4.1 Introduction

4.1.1 A brief history of universal access

Early developments in universal access and service policies targeted public and private access to copper based telephony services. By the start of the 21st century, fixed-line residential and fixed public payphone were included within most existing universal access and service definitions.

National programs promoting expansion of copper line networks and telephony services were reflected through measures such as the establishment of public telephone access centres and provision of private telephone connections to homes and businesses. The development of cellular mobile services was also a key means of expanding the reach of telephony services. As universal coverage of basic voice telephony services became close to reality in many countries and with the growing recognition of internet, particularly broadband services, as a key means of achieving economic and social goals, governments have in recent years turned their focus towards securing affordable high speed broadband access.

Initially using spare capacity in the telephone network, the internet is now the main driver of demand for network capacity. Growing innovation and technological advancements, especially with wireless and mobile products and their application, have enabled the rapid dispersion of broadband-capable services in areas that were previously inaccessible. These advancements, combined with market forces and a well-designed legislative framework, make broadband proliferation and penetration possible.

4.1.2 Legislative efforts to provide universal broadband access

Private sector initiatives and investment are, and have proven to be, crucial to achieving widespread broadband access and use. But when market mechanisms alone do not meet the goals set for broadband access and use the important question that arises is what role should government play?

Although policy makers generally aim to expand broadband service coverage as much as possible with minimal government intervention, some degree of intervention may be required to complement the market and overcome impediments to universal broadband. It is important for policymakers to remember that universal access policies should not be a policy substitute for regulatory reforms to make markets operate more efficiently.¹

The objective of universality policies is to provide or maintain service to those who would not normally be served by market forces alone. In the context of broadband access, unserved or underserved groups include people living in rural areas or other high cost service areas, low income populations, and people with physical disabilities who may have difficulty using standard equipment. Gaps in availability, accessibility and affordability of broadband will typically remain between and within countries where government intervention is absent.

Countries have varied in the boldness of their goals and methods to secure universal access to broadband. National broadband plans and strategies often provide targets for broadband rollout to populations or priority groups and communities, and indicate a clear commitment by governments to support the establishment of advanced infrastructure. A number of countries have already moved to include broadband as a universal service, as in Australia and the United Kingdom, and some countries go even further – Finland made broadband a legal right for its citizens in 2010. Yet in 2010, of the 99 developing countries with a universal access or service definition only 49 included internet dial-up and only 36 included broadband within their definition. A table of data identifying the number of internet users per 100 people in countries with population over 50 million is can be found at Attachment A.

As Next Generation Access (NGA) and national backhaul networks are rolled out across developed and developing nations there is a growing momentum towards ensuring access to these networks. This is being driven by the social and economic concerns of both policymakers and populations. This creates opportunities and challenges for governments. How can governments help facilitate access to networks, doing so in partnership with private enterprises? How can fair access to networks be balanced against the need for the networks to deliver a return on investment to those who build them?

As a starting point, many governments have already adopted broadband plans setting out policy goals. Although the official definition of broadband is contentious, national governments have set their own target minimum speeds, typically reflecting expected future rates of usage. In Australia, the National Broadband Network Company (NBN Co) will provide superfast access at bit rates of up to 100 Mbps in order to meet anticipated future demand. A terraced approach also exists in a number of countries, such as in Malaysia where, under its High Speed Broadband (HSBB) service, designated high economic impact areas will receive access at 10 Mbps, with businesses receiving up to 1,000 Mbps (1 Gbps). This chapter will provide an overview of the policy mechanisms being utilised by governments to ensure that populations have access to broadband products and services, and outline what policymakers can do to define a broadband development strategy capable of addressing market failures, work towards achieving universal broadband service and address potential policy challenges.

This chapter will discuss the different levels of intervention that a government strategy may pursue, the role of private-led competitive markets in achieving these objectives, the role of the government in narrowing or eliminating gaps between markets and a country’s development needs, and the design of effective government strategies to meet this challenge. Finally, this chapter will examine the use of fiscal resources to support private supply of broadband, including choice of policy instruments, the use of subsidies, and mechanisms to collect and disburse funds for subsidy.

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4.2 Universal Access Strategy and Broadband Development

The concept of universal access to telecommunications must be extended from pure telephony to encompass broadband services. Technology adoption is recognized as a major contributing factor to development, and the economic and social differences in communities on each side of the ‘digital divide’ are pronounced. Access to broadband services is recognized as a driver of economic growth, promoting efficiency and overcoming geographic market restrictions. World Bank statistics indicate that a ten per cent increase in penetration of selected ICTs may increase Gross Domestic Product growth per capita by up to 1.38 percentage points.

