CRTC announced a proceeding to review issues associated with access to basic telecommunications services (Telecom Notice of Consultation CRTC 2010-43) including the obligation to serve, the basic service objective, and local service subsidy. The review was completed in May 2011 (Telecom Regulatory Policy CRTC 2011-291).

The May 2011 policy attempts to further rationalise the local service subsidy regime by eliminating subsidies in competitive markets and reducing the amount of subsidy available to companies in regulated areas. Although the subsidy regime is still required in rural and remote areas, the amount available to companies will be reduced by approximately 20% by 2013. This will be achieved in part by eliminating subsidies in high cost areas that are no longer regulated. The CRTC has noted that its new policy will help make the price of basic telephone services more consistent and reasonable across Canada, while also reducing the reliance on subsidies.

In price-regulated markets, the CRTC retained the obligation to serve and the basic service objective, subject to minor modifications. Most ILECs will continue to receive a subsidy to ensure that basic telephone services are offered to all consumers in rural and remote areas and to help offset higher costs. However, the CRTC will be phasing in a new formula over the next three years that will reduce the amount of subsidy available to companies in regulated areas. To offset lost subsidies, companies will have the option of gradually raising rates to a maximum of USD 31 (CAD 30) per month by 2013.

In de-regulated markets, the CRTC lifted the requirement to meet the basic service objective, considering that competition between wireline and wireless alternatives is sufficiently pervasive to protect the interests of consumers. However, the CRTC established safeguards to protect consumers, determining that ILECs must continue to offer basic telephone services at a reasonable rate. Companies can increase rates over the next three years, to a maximum of USD 31 (CAD 30) per month.

The CRTC declined to make broadband part of its universal service regime, based on the argument that it would have greatly increased the subsidy requirement. The CRTC noted that the rollout of broadband Internet in Canada has been successful through a combination of market forces, targeted funding, and public-private partnerships at all levels of government, and that these should continue to be the main drivers of broadband service to rural and remote areas. In particular, the CRTC considered that private sector deployments, such as the launch of new satellites and advances in mobile and fixed wireless technology, will play important roles in this regard.

In areas where the costs of providing broadband services exceeds revenues, the approach of the Canadian government has been to use targeted programmes funded out of general revenues, as opposed to cross-subsidisation, in order to minimise market distortions and promote technology neutral competition. The most recent federal broadband programme is Broadband Canada: Connecting Rural Canadians (BCP), a three year USD 230 million (CAD 225 million) initiative announced in Budget 2009 to expand rural

broadband access to as many unserved and underserved households as possible. Governments at the provincial, territorial, and local levels also administer their own programmes to help improve connectivity to rural households, businesses, and communities within their jurisdictions.

However, the CRTC did recognise that establishing universal target speeds for broadband would be in the public interest. As a result, the CRTC established an unregulated, aspirational minimum threshold of 5 Mbps of actual download speed and 1 Mbps of actual upload speed that it believes should be made available to all people in Canada by 2015, stating that it would monitor progress towards this goal. The CRTC expects these targets to be delivered through a range of technologies including satellite.

The CRTC policy also addressed the regulatory regime for small ILECs (small carriers that provide telecommunications services in smaller cities and towns throughout rural and remote Canada, but mainly in the provinces of British Columbia, Ontario, and Québec). The policy opens small ILEC territories to competition, but gives special consideration to these small providers given that they may be faced with reduced revenues due to the loss of customers, and are faced with the costs associated with implementing competition.

Specifically, smaller telephone companies will continue to receive subsidies until a competitor can offer service to 75% of the market; they will be able to claim half of the subsidy they would normally receive for a subscriber that switches to a competitor during the first three years of competition; and new entrants will be required to pay the number portability, interconnection, or other “start-up” costs in markets where the small telephone company has fewer than 3 000 subscribers.

European Union

Directive 2002/21/EC⁸ defines universal service as “a minimum set of services of specified quality which is available to all users regardless of their geographical location and, in the light of specific national conditions, at an affordable price”. According to Directive 2002/22/EC,⁹ as amended by Directive 2009/136/EC,¹⁰ these minimum services consist of:

- Connection to a public communications network at a fixed location and at an affordable price. The requirement is for the provision of local, national and international telephone calls, facsimile communications and data services, the provision of which may be restricted by member states to the end-user’s primary location or residence. There should be no constraints on the technical means by which this is provided, allowing for wireless technologies. Data connections to the public communications network at a fixed location should be capable of supporting data communications at rates sufficient for access to online services such as those provided via the public Internet. It is not appropriate to mandate a specific data or bit rate at Community level. Functional Internet access is defined by the member states, taking due account of specific circumstances in national markets, for instance the prevailing bandwidth used by the majority of subscribers in that member state, and technological feasibility, provided that these measures seek to minimise market distortion.
- Access to at least one comprehensive directory, covering all listed telephone subscribers and their numbers (including fixed and mobile numbers) whether printed or electronic or both, and at least one comprehensive telephone directory enquiry available to all end-users, including users of public payphones.
- Public payphones or other public voice telephony access points that meet the reasonable needs of end-users in terms of the geographical coverage, the number of telephones or other access points, accessibility to disabled end-users, and the quality of services.

- Access to the European emergency call number 112 and other national emergency numbers free of charge from any telephone, including public payphones, without the use of any means of payment. Suitable measures to guarantee access to and affordability of all publicly available telephone services at a fixed location for disabled users and users with special social needs. Equivalence in disabled end-users' access to service should be guaranteed to the level available to other end-users. To this end, access should be functionally equivalent, such that disabled end-users benefit from the same usability of services as other end-users but by different means.

The decision to establish universal service provisions was taken at the time of liberalisation of voice telephony in the European Union, which established a final deadline for liberalisation by 1998. The purpose of these measures was to promote inclusion by ensuring that people had affordable access to basic services that were considered essential for participation in economic and social activity. While the principal parameters of universal service are defined by the European Union legislator, important implementation aspects remain at the level of each member state of the European Union.

The 2009 “telecom reform package” addressed universal service both explicitly and implicitly. Explicit amendments to the universal service directive do not alter its fundamental principles but aim to leverage recent market and technology developments for the implementation of universal service obligations. For instance, the package explicitly requires the inclusion of free access to emergency services through mobile phones and advocates using multi-media devices to provide better access to disabled users.

Other portions of the “telecom reform package” address universal service implicitly. For instance, Directive¹¹ 2009/140/EC, which amends Directive 2002/21/EC, recognises that “the Internet is essential for education and for the practical exercise of freedom of expression and access to information” which under European legislation are considered fundamental human rights. Therefore, this statement *de facto* elevates the status of universal service by assimilating functional access to the Internet to a fundamental right protected under the European Convention for the Protection of Human Rights and Fundamental Freedoms. In addition, the reform package seeks to reduce the “digital divide” by strengthening competition, maximising the technology and service flexibility of spectrum usage and encouraging investment in next generation networks.

Competition is the one area where European Union legislation is most relevant given the powers of the Commission. To prevent distortions to competition the Commission may adopt opinions on draft measures proposed by national regulators and require the withdrawal and/or review of relevant market definition and analysis. To increase legal certainty, the package increases the protection of national regulators against arbitrary dismissals. In addition, to increase the adaptability of the framework, regulators may also be allowed to lift regulatory obligations on a sub-national basis when competition no longer makes them necessary. Finally, the package establishes a new body, the BEREC (Body of European Regulators for Electronic Communications), one of whose roles is to develop and disseminate among national regulatory authorities regulatory best practice, such as common approaches, methodologies or guidelines on the implementation of the EU regulatory framework,¹² therefore addressing regulatory fragmentation and inconsistencies.