Beyond this, access to information and the ability to communicate opinions contribute to a country’s education and political systems. Public services such as remote health advice and disaster warning systems are improved through the construction of nationwide communication networks. As a result of these benefits, the World Bank and other international organizations are encouraging infrastructure development plans and governmental schemes to promote broadband use and accessibility in underserved areas.

The United Nations’ Millennium Development project aims to achieve affordable and reliable access to broadband services for all by ensuring that all countries will have a national broadband plan in place or include broadband access in their national service definitions by 2015. Most countries have preferred the more proactive approach of implementing a national broadband plan. The approach adopted by a government depends on whether it seeks to intervene to drive or facilitate development, or whether it prefers to rely on market forces to increase coverage. A national broadband plan should set out desired outcomes, rather than to specify the technologies sought to be implemented.

**Box 4.1: CASE STUDY: Government approach to broadband in St Kitts and Nevis**

The government in St Kitts and Nevis has repeatedly stated its commitment to internet access and improved digital literacy for all citizens. As well as ushering in new telecommunications policies

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and harmonising its approach to ICT with those of its Caribbean neighbours in order to achieved increased uptake of internet technologies, St Kitts and Nevis has entered into PPP arrangements with telecoms providers LIME and The Cable in order for schools to be provided with free internet access ensuring that the next generation is proficient with the use of broadband technologies. Providers have also supported government policies to train citizens in how to use broadband technologies by providing the equipment and internet access to community centres to run internet usage courses to teach basic online skills to the wider community.

For greater analysis on broadband developments in St Kitts and Nevis see the case study provided by infoDev at: [http://broadbandtoolkit.org/Custom/Core/Documents/kn.pdf](http://broadbandtoolkit.org/Custom/Core/Documents/kn.pdf)

As demonstrated in Malaysia, licensees providing service to rural areas under the High Speed Broadband Network plan have been given permission to use TD-LTE services, rather than WiMAX, as initially planned. Ensuring that major network backbones are suitably positioned to support a variety of technologies will allow flexibility to adapt last mile services to the best solution available at the relevant time.

### 4.2.1 Achieving Universal Access

Universal access can be accomplished when either:

- in response to demand for services, private entities decide independently to extend their network coverage;
- regulatory measures are put in place to require private entities to extend their existing networks; or
- governments fund infrastructure projects to increase network coverage.

Governments can play a role in ensuring sufficient demand for paid broadband subscriptions by, if necessary, encouraging the use of the internet in a productive and enriching manner. A coherent and comprehensive national broadband plan is necessary to ensure that broadband development is successful across both steps and will create the intended benefits.\(^8\)

The success of countries that have implemented holistic plans that incorporate both of these policy steps, including Korea, Japan and Canada, is testament to the efficacy of this approach.

In each country unique hurdles will have to be overcome. Encouraging adoption of existing networks in the European Union, extension of service to isolated rural areas in Australia and subsidising access technology in Malaysia are good examples of tailored policy approaches to local conditions.

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**Box 4.2: CASE STUDY: Sri Lanka; overcoming socio-economic factors to stimulate broadband uptake**

The government of Sri Lanka acknowledged the growing information and opportunity divide between rich and poor and produced a roadmap to develop a more inclusive information society called e-Sri Lanka. Closing the information gap between rich and poor was achieved by a blended policy and regulatory approach of encouraging greater competition by the awarding of additional sector licences, coupled with early licencing of 3G spectrum. The presence of 4 telecommunications operators forced the telcos to move away from skimming profits from servicing only the rich and middle class consumers of Sri Lanka to a model which profits from high volumes of users who only spend a small amount of pre-paid disposable income on internet and data services, thus increasing universal access amongst poorer Sri Lankans.

For greater analysis on broadband developments in Sri Lanka see the case study provided by infoDev at: [http://broadbandtoolkit.org/Custom/Core/Documents/lk.pdf](http://broadbandtoolkit.org/Custom/Core/Documents/lk.pdf)

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**Figure 4.1: Average annual increase in internet users per 100 people across income groups**

![Graph showing average annual increase in internet users per 100 people across income groups from 2005 to 2011.](chart.png)