Spectrum management is a national competence of each member state of the European Union. However, there is also a European Union regulatory framework to ensure the functioning of the internal market in the Union policy areas using spectrum, such as electronic communications. This framework includes technical harmonisation of access conditions whenever necessary for the availability and efficient use of radio spectrum and for interoperability of underlying equipment. The European Union also adopted its first multiannual policy programme, entering into force on 10 April 2012, to harmonise policy orientations and set out strategic objectives. Its core focus is to ensure that sufficient spectrum is made available for wireless broadband to achieve the Digital Agenda for Europe and to bring broadband

connections to rural and remote areas. The Commission and member states must also ensure that anticompetitive behaviour such as spectrum hoarding does not distort the single market.

Competences for the design and implementation of plans to expand next generation communication networks also remain the realm of each member state. However, the Commission proposes a series of measures to facilitate the deployment of new infrastructure. These include co-operative agreements between different stakeholders to access to ducts and pits, and a framework to encourage investment in less commercially attractive areas. On the basis of the new rules, the Commission issued in September 2010 a recommendation for the regulation of access to next generation access networks (NGAs), which aims to provide greater regulatory certainty, and balance the needs to encourage investment and safeguard competition. The Commission also sets policy goals for electronic communications in the European Union. The recommendation is part of the “Digital Agenda package”¹³ announced on September 2010, which has already been endorsed by member states, the European Council and the European Parliament. The main objective of the Agenda is to give every European access to basic broadband by 2013 and to fast broadband (30 Mbps or above) by 2020 with 50% of households receiving speeds above 100 Mbps.

Many of the European Union’s legal provisions in the new telecom package impose specific obligations to be transposed into national legislation by member states. EU member states may also include additional provisions as long as they comply with those set out in the Directives. These generally admit little discretion and are therefore clear at the European Union level, although implementation is monitored very carefully by the European Commission. Other aspects such as spectrum management, measures to promote the expansion of the new electronic communication networks, arrangements to finance universal service obligations (USO), the definition of “functional internet access” and the transition between circuit-switched and new networks (an issue that is not specifically addressed at European Union level) are also relevant for universal service, but member states have wider discretion over them. Therefore, it becomes necessary to explore these issues at a country level.

In October 2011, the European Commission presented a proposal to spend almost USD 13 billion¹⁴ (EUR 9.2 billion) from 2014 to 2020 on pan-European projects to give access to fulfil the objectives of the Digital Agenda. The funding part of the proposed Connecting Europe Facility (CEF) would take the form of both equity and debt instruments and grants. It would complement private investment and public money at local, regional and national level and EU structural and cohesion funds. At least USD 10 billion (EUR 7 billion) would be available for investment in high-speed broadband infrastructure. These resources would leverage a total of between USD 70-139 billion (EUR 50-100 billion) on public and private investment (out of the USD 375 billion [EUR 270 billion] needed to meet the Digital Agenda targets) giving these investments credibility and lowering their risk profiles. The remaining CEF funding for digital infrastructure would support public interest digital service infrastructure such as electronic health records, electronic identification and electronic procurement. Projects are likely to be proposed by established telecoms operators as well as others such as water, sewage, electricity utilities, co-operative investment projects or construction firms, sometimes clubbing together. The Commission also expects public authorities to join projects as part of public-private partnerships.

Finland

The Communications Market Act of 2003, as modified in 2007, defines universal service as “the provision of universal telephone services at a fixed location, and the provision of directory enquiry services and directories”. In compliance with the European Union regulation, universal service involves a subscriber connection to the public communications network at the user’s permanent place of residence or location regardless of geographical location. The connection should allow outgoing and incoming international calls and free of charge outgoing emergency calls, and should be provided at a reasonable price.

To ensure the implementation of universal service provisions, the Finnish Communications Regulatory Authority (FICORA) can impose the obligation to comply with universal service on one or more operators in specific geographic areas. Where the provision of universal service constitutes an unreasonable financial encumbrance to the operator, it can request FICORA to calculate the net cost of universal service. Then the operator can claim compensation for those costs to the Ministry of Transport and Communications.

Prior to liberalisation in the 1990s, Finland was one of a small number of OECD countries that did not have a single national telecommunication operator. Instead there were three large operators with similar market shares, and a number of small regional operators that dominated their local markets both for cable television and fixed line telephony. As a result, Finland is today divided into numerous geographic areas each of which has a designated universal service provider.

As in other OECD countries, rapid growth of new technologies such as wireless telephony prompted initiatives to fulfil universal service obligations in new ways. For instance, in 2005 Finland elaborated a plan to make emergency services available through SMS. However, the most considerable transformation of universal service runs parallel to broadband policy developments. A pioneer in the promotion of broadband services, Finland published its National Broadband Strategy (NBS) in 2003. At a time when less than 10% of people in Finland contracted for broadband service,¹⁵ the NBS aimed for Finland to become a leader in the availability and use of high-speed communications, and to provide broadband geographical coverage for all people in Finland. The National Broadband Strategy intended to be both market oriented and technologically neutral but also had clear goals to encourage the provision of service and content, to increase demand for broadband services, and to support the development of broadband infrastructure in areas where investment was not commercially viable. To implement these objectives the NBS contained 50 specific actions which were to be implemented between 2004 and 2007.

Broadband in these early policy documents was understood as a wide umbrella concept covering communication services based on a variety of different transmission technologies and capable of delivering speeds of 256 Kbps or more.¹⁶ Throughout the implementation of the NBS, broadband remained outside the scope of universal service provisions. This would change after the Finnish government approved a Plan of Action that raised the bar of broadband infrastructure and service provision in December 2008. The plan aimed to provide a wired or wireless broadband connection delivering average download speeds of at least 1 Mbps to every permanent residence, firm or public administration body by 2010. In addition, by the end of 2015, the plan expected “practically all” (more than 99% of the population) permanent residences, firms, and public administration bodies to be within two kilometres of an optical fibre or cable network permitting connections of 100 Mbps.

Under this plan the Finnish government expects 95% of the population to be served through commercial investment. The remaining 4% up to the stated goal of 99% (130 000 connections, situated mostly in sparsely populated rural areas) will be served through a combination of private and public investment. These subsidised projects are to be assigned through a competitive tender to a telecom operator that will become responsible for the project’s execution and for funding at least 34% of its costs. The remaining investment will consist of a combination of state, municipality and European Union funds. There are approximately 800 of these subsidised projects for an expected total value of USD 521 million (EUR 375 million).¹⁷ To subsidise these initiatives the state has already committed USD 92 million (EUR 66 million). The municipalities will contribute with approximately USD 70 million (EUR 50 million), and the European Union Rural Development Programme will provide USD 35 million (EUR 25 million). Since 2009, subscribers can also contribute to the installation of communications connections to their main residences. Each individual taxpayer can claim a credit tax deduction of USD 4 170 (EUR 3 000) for labour costs through the so-called domestic help credit.

This ongoing transformation in the communications infrastructure under the 2008 plan has prompted significant changes to universal service arrangements. Since July 2010, every consumer or business place has the right to obtain “an appropriate Internet connection taking into account prevailing rates available to the majority of subscribers, technological feasibility and costs”. Provisions for the minimum rate of functional Internet access are determined by Ministerial Decree based on analyses of market conditions, technology development, and financial impact performed by FICORA. Currently, the minimum appropriate Internet connection is 1 Mbps, although the provision considers sufficient actual speeds of 750 Kbps over 24 hours and 500 Kbps over four hours.