<table>
<thead>
<tr>
<th>Year</th>
<th>High income countries</th>
<th>Upper middle income countries</th>
<th>Lower middle income countries</th>
<th>Low income countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005-2006</td>
<td>1.00</td>
<td>2.00</td>
<td>3.00</td>
<td>4.00</td>
</tr>
<tr>
<td>2006-2007</td>
<td>2.00</td>
<td>3.00</td>
<td>4.00</td>
<td>5.00</td>
</tr>
<tr>
<td>2007-2008</td>
<td>3.00</td>
<td>4.00</td>
<td>5.00</td>
<td>6.00</td>
</tr>
<tr>
<td>2008-2009</td>
<td>4.00</td>
<td>5.00</td>
<td>6.00</td>
<td>7.00</td>
</tr>
<tr>
<td>2009-2010</td>
<td>5.00</td>
<td>6.00</td>
<td>7.00</td>
<td>8.00</td>
</tr>
<tr>
<td>2010-2011</td>
<td>6.00</td>
<td>7.00</td>
<td>8.00</td>
<td>9.00</td>
</tr>
</tbody>
</table>

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**4.2.1.1 Service Quality**

The purpose behind implementing a universal access plan must be reflected in the bit rate provided under the relevant broadband development scheme. Many of the functions that universal access seeks to provide, including telemedicine and tele-learning, require access at up to 100 Mbps, while standard applications such as email and web browsing can function speeds as low as 0.5 Mbps. High broadband upload rates facilitate a collaborative online environment by

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encouraging user contribution, while high download rates enhance the accessibility of content. High bit transfer rates enable interactive functions such as real time feedback and video calling.

It is advisable that access to ‘high-speed broadband’ be specified in universal access models. Even where the headline rate is sufficient, frequently consumer experience of a broadband connection will be substantially less. Other factors, including throughput and latency must also be taken into account. For instance, the Ethernet port of an ADSL modem will report connectivity at its particular line rate while the actual connection rate is determined by the distance from the DSL access multiplexer in the exchange building and the quality of the copper lines. Similarly, a wireless connection rate will depend on the use of others on the same access network and the backhaul capacity from the relevant base station to the core network.

In some instances there is an additional issue of service providers submitting false compliance reports on the quality of broadband services they offer. In India, the telecommunications regulator has addressed this by imposing fines on providers found to have made such statements.\textsuperscript{11} In South Korea, all buildings are to be designed to enable high-speed connections, and assigned ratings to communicate to potential residents the bit rate supported.\textsuperscript{12}

Government spectrum allocation decisions impact wireless service quality, while fixed line services can be improved by upgrading the network quality and ensuring customers have access to sufficiently advanced modem technology.

Countries at times adopt different target bit rates based on the forecasted use in different areas. This may particularly be the case where governments are required to fund or subsidize infrastructure or subscription costs. In Australia, the National Broadband Network that is currently under construction plans to provide broadband access at bit rates of up to 100 Mbps. Conversely, in the European Union the required base rate is to be 30 Mbps, although the Digital Agenda aims to encourage 50 per cent of subscribers to pay for access at over 100 Mbps. In Malaysia broadband and universal service policies are separate, and levels of access are terraced by region. Under the HSBB service, households under the designated high economic impact areas receive minimum of 10 Mbps, while businesses in these areas will receive up to 1000 Mbps.

4.2.2 Levels of Access

The levels of access provided under a universal broadband access scheme may be assessed according to the proportion of the population that are able to access the internet and the locations from where access is achieved. Establishing individual fixed broadband connections for all households and businesses may not be a viable option in all areas due to the associated costs, lack of demand and geographical constraints. At times, governments must assess the underlying goals of their universal access strategy and prioritise the most cost effective means to achieve those. The extent to which existing systems can be upgraded as opposed to new systems having

\textsuperscript{11} Times of India ‘Telcos to be penalised for false compliance report’, 26 December 2012. Available at: http://articles.timesofindia.indiatimes.com/2012-12-26/telecom/36007036_1_parameter-for-subsequent-non-compliance-broadband-service-compliance-report

to be built, will likely inform outcomes. Part 4.2.2.1 discusses the benefits of establishing broadband connections to individual users and households, while Part 4.2.3 explores additional approaches to facilitating communal and institutional access.

4.2.2.1 Individual Users and Households

Connecting individual users and households to a broadband network represents optimal service penetration. Household connections overcome restrictions to access in other settings such as age, employment situation or educational background. Broadband usage by households has increased as access costs become more affordable and service coverage extends. Household internet access in developed countries has consistently been higher than in the developing world. In 2011, 70.3 per cent of households in developed countries had internet access, compared with 20.5 per cent of developing countries. The Broadband Commission for Digital Development (Broadband Commission), a joint initiative of the International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), targets 40 per cent of houses in developing countries to have internet access by 2015.