To comply with universal service obligations, FICORA has designated 26 operators to provide universal service to pre-determined geographical areas. Within these areas, carriers can fulfil their obligations through a fixed or wireless communications network. Although the price of an Internet connection must be reasonable, prices may vary depending on service costs for the operator.

Japan

According to the Telecommunications Business Law (TBL) of 1984, universal service in Japan responds to three basic premises: a) indispensability: the service is essential for the life of every person; b) affordability: the provision of services at prices that everyone can afford; and c) availability: the provision of service everywhere without regional variations. As established in the TBL, the scope of universal services is determined by Ministerial Ordinance of the Ministry of Internal Affairs and Communications (MIC) and currently includes subscriber telephone lines (a fixed telephone connection to the network), public telephone boxes, and emergency calls. Under the TBL, NTT East and West are designated as universal service carriers. As such, they need to meet specific criteria and they are responsible for the fair and stable provision of nationwide telephone services which are indispensable for people’s lives.

Prior to the privatisation of NTT, universal service was provided by the monopoly and funded through cross-subsidisation from profitable to unprofitable regions. NTT East and West inherited these responsibilities after privatisation, but increasing competition, a decrease in the number and revenue of fixed lines, and the spread of mobile telephones, eventually imposed an unfair burden on the regional NTTs. As a result, the 2001 amendment of the TBL established the Universal Service Fund (USF) to cover deficits in universal service provision. In accordance with the TBL, the MIC designated the Telecommunications Carrier Association as responsible for the USF’s administration. The Association is responsible for collecting contributions to the fund, calculating compensations for designated carriers, and performing administrative tasks, such as obtaining ministerial permissions.

Compensations for universal service carriers are calculated on the basis of profit and loss from the previous fiscal year. Compensation for subscriber lines, which comprise the largest share of the total, is calculated using the “total element long-run incremental cost” method. This method is based on the estimated costs the carriers would incur in supporting actual numbers of subscribers and traffic volume if the networks were built using today’s cheapest and most efficient equipment and technology. The compensation is determined as the difference between the basic cost of the top 4.9% access lines by cost and the average cost nationwide. In fiscal year 2007 the system was modified to include the average cost nationwide plus twice the standard deviation to prevent excessive passing on of costs to consumers. The Communications Council recommended further amendments in 2008 to offset the decline in subscription telephones due to the growth of IP networks. The USF first issued compensations to NTT East and West in 2006.

The USF is financed through contributions from all fixed, mobile and IP carriers that benefit from connections to NTT East and West installations and whose annual revenues exceed USD 13 million (JPY 1

billion).¹⁸ As of April 2011 this included 28 companies, but the number of contributing firms vary year over year. Each carrier's contribution is based on a formula calculated on the basis of a rate per number per month.¹⁹ This amount is then multiplied by the number of subscriber lines operated by each carrier to calculate its contribution.

Table A.1. Annual subscriber line compensation for NTT East and West in USD

Fiscal year of authorisation	2006	2007	2008	2009	2010
Annual compensation (USD million)	199	177	235	244	198
Compensation per number per month (USD)	0.09	0.08	0.10	0.10	0.09

While broadband access is not currently part of universal service, deliberations about its inclusion in the future, and the way in which this should be done are already taking place in the context of national plans to expand broadband access to all.

Japan is a world leader in broadband infrastructure and service take up. As of 2010, 99.1% of households had access to broadband (FTTH, ADSL or CATV) and 91.6% of those accesses permitted download speeds of 30 Mbps or higher through FTTH or cable. Furthermore, in 2009, the MIC unveiled a strategy called “New Broadband Super Highway” (*Hikari-no-michi*) which aims to deliver ultra-high speed broadband (30 Mbps or more) to 100% of households by around 2015. The *Hikari-no-michi* strategy relies on three pillars: *i*) provision of incentives to accelerate the development of broadband infrastructures; *ii*) revision of competition policies including a reconsideration of NTT's role and position; and *iii*) promotion of broadband utilisation through regulatory reform and other measures. The plan sets out two further elements within the second pillar *i*) creation of a universal service system suitable for the transitional period until the *Hikari-no-michi* is fully rolled out; and *ii*) examination of a universal service system once the *Hikari-no-michi* goals have been achieved.

As a result, the following issues regarding universal service are already being examined by the Information and Communications Council within the MIC:

- The inclusion of broadband within the scope of universal service after completion of the *Hikari-no-michi*. The rollout of the new broadband super-highway will enable the provision for all of healthcare, education, government and other services through broadband. This would have a major direct impact on people's lives and therefore reinforce the argument for the inclusion of broadband in the scope of universal service. However, Japan considers premature to discuss the inclusion of broadband in the scope of universal services before complete rollout of the new networks as service availability and take-up has not yet reached 100% of households.
- Revision of the universal service regime during the transitional period until complete rollout out of the *Hikari-no-michi*. Under the current terms of the universal service regime, carriers must

maintain and upkeep the copper networks that provide conventional subscriber telephone service. This obligation poses impediments to the rapid roll-out of the fibre optic infrastructures that constitute the core of the *Hikari-no-michi* strategy, especially in new residential buildings, and could lead to duplicate infrastructure deployment. To prevent these issues, since April 2011, carriers are able to provide telephone service through either traditional copper lines or through “optical IP phones with price levels equivalent to traditional subscriber lines”.

Korea

The Korean Telecommunications Business Act (TBA) defines universal service as “the basic telecommunications service that any user may receive at an appropriate charge anytime and anywhere within Korea”. Universal service involves access to basic telephony services, price discounts for low-income households, and special provisions for people with disabilities. According to the TBA, the specific content of universal services is established taking into account the state of information and communications’ technology development, current supply of telecommunication services, public interest and safety, promotion of social welfare goals, and the acceleration of “informatisation”. Since its introduction in 2000 universal service has comprised local telephone calls, emergency calls and discount – rate telephone service for the disabled, low income people, and residents of remote areas.

The Korea Communications Commission (KCC) designated Korea Telecom (KT) as the sole universal service provider for 2010-2011. As such, KT is responsible for providing local call services and public phone service at the same price, to all users in Korea, regardless of their geographical location. Universal service obligations are funded through a combination of universal service provider resources and industry contributions. All telecommunication carriers whose turnover exceeds USD 27 million²⁰ (KRW 30 billion) excluding virtual operators contribute to the reimbursement of USO costs based on their respective earnings. KT receives payments directly upon submission of its net loss claims. To ensure that universal service is provided efficiently, part of USO costs are not reimbursable. Thus, KT may claim compensation for up to 63% of the actual costs for the provision of local calls. Of the remainder, 10% is considered an indirect benefit for the universal service provider and the rest (27%) is excluded to prevent moral hazard. KT’s compensation for the provision of public telephone services is lower than that for local call services and has been decreasing over time. This is due in part to a reduction in the number of public payphones as widespread use of mobile phones has made public payphones less profitable. That being said, public telephone services still play a significant role for some users and therefore continue to be part of the universal service regime. Taking into account the efficiency allowance universal service compensation has consistently decreased from USD 84 million (KRW 93.8 billion) in 2007, to USD 81 million (KRW 89.7 billion) in 2008 and to USD 75 million (KRW 83.7 billion) in 2009.

Universal service provisions for low-income households and users with disabilities comprise the largest share of USO costs. All carriers must offer local and long-distance fixed telephone calls, directory assistance, mobile telephone service and broadband service, to eligible subscribers at specific tariff schemes which are between 30% and 50% lower than standard prices. There are currently no specific provisions to fund these obligations.

Table A.2. Discounts for low-income households and people with disabilities¹⁾

Service	Sub-category	Low income households	Disabled people
Fixed telephony	Local call	<ul style="list-style-type: none"> - Free subscription and installation - Base fee exemption - Free first 225 minutes 	<ul style="list-style-type: none"> - 50% discount of monthly charge
	Long-distance call	<ul style="list-style-type: none"> - Free first 225 minutes 	<ul style="list-style-type: none"> - 50% discount of monthly charge (within USD 27, KRW 30 000 a month)
	Phone number information	<ul style="list-style-type: none"> - Free phone directory service calls (114) 	
Mobile telephony	Mobile services	<ul style="list-style-type: none"> - Free subscription - Base fee exemption (within USD 12, KRW 13,000 a month) - 50% discount of voice and data charge, (within USD 19, KRW 21 500 a month) 	<ul style="list-style-type: none"> - Free subscription - 35% discount of base fee - 35% discount of voice and data charge
	Page	<ul style="list-style-type: none"> - 30% discount of base fee 	
Broadband access		<ul style="list-style-type: none"> - 30% discount of monthly charge 	

Note: 1) In 2008 there were 2,137,226 registered people with disabilities in Korea. Of these, 53% had physical disabilities 10.4% hearing/speech disabilities and 10.3% visual disabilities. Source: Ministry of Health, Welfare and Family Affairs; Statistics on registered people with disabilities 2008.3.

While the universal service regime guarantees access to fixed voice telephony to all people in Korea, it does not include the obligation to provide broadband access. The Korean government has, however, introduced additional regulatory requirements on major telecommunication operators to guarantee broadband access to all, especially to those located in less densely populated areas.

When the Korean government sold off its remaining 28.4% shares of KT in 2002, there were concerns that KT would not invest in state of the art broadband infrastructure in potentially unprofitable areas or those with low population densities. To prevent this, as a condition for the final privatisation, Korea issued a privatisation-based-roll-out obligation which imposed on KT the duty to provide broadband access at a minimum 1 Mbps advertised download speed in all rural areas by 2005. Fixed networks were expected to be the main type of technology used to fulfil this obligation, although wireless technologies could be used where geographical conditions made fixed networks impractical or unfeasible. KT fulfilled this obligation by upgrading its broadband service in all towns over 50 households between 2002 and 2006. By the end of 2008, KT had also installed faster broadband access in towns of less than 50 households with funding assistance from the MIC and the local governments. By the end of 2008, 99% of Korea's 3.77 million households in rural areas had access to broadband service of at least 1Mbps download speed through KT's networks.

Table A.3. KT's high speed broadband service penetration in rural areas (thousands, %)

Year	2002	2003	2004	2005	2006	2007	2008
Number of households with accessible service	3 030	3 180	3 250	3 530	3 690	3 740	3 761
% of total households (3 770 thousand)	80.4%	84.4%	86.2%	93.6%	97.9%	99.2%	99.8%

After its establishment in 2008, the Korea Communications Commission (KCC) enhanced its policy support to the development of broadband infrastructures in rural areas. Since 2008, the KCC has

encouraged network operators to expand their infrastructure investment in rural areas and has provided financial support worth USD 27 million (KRW 30 billion) every year under the form of low interest rate loans. In addition, since 2010, the MIC has sought to expand coverage of its Broadband Convergence Network (BcN) in towns with less than 50 households. The BcN is a broadband infrastructure project started in 2004 by a consortium that included the MIC and various private sector telecommunication and cable firms. BcN aims to offer seamless multimedia service with speed ranges of 50 to 100 Mbps. To overcome the unwillingness of operators to invest in these low profitability areas the KCC has adopted the matching fund method. Under this arrangement the government and network operators provide 50% of the costs each. In other words, if the central government secures 25% of the fund, then the local government who wishes to build broadband network secures another 25%, while the rest 50% is invested by network operators to build broadband networks in the region. Furthermore, the KCC has been developing and initiating BcN-based services for rural areas, such as monitoring of e-farming facilities, online direct dealings of agricultural and marine products, and remote IPTV study rooms.

In February of 2008 the KCC approved SK Telecom's USD 1.15 billion acquisition of Hanaro Telecom on the condition that SK Telecom provides BcN service to approximately 41% of towns of 50-240 households before 2013. The rationale for this condition was that the acquisition might reduce broadband competition in rural areas. Moving forward, BcN in towns of less than 50 households will be funded by a combination of KCC and local government funds while the private investment is expected to serve towns above 240 households.

To summarise, access to basic communications services in Korea is guaranteed by two sets of policies: a universal service regime that ensures access to fixed voice telephony services, and a variety of initiatives including targeted public funding and ex-ante regulation that aim to enhance broadband services in specific areas (e.g. low population density). Currently, the KCC is reviewing the scope of universal service with a view to include mobile and broadband communications. Factors considered for the inclusion of mobile communications include high mobile penetration, increases in traffic volume, and the rapid adoption of smart phones. The inclusion of broadband in the universal regime is being considered as a way to reduce the information gap between people in different income groups and across regions.

Mexico

Mexico lacks legislation that enshrines the concept of universal service, and therefore, strictly speaking, it has no universal service regime. Instead, the Federal Telecommunications Law refers to the concept of "social coverage in public networks" (*cobertura social*). This concept aims to extend adequate provision of telecommunication services to public and social services, firms, and the population in general throughout the national territory. Telmex, the incumbent operator, is responsible for the implementation of social coverage.

When Telmex was privatised in 1990, it was established in the license agreement that one of its goals should be to provide universal service. This involved two commitments. First, Telmex was required to expand basic telephony access to municipalities with a population of more than 5 000 inhabitants by the end of 1994. In addition, it was established that Telmex would present additional four-year network expansion programmes developed in agreement with the Secretary of Communications and Transport (STC). The four-year review of targets with the STC include programmes of expansion for rural telephony, for which the foreseeable conditions of demand, and its costs, will be considered in determining service provision. Since 1 January 1995 Telmex has committed to install a basic telephone service in all areas where there is a minimum of 100 requests for connection, within 18 months of the requests being received. Telmex also has to service populations that are included in the programme of described expansion of rural telephony. This will include those municipalities in which Telmex can recover at least 75% of the costs of installing and maintaining the operating service. In order to cover municipalities not

originally included in this plan, the SCT has developed additional programmes to provide the telephone service of community access with satellite and wireless equipment in municipalities with a population of between 100 and 499 inhabitants. From 1995 to 2010, Telmex reported investments of USD 548 million for the expansion of rural telephony. In the last programme presented (2007-2010) Telmex committed to providing accessibility to 82 municipalities between 500 and 2 500 inhabitants and to 32 municipalities of more than 2 500 inhabitants by the end of 2010.