Studies in the United States found that home broadband users overwhelmingly valued the social aspects of internet use, citing the ease of communicating with family and friends and content sharing applications as the most important functions. Access to information, news and entertainment are also important, as is the ability to engage in e-commerce through shopping and selling goods online. The educational value of home internet access is frequently highlighted, as research has shown that children with internet access at home perform better in school.

In many countries, the extension of direct fixed line service networks to individual homes is included in universal access targets. Governments have adopted a variety of strategies in order to attain such connections.

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14 Based on ITU statistics: Percentage decrease in fixed broadband costs in developed countries between 2008 and 2010 of 52.2%; for developing countries 35.4%.
15 ITU Statistics: In the developed world 70.3 per cent of households had internet access in 2011, whilst only 35 per cent had access in 2002. This increase is also visible in the developing world, where 9.6 per cent of households had access in 2002, compared with 20.5 per cent by 2011.
16 ITU Statistics.
Box 4.3: CASE STUDY: Extending broadband networks through regulation

Regulatory tools may be used to increase market entry and competition, while minimising the input governments are required to contribute. Models which have separate sources of supply at each “layer” tend to promote competition more effectively than vertically integrated supply. This drives policies which seek structural or functional separation between the elements of the network on the grounds that a vertically integrated approach may inhibit investment by competitors and new entrants. In Singapore this strategy was initially adopted, however it proved insufficient to extend coverage to a satisfactory level within the time limit this was required. In Finland, a regulatory approach was also adopted when the Finnish Communications Regulator required 26 designated telecommunications operators to provide connectivity of at least 1 Mbps for all consumers and businesses at their permanent place of residence.

Finland is part of a growing global trend that identifies the communications and educational opportunities afforded by broadband as so basic a foundation for adequate functioning in modern society and accessing opportunities that it has become a fundamental right of all human beings that governments must protect. Spain has taken a similar approach to the rollout of basic broadband speeds and there is strong political support in Estonia that broadband is essential for modern society, which led to a massive investment in Estonia of broadband facilities in rural areas.

Legal challenges have also confirmed that broadband access is gaining recognition as a basic human right. A 2010 Supreme Court ruling in Costa Rica confirmed that internet access is so essential to modern day communication and expression and was a tool to access other rights such as participation in society and self-government that the Court held that internet access itself was a human right. Similarly, in France the Constitutional Court delivered a judgment striking down a French law which proposed to cut internet access to people who were considered to be guilty of illegally downloading content. The French court argued that broadband was essential to access information and give free expression to ideas and political dialogue. Although Finland is one of the forerunners of this rights based regulatory approach, it is likely many other states will follow suit.

Regulatory intervention may not be appropriate in all circumstances. In the United States attempts to regulate the telecommunications market have been met with protracted litigation from incumbent local exchange carriers. When constructing the National Broadband Plan in 2010, the United States Federal Communications Commission specifically referred to the possibility State governments might intervene to provide infrastructure and broadband services to individual premises in areas where private enterprises do not. This approach was more palatable than imposing regulations requiring extension of coverage into non-profitable regions, while still working towards the universal access goal of connecting 100 million Americans to broadband services.

Investment in network infrastructure reduces the initial capital investment for market entrants, encouraging pricing competition, and also extends coverage to areas where this may not otherwise have been commercially viable. In Australia the government-funded National Broadband Network Company will construct a high-speed wholesale broadband network that serves every home through a combination of fibre, fixed wireless and satellite services. Although this is a far more substantial task than only providing connections in areas where they are not currently available, this model allows the higher costs of rural rollout to be offset against the lower costs of connections in urban areas.

In Canada the government has also funded infrastructure development, but restricts this to areas where private coverage is not sufficient. In 2009 a $225 million (US$217 million) subsidy was allocated to extend access to around 3 million people who did not have access to broadband services, including the high-profile projects to provide satellites to the remote Far North Nunavut and Northern Territories. A major benefit of the single wholesale provider model is that in addition to regulating price, a single national infrastructure may also ensure that sufficient backbone services and long haul data transmission are provided.