A “Social Coverage Fund” (*Fondo de Cobertura Social*) was established in 2002. The Fund has invested USD 98 million²¹ – MXN 1 227 million – since its creation until 2010 on projects that aim to expand telephony and Internet services in rural areas and less affluent urban areas. Its goal was to install 117 000 new lines by 2010 in 2 500 municipalities of more than 500 inhabitants that do not have access to a telephone line or public telephone facility. The line would be provided with free installation, no monthly rent, no charges for incoming calls and allow for prepaid outgoing calls as well as Internet and data transmission. The universal service programme aimed at providing at least one telecentre (Community Digital Centre) per municipality in the country, with a population of at least 10 000. 71% of the telecentres established to date have been in schools and libraries (accessible to the poor and staffed to help people learn how to use the computers). Part of the telecentre programme is aimed at developing local educational, health, economic, and government content. The universal service fund selected 164 service areas for first round tenders, with areas selected using an Indicator of Telephony Density (ICTEL) to select areas that: i) have the greatest deficits of residential telephone lines, and ii) have households that would be able to pay for telephone service. Each area’s ICTEL is then evaluated based on an index of social marginalisation, income levels, the portion of households without telephones, and the number of households that would benefit from coverage expansion. The Fund is currently allocated through a reverse auction.

Finally, Mexico has also made available the National Network for Broadband Development (*Red Nacional de Impulso a la Banda Ancha*) to state governments, universities and research centres. This is a fibre-based backbone network with a transmission capacity up to 10 Gbps leased from the Federal Electricity Commission. The purpose of this initiative is to allow local governments to provide broadband service to schools, medical centres and government offices.

Spain

Article 21 of the General Telecommunications Law (GTL) of 2003 (Law 32/2003) characterises universal service as a public service obligation. The purpose of public service obligations is to guarantee the existence of adequate quality services throughout the national territory via competition, and to ensure that end-users’ needs are satisfactorily met in those instances when the market mechanisms alone will not suffice.

Consequently, Article 22 of the GTL defines universal service as “a defined set of services whose provision is guaranteed for all end-users independently of their geographical location, at specified quality levels, and at affordable prices”. Royal Decree 726/2011²² defines the characteristics of those services in accordance with Directives 2002/22/EC and 2009/136/EC:

- A connection to the public communications network from a fixed location, supplied through any technology. Requests for a connection must be reasonable (a request will be considered reasonable when it refers to an urban dwelling, or to edification, even if it is not on urban land, which is used as a regular residence). The connection must be capable of supporting voice, facsimile and data communications. Since 1 January 2012, the requirement for data

communications involves an actual download transmission speed of 1 Mbps, per Art 52 of the Sustainable Economy Law (Law 2/2011).

- A telephone service (fixed or mobile) capable of supporting outgoing and incoming national and international calls.
- A printed telephone directory service that contains the numbers of all subscribers and is updated at least once a year. When the provision of this service is not guaranteed by the market, the designated carrier is responsible for the directory's elaboration and its free distribution. The directory must be available through the Internet in a format accessible for those with disabilities.
- A directory inquiry service provided at affordable price and conforming to quality standards.
- A sufficient number of public payphones or other public access points with a minimum of one public payphone in each municipality of more than 1 000 inhabitants and one more for every 3 000 additional inhabitants. Municipalities of less than 1 000 inhabitants shall have one public payphone provided it is justified by the municipality's distance from other similar facilities, low penetration of fixed telephony, lack of mobile telephony coverage, or high rates of floating²³ population. Public payphones must allow free-of-charge access to the European emergency number (112) and other national emergency numbers and allow free-of-charge calls to the directory enquiry service.
- Suitable measures to ensure that disabled end-users receive equivalent service to the telephone services, the directory and inquiry services and the public payphone services referred to above.
- Special tariff packages available under transparent and non discriminatory conditions to people with special social needs.

The Ministry of Industry, Energy and Tourism is responsible for the implementation of universal service obligations. To this end, the Ministry may impose the obligation to provide one or more service elements on one or more designated carriers in specific geographical areas. Telefónica is currently the designated universal service carrier for all service components except the provision of telephone directory inquiry services. The Ministry decided in 2011 that it was unnecessary to impose an obligation associated with this directory inquiry services as they are adequately provided by the market.

The Telecommunications' Market Commission (*Comisión del Mercado de las Telecomunicaciones-CMT*), Spain's telecommunications regulator, is responsible for determining the net costs of fulfilling universal service obligations and issuing compensation. Designated carriers may claim compensation when they consider that they incur an unfair burden in fulfilling their obligations. Obligations are funded through an industry levy to which all providers of electronic communications networks and services contribute. The regulator may exclude operators with low turnover from contributing to the fund. In 2008 exclusions were based on a revenue threshold of USD 9 million (EUR 6 million). The CMT determines each carrier's contribution using objective and non discriminatory criteria and in accordance with the principle of proportionality. Since 2003 the regulator has considered that carriers incur an unfair burden in fulfilling universal service obligations. Net costs have been shared among the four largest carriers (Telefónica's fixed and mobile subsidiaries, and the second and third largest mobile network operators). Compensation for the last cost evaluation approved (2009) amounted to USD 65 million (EUR 46.8 million).

Plan Avanza is Spain's umbrella strategy for the advancement of "Information Society". The Plan's first phase (2005-2010) aimed at catching up with the European Union average in terms of broadband coverage and connectivity. Some of its milestones were public sector modernisation, increased broadband

availability, ICT diffusion and the emergence of the ICT sector as a driver of growth. *Plan Avanza* was conceived as a co-ordinated effort between national and regional governments, and municipalities. It revolved around four lines of action:

- Digital citizenship: increase ICT literacy, adoption and use among individuals
- Digital economy: increase ICT literacy and adoption among SMEs
- Digital public services: develop e-government and modernise educational models
- Digital context: extend broadband infrastructures to unserved and underserved areas, raise awareness regarding ICT security issues and expand the use of digital IDs.

Between 2005 and 2010, *Plan Avanza* dedicated USD 7 923 million (EUR 5 700 million) to support these lines of action. Of these funds, USD 356 million (EUR 255.8 million) in the form of loans and grants to operators to develop telecommunication infrastructures and services through three separate programmes:

- The National Program for Broadband Deployment in Rural and Isolated Areas (PEBA) received USD 72 million (EUR 51.8 million) during the 2005-2008 period.
- Avanza Infrastructures, which aims to expand service coverage to isolated and rural areas received USD 56 million (EUR 40 million) during the 2008-2009 period.
- New Avanza Infrastructures received USD 228 million (EUR 164 million) during the 2010-2011 period for extension of basic broadband and development of ultra high-speed networks.

In 2011, before the inclusion of broadband in the scope of the universal service obligations, broadband coverage at download speeds of 1 Mbps stood at 99% of Spanish households, and service take-up stood at 61.9%.

Switzerland

The Federal Constitution (Art 92) states that the Confederation shall ensure the adequate, universal and reasonably priced provision of postal and telecommunications services in all regions of the country. The scope of universal service is determined by the Telecommunications Act (TCA) according to which the universal service provider shall provide one or more of the following services in the area covered by its license: a public telephone service (voice transmission, telefax and connection to the internet), access to emergency call services, public payphones in sufficient numbers, access to the Swiss directories of subscribers, and comparable services for the disabled. The content of these services is to be periodically adapted to reflect state of the art technologies and social and economic demands.

More specifically, the designated universal service carrier, Swisscom, is required to provide a choice of three types of connection for telephony and data transmission: analogue, digital (ISDN) and broadband (always coupled with a telephone line, a telephone number and a directory entry). Switzerland was the first country in the world to include broadband in the scope of universal service. Under current terms (1 March 2012), the broadband connection must be able to provide minimum download and upload speeds of 600/100 Kbps at a maximum price of USD 62 (CHF 55) per month, excluding VAT.²⁴ Swisscom is not required to provide broadband access when a comparable service is offered on the market by another operator.

To guarantee access to emergency services, Swisscom must forward calls to the emergency numbers and transmit the data necessary to identify the location from where the call originates.

Swisscom is also required to provide the minimum number of public payphones allocated to each municipality by the Communications Commission (ComCom) with a minimum of one per municipality (or

more depending on population and surface area). Currently, Swisscom provides 8 100 public payphones throughout the country; 4 600 as part of the universal service commitment and 3 500 voluntarily on the basis of purely commercial criteria. Prices for the use of public payphones must not exceed USD 0.21 (CHF 0.19) per minute or fraction, or USD 0.57 (CHF 0.50) per call.

Finally, Swisscom is responsible for making communication access for the hearing and visually impaired, and for people with reduced mobility qualitatively, quantitatively and economically comparable to services offered to those who are not disabled. This is ensured through the provision of public payphones adapted to meet the requirements of the sensory impaired and those with reduced mobility, text relay or text messages (SMS) services for the hearing impaired, and a directory inquiry and operator service for the visually impaired.

Swisscom may request compensation for the provision of universal service although to date, it has never done so. In the case that compensation was requested, ComCom would examine the application and determine compensation based on effective costs. Funding would be provided through an industry levy on all telecommunication services carriers and the amount of compensation would be divided between the carriers on a pro rata basis according to their turnover.

In Switzerland, infrastructure investment in telecommunication networks is entirely driven by the private sector and there is no National Broadband Plan. However, in 2008 the Swiss Federal Office of Communication (Ofcom/Bakom) and ComCom initiated a series of round tables in co-operation with telecommunication carriers, electricity companies and cable operators to define a co-ordinated approach to deploying FTTH across Switzerland. The purpose of this initiative was to agree on common technical standards and to prevent parallel and duplicated construction efforts to roll out fibre optic while facilitating competition at both service and infrastructure levels. As a result of this effort, most FTTH projects in Switzerland have embraced a multifibre model in which several (normally four) fibre cables are simultaneously installed. In addition, several working groups are currently addressing technical and logistical aspects to ensure that hardware is standardised so that users can potentially switch providers easily.

Although Switzerland strongly believes that fibre technologies will form the backbone of its future telecommunication services, it estimates that it is too early to consider raising the threshold of universal broadband service to bandwidths provided through FTTH networks. The Federal Council estimates that at a time when infrastructure is being rolled out this would increase uncertainty for investors, who would have to compete with a universal service licensee with a government investment mandate and corresponding compensation. Furthermore, the average bandwidth used by the population is much lower than the performance possible using fibre, which suggests that there is a need to adopt such a threshold on the basis of social and economic necessity.

In the event that Switzerland decided to raise the threshold of universal broadband to fibre bandwidths it would need to transform the funding mechanism. The current compensation system was designed to cover minor gaps in services provided through existing infrastructure, but not to finance infrastructure deployment. Ongoing commercial projects are expected to provide FTTH-based service to 60-70% of the population. As a result, the Federal council estimates that closing the availability gap would require USD 15 billion (CHF 13.6 billion) in public funding or 63.6% of the estimated cost of total FTTH deployment for the country.

Turkey

Law No. 5369 (2005) defines universal service as “the electronic communications services, including access to Internet, which are accessible to anyone within the territory of the Republic of Turkey regardless

of geographical location, and which are offered at predefined levels of quality in return for reasonable prices affordable to anyone”.

According to Law No. 5369 (Art 5), as modified by Law No. 5809 in 2008, universal service involves fixed telephony services, payphone services, telephone directory services to be provided through print directories or electronic media, emergency call services, Internet service and safety communication services for maritime transportation. The scope of Universal Service coverage is reviewed at intervals of no longer than three years to account for changes in the country's social, cultural, economic and technological conditions. Revisions are determined by the Turkish Council of Ministers upon a proposal from the Ministry of Transport, Maritime Affairs and Communications in consultation with the Information and Communications Technologies Authority (ICTA) and the carriers.

A series of decisions by the Council of Ministers have expanded the scope of universal service since its original definition. A 2006 decision included computer literacy in 2006. In 2008, Law No. 5809 modified the requirement to provide Internet service to extend the concept to broadband, establishing minimum upload and download speeds of 256 and 512 Kbps. Another decision adopted in 2011 expanded the scope of universal service to small rural residential areas with a population of less than 500 where there is no mobile coverage.

Turk Telecom's (TT) concession agreement designates it as the universal service provider, although Law No. 5369 envisages a tender procedure for the eventual designation of universal service providers. Universal service is funded through contributions collected as follows: 2% of the authorisation fees collected by the ICTA, 1% of net sales revenues of all carriers except mobile ones, 10% of payments issued by mobile operators to the treasury, 20% of the administrative fines collected by the ICTA, and 20% of ICTA's remaining budget after all expenditures are deducted. The Council of Ministers can increase these percentages by up to 20%. Universal Service Fund contributions are allocated to the budget of the Ministry of Transport, Maritime Affairs and Communications. The net costs of fulfilling universal service obligations are calculated on the basis of the difference between the annual costs incurred by the carrier excluding the provision of universal service, and the costs incurred when the provision of universal service is included. The calculation of universal service costs also takes into consideration the benefits obtained by the carrier as a provider of universal services.

Turkey significantly relies on universal service provisions to support the expansion of broadband access throughout the country. In this regard, the “10th Transportation Forum Report” (2009), which sets the strategic goals and guiding principles for the Ministry of Transport, Maritime Affairs and Communications, has established broadband expansion as a key objective and allocated responsibility for developing broadband expansion plans to the Ministry. Specifically, the report aims to “install fiber optic connections in every household by 2023, and to expand wireless communication networks throughout Turkey by 2015”. A series of projects funded through the Universal Service Fund have a strong role to play in achieving those goals. In addition, the Communications Strategic Plan (2009-2013) aims, among other things, to expand broadband service to all schools and to eliminate access differences between urban and rural areas within the framework of the Universal Service Act.

Within the context of these objectives Turkey has developed a number of projects funded through the Universal Service Fund. To date, total expenditures amount to USD 300 million. The most significant of these projects are summarised below:

- **Providing broadband access to public schools:**

Providing broadband access to all public schools is an essential component of universal service goals. To date, this programme has expanded broadband access to 10 600 schools through terrestrial (ADSL) and satellite (VSAT) technologies.

- **Establishing public Internet access centres:**

The Information Society Action Plan aims to establish public Internet access centres to provide broadband to those without access at home. To date, this program has established 2 284 public Internet access centres at various public facilities such as public libraries and public training centers.

- **Expanding telephone and broadband access in rural areas:**

A few areas still lack broadband connectivity in Turkey due to difficult geographical conditions. This project aims to provide broadband access to 2 500 rural villages through WiMax technology. To date, this programme has expanded telephone and broadband access to 200 locations.

- **Expanding and improving mobile coverage in rural areas:**

This programme aims to expand 3G coverage to around 2 000 rural residential areas of less than 500 inhabitants.

- **Covering broadband costs at public schools:**

This programme aims to cover monthly broadband connection fees for nearly 40 000 public schools using the Universal Service Fund.