### 4.2.2.2 Demand Creation

It is particularly important in countries which extend networks to individual and households that customers exhibit sufficient demand for broadband services. In situations where broadband networks grow organically without regulatory intervention, broadband take-up and coverage figures should follow a similar trajectory, as providers will improve upon the service they offer in order to meet demand. Where universal service capacity is achieved through government encouragement, individual users must take up paid subscriptions with service providers in order for models to remain sustainable. A United States Federal Communications Commission Report on home broadband use cited cost, lack of digital literacy and a feeling access was irrelevant to a person’s life as reasons for not taking up available broadband services available.\(^{21}\) Cost is addressed below in Part 4.2.4.2, while this section will explore examples of the measures adopted by governments to increase the relevance of broadband services to people’s lives and improve digital literacy.

There is a direct correlation between high household broadband use and areas in which a holistic universal service strategy has been implemented.\(^ {22}\) While a recent OECD report has suggested that governments need to play more than a ‘push’ role of providing ICT infrastructure and

\(^{21}\) United States Federal Communications Commission Report on home broadband use in 2010 concluded that of the 35 per cent of Americans who did not have home broadband access, 36 per cent stated this was due to the cost, 22 per cent lacked the requisite digital literacy to make use of broadband, and 19 per cent claimed it was irrelevant to their lives. John B. Horrigan, ‘Broadband Adoption and Use in America’ (OBI Working Paper Series No. 1, Federal Communications Commission’ (2010). Available at: [http://online.wsj.com/public/resources/documents/FCCSurvey.pdf](http://online.wsj.com/public/resources/documents/FCCSurvey.pdf)

\(^{22}\) ITU Statistics: in 2012, 70.9 per cent of households in Europe, 51.1 per cent in The Americas, 37.3 per cent in the Commonwealth of Independent States (ie former Soviet Republics) 25.7 per cent in Arab States, 24.5 per cent in Asia Pacific, and 4.1 per cent of Households in Africa had internet access.
development of a domestic ICT sector, it is also important that they adopt ‘pull’ strategies aimed at promoting digital literacy, establishing an appropriate legal framework surrounding internet use and fostering the development of local content.

**Box 4.5: CASE STUDY: ‘Pull’ strategies in the European Union and South Korea**

The European Union’s Digital Agenda provides a good example of a ‘pull’ strategy focused on facilitating certain uses of a broadband connection. By 2011 the whole of Europe had achieved universal broadband coverage by satellite and around 95 per cent coverage by fixed line. However, this coverage did not translate automatically into broadband subscriptions.

The European Commission’s Digital Agenda Scoreboard demonstrates that the percentage of households with a broadband connection has increased dramatically from 14.9 per cent in 2004 to 67.3 per cent in 2011. The Digital Agenda aims to increase take up of broadband subscriptions and to encourage particular uses of broadband services supported by a secure high-speed connection. Targets include 50 per cent of the population buying products online and 50 per cent of the population using e-Government. In pursuance of its goals, digital ‘to-do’ lists are published annually, detailing the measures required to encourage adoption of these new use habits.

In addition, digital education is encouraged in order to enable EU citizens to take full advantage of the benefits of broadband, with the aim of reducing the population that have never used the internet before to 15 per cent. The success of the policy can be seen in OECD statistics that suggest the European Union has some of the highest household broadband access rates in the developed world.

A similar project was undertaken in South Korea. The Korean government’s broadband strategy envisioned a ‘knowledge-based economy’ in which every citizen would have access to a personal computer and government would expedite development of an information infrastructure. Several initiatives were put in place, including regulatory efforts to encourage infrastructure investment by incumbents and market entrants, subsidies for low income citizens to purchase computers, and free digital literacy programs encouraging internet use as a means of obtaining information, providing entertainment, and accessing government services. South Korea further stimulated demand by targeting much of this training to homemakers, who are typically married women not in the workforce but who have a large amount of discretion in the organisation of household finances. The theory was that by convincing homemakers of the benefits of broadband, demand would be stimulated for household uptake and ensure the next generation of South Koreans would have access to broadband as their parents accessed such services. The targeted training was a successful approach to driving broadband uptake as the proportion of South Korean women who utilise broadband is much higher than their counterparts in Singapore, China, Taiwan and the

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In this way, top down and bottom up approaches were combined so that incentives to improve service to citizens would be met by increased demand for services. South Korea now leads the developing world in household internet connections. By June 2011, 97.2 per cent of households in South Korea were connected to the internet.

Other governments have implemented regulation to directly create demand:

- in Japan it was mandated that all administrative agencies must buy their broadband services from the Next Generation National Broadband Network;
- in Sweden, companies that purchase PCs for their employees receive subsidies and household that install broadband can receive tax deductions for the costs of installation up to approximately US$650. Computer ownership and the cost of hardware and software upgrades have been found to be a factor contributing to lower broadband uptake;
- In Denmark broadband can be offered to employees as a tax-free fringe benefit which was a tailored demand creation mechanisms which took into account the relatively high income tax rates in Denmark and found that providing broadband as a form of employment benefit would be more effective at stimulating uptake;
- and
- in Bahrain, the government has a policy of encouraging the use of the internet to deliver government services and involve citizens in decision-making. Over 200 services are offered online, including payment of utility bills and traffic fines, tourist visa applications, driver’s licence renewals and student exam result delivery.

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Figure 4.2 Internet users per 100 people in countries with population over 50 million 2005 – 2011

Explanatory Note: Weight of lines demonstrates relative wealth of the country. Solid lines are high income, large dashes are upper middle income, smaller dashes are lower middle income, and dots are low income countries. The internet usage includes both mobile and fixed sources.


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4.2.2.3 Mobile Access

While household access is simpler to measure, individual access figures incorporating the access of individual household members may be a more relevant developmental indicator. Many governments include mobile broadband penetration in assessments of whether universal service is available. Many individuals with mobile subscriptions may not have access to a household connection, yet still have access to broadband services. In many areas across all stages of development, mobile broadband subscriptions have overtaken fixed line ones. By the end of 2011, the United Nations estimated that 45 per cent of the world’s population was covered by a high-speed (3G) mobile broadband service.

Mobile technology can overcome major infrastructure barriers to internet access, and access devices are cheaper and more portable than computers. However, capacity, quality and data transfer rate can remain problematic. The expansion of mobile broadband subscriptions needs to be coupled with adequate investment in robust backbone networks, as well as a careful spectrum allocation plan. The broadband capabilities of mobile devices should also be examined. Some functions, like reading and constructing long documents, may be sufficiently necessary to achieving universal access goals to warrant computer broadband connection being included in a country’s definition of universal access.

4.2.2.4 Smartphone Adoption

Continued growth in smartphone adoption poses a challenge to extending universal broadband access and use as a number of previous studies have shown that an increase in the number of smartphones leads to a decrease in fixed telecommunications lines. The relatively recent advent of smartphones which utilise 3G broadband technology poses the question as to whether a similar substitutability of access methods will occur, leading to a decrease in fixed connections. Put another way, the question is will consumers choose to access broadband simply from 3G smartphones rather than from computer broadband connections? There is a paucity of hard evidence as to whether this is the case although some industry analysts have predicted that smartphones will come to be utilised in a complimentary way to computer-based broadband connections. Arguably there is still a need for fixed broadband that is not met by 3G broadband, particularly for increasingly popular content services and business functions which still remain challenging to access on smartphone technology. Fixed broadband connected to adequate backhaul networks is better able to cope with large volumes of data traffic which is a challenge for

mobile technology and fixed access is better able to service business clients with increasingly complex applications to run.

**Table 4.1: Fixed and mobile broadband subscriptions per capita by region**

<table>
<thead>
<tr>
<th>Country</th>
<th>Mobile broadband subscriptions per 100 inhabitants (2011)</th>
<th>Fixed-line broadband subscriptions per 100 inhabitants (2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>26.50</td>
<td>24.8</td>
</tr>
<tr>
<td>CIS</td>
<td>31.33</td>
<td>9.3</td>
</tr>
<tr>
<td>The Americas</td>
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<tr>
<td>Africa</td>
<td>3.26</td>
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</tr>
</tbody>
</table>

### 4.2.3 Communal and Institutional Access

Universal access to broadband does not require direct service to individual premises. In some national broadband strategies access in businesses, educational and government premises is prioritised. This may be due to prohibitively high costs of internet-enabled devices, paying subscription fees and financing last mile connections. In addition, while many national broadband schemes may be subsidised or supported by governments, ultimately the aim is to create systems that support themselves through charging for use. If individual subscribers are unable or unwilling to pay for broadband, institutional or community provision may be a more appropriate solution, at least in the interim while demand for individual fixed lines is being promoted.

Community centres and institutional access may also help to supplement mobile phone use of broadband services in situations where a larger computer is required. For example, basic searching and email may be carried out by mobile phone, whereas creating complicated documents requires a larger device such as a tablet, laptop or desktop.

#### 4.2.3.1 Community Access Centres

Community access centres allow individuals to access internet services either free of charge or at an appropriate rate. The size and frequency of these centres can be adjusted according to the requirements of individual communities. Computer education programs can be run from the same centres, teaching people to draw optimal benefit from their internet access and creating demand for broadband connections in homes. Demand can later be met by the expansion of national broadband networks to homes or through private financing of last mile connections from the access centre node.