United Kingdom

The concept of Universal Service was introduced in the United Kingdom in 1984, at the time of privatisation of British Telecom. Its purpose is to act as a “safety net” by ensuring that basic fixed line telecommunication services are available at an affordable price to people across the United Kingdom. The current definition of universal service applies to voice telephony services and does not include broadband. The non-inclusion of a minimum broadband threshold as part of universal service is consistent with a national approach to investment in broadband infrastructures that emphasises private initiative and technological neutrality as opposed to government dictated standards. It is unlikely that minimum broadband services will be included as part of universal service commitments in the immediate future.

The scope of universal service obligations is defined by the 2003 Electronic Communications (Universal Service) Order and the 2011 Amendment Order, which came into force on 26 May 2011. The Order states that “at least one designated universal service provider shall meet all reasonable requests by end-users for connection at a fixed location to the public electronic communications network and for access to publicly available telephone services at a fixed location over that communications network”. In compliance with European Law, universal service in the United Kingdom involves a connection capable of making and receiving directly or indirectly national and international telephone calls through a number or numbers in a national or international telephone numbering plan, facsimile, and data communications “at data rates that are sufficient to permit functional Internet access, taking into account prevailing technologies used by the majority of subscribers and technological feasibility”, free of charge outgoing emergency calls to the European and local emergency numbers 112 and 999, access to at least one comprehensive telephone directory, reasonable access to public payphones or other public voice telephony access points, and adequate and affordable facilities for users with disabilities.

The Order is implemented by Ofcom, the regulator and competition authority for the United Kingdom communication industries through specific conditions for the designated universal service carriers BT and Kingston Communications (in the Hull area), and general conditions on all providers. Under the universal service regime, providers are required to respond to any reasonable demand for a fixed line at uniform prices and irrespective of geographical location. If installing the line costs USD 5 440²⁵ (GBP 3 400) or less, BT charges a standard charge of USD 120 (GBP 74.99). If the installation costs over USD 5 440, the

customer pays the excess as well as the standard charge. Ofcom considers that BT's general approach of a threshold is sensible in the interests of efficiency and consistency. According to the USO, the line must be able to support a data connection capable of "functional Internet access" which is currently set at 28.8 Kbps.

In addition, prescribed services covered by universal service obligations (USO) include special tariff schemes based on customer eligibility to ensure affordability for all citizens. To fulfil this obligation BT offers a scheme called "BT Basic". Under this scheme eligible customers claiming government benefits pay USD 23 (GBP 14.40) for three months line rental, which includes a call allowance of USD 7.20 (GBP 4.50) every three months. If the customer goes over its allowance, it pays USD 0.02 (GBP 0.107) a minute (plus USD 0.05 (GBP 0.031) for each call) for standard calls to fixed lines within the United Kingdom.

BT and Kingston are also responsible for providing an adequate number of public payphones. To determine what is adequate, local people and organisations have what is known as the "local veto" to prevent the removal of the last payphone in their area. To protect customers with disabilities, all communication providers must provide bills in accessible formats, a text relay service that translates voice into text and vice versa, a priority fault repair service and free directory inquiries for end users who are unable to use a printed directory because of their disability. Furthermore, at least 75% of public payphones must be accessible to wheelchair users. There are currently no specific provisions for funding USO since Ofcom estimates that the carriers do not incur an excessive burden in fulfilling their obligations. Benefits from providing universal service arise primarily from brand image and advertising in public payphones. The regulator estimated in 2005 that current costs for BT were around USD 80-112 million (GBP 50-70 million) and benefits around USD 96 million (GBP 60 million). To evaluate net costs, Ofcom uses estimates of specific cost and benefits components. Three components of costs have been identified: areas of the United Kingdom which give rise to a universal service cost, customers in areas that are otherwise profitable for the universal service provider, and public payphones which give rise to universal service costs. Possible benefits generated are: ubiquity benefit, life-cycle effects, brand enhancement, corporate reputation and advertising on public payphones.

Plans to build Britain's Superfast Broadband network are not expected to have a significant impact on the immediate future of universal service. A 2009 long-term evaluation document entitled "Digital Britain" established a commitment to build "the best broadband network in Europe" and aimed to set a universal service threshold for functional service speed at 2 Mbps. The government that emerged after the 2010 election maintains the commitment to have the best superfast broadband network, but has modified the strategies to achieve it.

The plan unveiled in December 2010 aims to ensure that virtually all homes in the United Kingdom have access to a minimum level of service of 2 Mbps by 2015 but delivery of this minimum goal will not be achieved through universal service requirements. Instead, the government approach is to incentivise private investment to make it go as far as it can, then bridge the gaps where the market looks unlikely to deliver with public funding. The initiative to deliver connectivity in rural and hard to reach areas where the business case is weaker or non-existent falls on the shoulders of local authorities, not the central government. Local councils are responsible for developing broadband infrastructure upgrade plans that reflect the needs of their communities, and for stimulating broadband demand. Broadband Delivery UK (BDUK), a team set up within the government's department for culture, media and sports, is responsible for providing support and for disseminating best practices to local authorities as they develop their plans. BDUK is also responsible for the allocation and distribution of the USD 848 million (GBP 530 million) the government has earmarked to bridge the gap with private investment. Four pilot projects that follow this structure are currently underway. To ensure the interoperability of the projected local networks, both the government and Ofcom participate as observers on the board of the Network Interoperability Consultative

Committee (NICC). NICC is an independent technical standardisation body that develops interoperability standards for the United Kingdom's communications sector and is owned and run by industry members.

United States

Universal service has been a national objective in the United States since the Communications Act of 1934. It stated its goal "to make available, so far as possible, to all the people of the United States...a rapid, efficient, nationwide, and worldwide wire and radio communication service with adequate facilities at reasonable charges." The 1996 Telecommunications Act states that universal service is "an evolving level of telecommunication services that the [Federal Communications Commission (FCC)] shall establish periodically...taking into account advances in telecommunications and information technologies and services." Since the adoption of the 1997 Universal Service Order, those supported services have been defined as single-party service, voice-grade access to the public switched network,²⁶ "DTMF"²⁷ signalling or its functional equivalent, access to emergency services, access to operator services, access to interexchange service, access to directory assistance, and toll limitation services for qualifying low-income consumers. In October 2011, the Commission modified this definition and specified that the supported service is voice telephony service comprised of specific functionalities.

Universal services thus defined are supported by the Universal Service Fund (USF), a federal mechanism which comprises four programmes responsible for disbursing universal service funds to various recipients. The largest programme, the high-cost programme, which disbursed close to 50% of universal service funding in 2010, aims to ensure consumers in rural, insular, and high-cost areas have access to reasonably comparable services at rates that are affordable and reasonably comparable to those in urban areas. The other three disbursement programmes provide discounts and subsidies for low-income consumers, schools and libraries, and rural health-care providers.

In 2009, Congress directed the FCC to develop a National Broadband Plan (NBP). In 2010, the FCC staff developed such a plan, which articulated a vision to expand broadband connectivity across the nation, increase broadband adoption and utilisation by individuals, and leverage broadband capabilities to advance national objectives.

The NBP articulated a universal service goal of providing access to broadband services to all people in the United States at an initial rate of 4 Mbps of actual download speed and 1 Mbps of actual upload speed by 2020. The NBP estimated that at the end of 2009, 95% of people in the United States had access to terrestrial, fixed broadband infrastructure capable of supporting download speeds of 4 Mbps, although actual speeds might be lower. In addition, while the private sector has announced plans to provide 4G mobile coverage to most of the country, 2% of people live in an area where no carrier provided 3G mobile service, with no prospect of upgrades to 4G. The availability gap was greatest in areas with low population density where there is unlikely to be a business case to deploy and operate broadband networks. As a result, the NBP concluded that private investment alone would not fill the broadband availability gap.