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Box 4.6: CASE STUDY: Community Access Centres

In Malaysia, in addition to the national broadband rollout scheme, universal access has been brought to rural areas by creating 3100 ‘wireless villages’ and 796 ‘telecenters’. Wireless villages have at least three Wi-Fi spots in them to deliver data at 2 – 4 Mbps, and operate in conjunction with a system of distributing 1 million netbooks to poor students. Telecenters each contain 5 – 20 personal computers for community use. Similarly in India the Universal Service Obligation Fund provides kiosks connected to rural fixed line broadband exchanges. Kiosk workstations provide internet browsing and other broadband applications, such as video calling, access to online education and health services at subsidised rates. The benefit of this strategy is that any interested community member may become involved.

There are some difficulties associated with community access centres that need to be overcome. In South Africa theft of computer equipment has been a problem, while in the Dominican Republic the national telecommunications operator INDOTEL provided the technical infrastructure to run community access centres but did not remain involved to ensure that centres were well-managed. Measures should be taken to ensure that access centre assets are adequately protected and that centres are maintained. However, in theory the community access approach strikes an attractive balance between universal access and cost-reduction.

4.2.3.2 Institutional Access

Some countries prioritise access in educational and governmental institutions. Broadband services open access to a large network of sources of information, including multimedia sources and online tutorials. These are seen to smooth out inherent disadvantages of some learning environments by allowing learners access to the same resources and ‘teachers’ from anywhere with a broadband connection.\(^{35}\) Institutional access may also be material in increasing content available in certain languages, a factor which has been recognised as important to stimulating demand for broadband services.\(^{36}\)

Box 4.7: CASE STUDY: Institutional Access

Strategies prioritising institutional access vary. In the United States the National Broadband Plan provides anchor institutions, including schools, hospitals and government buildings at rates of at least 1 Gbps compared to 100 Mbps for home access. By contrast in Canada the only publically funded broadband network is the CANARIE network, which connects research, industry and educational bodies through long-haul fibre optic cables, with last mile connections provided by users. The network can operate at bit rates as high at 100 Gbps, allowing the transmission of large amounts of data with an ease and swiftness unavailable to virtually any other internet users. Both

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the United States and Canadian models operate to give superior service to certain institutions on the basis that other users will still have access to broadband services.

### 4.2.4 Universal Broadband Targets within the Broadband Strategy

National broadband strategies should aim to facilitate universal access and target areas in which additional support is required to achieve this. Certain groups may face further barriers to access that cannot be addressed through a singular national policy. Inherent inequalities in position may be reduced, among other things, by funding infrastructure in less-populated areas and providing computer equipment to certain groups. In addition, strategies to improve access affordability may be included in universal broadband targets.

#### 4.2.4.1 Regional Access

In regional areas some form of external involvement is frequently required to ensure that adequate service is provided. The high costs of establishing a network and small pool of potential subscribers make expansion into these regions an unattractive business prospect. However, once network infrastructure is established, service providers need only pay maintenance and operational costs. This substantially reduces the investment required from service providers to enter new markets.

In regional areas the costs associated with rolling out and maintaining a network will differ according to the technology used. Policymakers should consider factors like the expected life span of technology deployed and potential for that technology to be upgraded or progressively replaced as technology developments and demand for broadband increases. The relative location of broadband connections to access nodes and the major network backbone should play a pivotal role in the choice of telecommunications infrastructure deployed, as this will significantly affect the quality of broadband access.

**Box 4.8: CASE STUDY: Regional Access in Chile**

A government scheme was established to extend high-speed broadband access into some remote mountain regions of Chile. Public and private investments of nearly US$110 million funded a combination or fibre and wireless network to provide broadband access at data transfer rates and prices similar to those available in larger cities. The goal of this project was to remove the disadvantage of distance from economic centres and encourage competition and efficiency across Chile.