In 2010, the American Recovery and Reinvestment Act provided USD 7.2 billion in one-time funding in the form of grants and loans to deploy broadband infrastructure in un-served, underserved, and rural areas, as well as support for public computing and sustainable adoption projects. Such funding has been administered by the United States Department of Agriculture and the United States Department of Commerce.

Following the NBP, the FCC initiated a rule-making regarding its universal service policies, culminating in an October 2011 order that comprehensively modernised and reformed the high cost programme to ensure that voice and broadband, both fixed and mobile, are available throughout the United States. At the same time, the FCC also reformed its intercarrier compensation (ICC) system. The aim of

this reform is to refocus the USF and ICC to ensure that all people have access to robust, affordable broadband and to accelerate the transition to all IP networks. The 2011 FCC order created the Connect America Fund (CAF) with an annual budget of USD 4.5 billion and articulated universal availability of both fixed and mobile broadband as national goals. The Connect America Fund will provide support for both fixed and mobile broadband, in high-cost areas, including the most remote, highest cost areas, and it also will provide funding to facilitate a measured transition for companies impacted by ICC reform. To ensure that the reform is not sudden or overly disruptive, the reform includes transitions and glide paths that will facilitate adaptation. Specifically, the FCC decision involves several specific, near-term steps that will accelerate broadband investment in underserved areas and will set the USF and ICC on a path towards greater efficiency and better allocation of resources. The FCC will monitor the process of near-term reforms closely and adjust course as necessary.

In addition to expanding broadband access, the NBP articulated a strategy for increasing broadband service adoption and utilisation by the 100 million people (one third of the United States population) that lack broadband at home. The NBP concluded that the top three obstacles to broadband adoption and utilisation are cost, literacy and relevance. The 2009 Recovery Act earmarked USD 450 million of federal funds to support broadband adoption, with the NBP making additional recommendations on how to address barriers to broadband adoption and how to design specific programmes to address those impediments.

In March 2011, the FCC proposed to implement a broadband adoption pilot to gauge whether the Universal Service Fund's low-income programme can effectively support broadband adoption by low-income households. If approved, the proposed programme would gather data about the effectiveness of different approaches to making broadband more affordable as well as the appropriate support amounts for the broadband service. In October 2011, the FCC announced the launch of "Connect to Compete," a new non-profit initiative that aims to address barriers to broadband adoption, digital literacy and employment skill gaps. Under this initiative, private sector companies like Microsoft will join non-profit groups to offer basic and advanced digital literacy training and certification. Training programmes will likely take place in public libraries and schools.

Finally, the United States government expects to leverage universal broadband to advance national goals in the areas of healthcare, education, energy, government performance, civic engagement and public safety. One of the envisioned applications is the enhancement of access to emergency services. Currently, Emergency 911 services operate through circuit-switched networks. Over the last ten years, several United States government agencies have been working in tandem on the development of a Next Generation system (NG 911) that will capitalise on recent technological advances and leverage broadband capabilities. NG 911 is being designed to eventually combine multiple streams of incoming information from any networked device such as highway cameras, security cameras, alarms or personal medical devices and to include multimedia data capabilities (text, images, and video). NG 911 is expected to establish more flexible, secure and robust emergency PSAP operations and to improve the quality and speed of responses.

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ANNEX NOTES

- ¹ Registered providers are carriers that present their Proposed Service Plans for the programme, according to the guidelines published annually, fulfil the government's eligibility and service criteria and are accepted to provide services within the Australian Broadband Guarantee programme.
- ² Although the Act enables the existence of several USO providers.
- ³ Eligible revenue is defined as a carrier's total telecommunications revenue minus certain allowable deductions.
- ⁴ AUD 1= USD 1.03 throughout (using an average annual exchange rate for January-December 2011 (www.oanda.com/currency/average))
- ⁵ Registered providers are carriers that present their Proposed Service Plans for the programme, according to the guidelines published annually, fulfil the government's eligibility and service criteria and are accepted to provide services within the Australian Broadband Guarantee programme.
- ⁶ A house or building together with its grounds, outhouses, etc., especially a building or part of a building that houses business (www.oed.com). Australian statistics are based on premises.
- ⁷ By the 1970s there were as many as 850 independent local telephone companies. Each of these was the sole provider of telecommunications services in its service territory. Today the incumbent telephone companies, frequently referred to as ILECs, consist of privately and publicly owned large regional telephone companies (large ILECs) and smaller independent local telephone companies (small ILECs). These companies provide service in southern Canada while Northwestel Inc. (Northwestel) provider service in the far north.
- ⁸ Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive).
- ⁹ Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive).
- ¹⁰ Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on co-operation between national authorities responsible for the enforcement of consumer protection laws.
- ¹¹ Directive 2009/140/EC of the European Parliament and of the Council of 25 November 2009 amending Directives 2002/21/EC on a common regulatory framework for electronic communications networks and services, 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities, and 2002/20/EC on the authorisation of electronic communications networks and services.

- ¹² Regulation (EC) no. 1211/2009 of the European Parliament and of the Council establishing the BEREC and the Office, Art 2 a.
- ¹³ http://ec.europa.eu/information_society/digital-agenda/publications/index_en.htm.
- ¹⁴ EUR 1= USD 1.39 throughout (using an average annual exchange rate for January-December 2011 (www.oanda.com/currency/average)).
- ¹⁵ According to the ECTA broadband scorecard Q3 2004, broadband penetration in Finland stood at 11.0% (national total connections divided by population and multiplied by 100).
- ¹⁶ Eskelinen *et al* (2008), Telecommunications Policy 32 (2008) 412-421.
- ¹⁷ EUR 1=USD 1.46602 as of April 27 2011.
- ¹⁸ JPY 1= USD 0.013 throughout (using an average annual exchange rate for January-December 2011 (www.oanda.com/currency/average)).
- ¹⁹ *i.e.*: approved compensation for FY2009 JPY 18.8 billion /188.9 million subscriber numbers)/12 months = JPY 8 per number per month.
- ²⁰ KRW 1= USD 0.009 throughout (using an average annual exchange rate for January-December 2011 (<http://www.oanda.com/currency/average>)
- ²¹ MXN 1= USD 0.08 throughout (using an average annual exchange rate for January-December 2011 (www.oanda.com/currency/average)).
- ²² Real Decreto 726/2011, of 20 May, which modifies the Regulation about conditions for the delivery of electronic communication services, universal service and end-user protection, approved by Royal Decree 424/2005 of 15 April (BOE n 23 of 24 May 2011).
- ²³ Floating population usually refers to seasonal tourists.
- ²⁴ CHF 1= USD 1.13 throughout (using an average annual exchange rate for January-December 2011 (www.oanda.com/currency/average)).
- ²⁵ GBP 1= USD 1.60 throughout (using an average annual exchange rate for January-December 2011 (www.oanda.com/currency/average)).
- ²⁶ Eligible Libraries, schools and rural health-care providers are given greater bandwidth.
- ²⁷ DTMF stands for Dual-Tone-Multi-Frequency signalling, otherwise known as “touch-tone”. Alternative functional equivalents are out-of-band digital signalling mechanisms.