The benefitted localities were selected on the basis of their involvement with other national developmental goals, including agriculture and tourism. These selections reflect the Chilean Information Society Universal Access Policy, which seeks to enable rural communities with productive potential to participate more effectively in the economy. Although this particular project did not benefit all rural communities, its purpose was linked to the wider policy goal of ensuring increased broadband use contributed towards a more cohesive and efficient Chilean economy.
4.2.4.2 Broadband Pricing

Service availability is the primary concern for achieving universal broadband access, but cost is also relevant. Pricing may also impact the rate of household internet use, which is frequently prioritised below business and institutional access. Studies of dial-up users on lower incomes found that cost was a major factor influencing the decision not to switch to broadband and that increasing household income led to increased demand for broadband technologies. In developing countries, broadband access costs can account for 60 – 80 per cent of the total costs of owning a computer. By contrast, the United Nations estimates that entry-level broadband services in developing countries should cost less than five per cent of the average monthly income in order to be considered affordable and to drive uptake. There has been some progress towards meeting this target, as access prices have fallen in over 120 countries in 2008-2009 and policymakers in developing countries have signalled their intent to make affordable pricing a key policy issue in order to drive broadband uptake. Once universal service is established, it is more likely service provider competition and related pricing and service levels will gain prominence in access debates.

Box 4.9: CASE STUDY: Broadband pricing strategies

The Broadband Commission has suggested substituting a prepaid package system for a monthly quota system. This approach has been adopted by the Intel World Ahead Program. Inspired by the success of prepaid mobile telephones in developing countries, the Intel World Ahead Program provides PCs and prepaid data download packages at low rates. For example, in Vietnam Intel has partnered with the major telcos Viettel and VNPT to provide 700 MB of data prepaid for $2. This result has increased the percentage of citizens who can afford broadband access from 12 to 70 per cent.

In Brazil the approach has been to institute an affordable fixed line access cap of BRL$35 (around US$20) per month. It is hoped that this will enable fixed line service providers to compete with the popular 3G mobile services, which are comparatively slow and expensive. For a more

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extensive analysis, the broadband toolkit chapter on Brazil is available at:
http://broadbandtoolkit.org/Case/br

**Box 4.10: CASE STUDY: Broadband pricing in Kenya**

Retail broadband prices in Kenya initially dropped following an 80% reduction in wholesale pricing. For example, a monthly E1 link charge fell from US$ 7,5000 to US$ 1,290 in 2007 and retail prices followed suit, with Telekom Kenya’s 256Kbps DSL monthly service falling from KES 16,008 to KES 2,999 (US$ 182 to US$34). However, there has been a lack of further price reductions, with operators preferring instead to compete on broadband speeds and additional features.

Mobile internet services are popular in Kenya as operators have developed pre-paid data products which cater to the lower socio-economic end of the market. For example Safaricom offers as little as 5 MB a month for KES 5 (US$0.07) per day.

For a more extensive analysis, the ICT toolkit chapter on Kenya is available at:
http://broadbandtoolkit.org/Case/ke/

4.2.4.3 Device Distribution

Depending on levels of computer and internet penetration in a country, a computer-distribution program may either reduce disadvantages to certain groups where a large part of the population has access, or to provide an advantage to students where the general population does not have access. The ‘Home Access’ scheme, introduced in the United Kingdom in 2010, gave 270,000 low-income families a free computer and broadband access for one year.

**Box 4.11: CASE STUDY: One laptop per child in Rwanda**

As part of its objective to transform Rwanda into a knowledge-based society, the universal service fund which has been in operation since 2004 is being used to provide a One Laptop Per Child program in Rwanda’s primary schools coupled with internet access in educational institutions. As of 2012, the initiative has provided over 200,000 laptops for children currently in the educational system and also aims to provide training to teachers on how to prepare classes in digital format and troubleshoot software and hardware problems with the laptops. However, there are over 2.5 million children in the educational system and the program has only delivered 200,000 laptops in the 4 years it has been in existence and has to contend with an educational system where most of the schools are not linked up to the national electricity grid.43

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Box 4.12: CASE STUDY: Armenia’s Computer for All Program

Armenia’s attempt to boost digital literacy resulted in the Computer for All Program a public-private partnership with the Enterprise Incubator Foundation and Hewlett Packard, which aimed to ensure access to new computers and lap for all citizens via a reduced pricing model and financing and subsidisation schemes. The program objectives stipulate that 10,000 computers should be distributed each year utilising government lines of credit to end users. The project has a budget of US$3.5 million and also aims to provide technical support and broad training programs to the population on how to use computer systems.

For a more detailed analysis please see:
4.3 Mechanisms

4.3.1 Government Intervention

Governments have an important role to play in the development of broadband infrastructure, given the centrality of access to this technology to economic and social development. Not only do broadband networks make national economies more efficient, they can assist government agencies with the delivery of important services like healthcare and education. Governments are also aware of the risks of being left behind, with decisions about international business investment increasingly dependent on ready access to broadband networks. In this context, over the past decade governments have tended to re-engage in the development of telecommunications infrastructure, reversing the trend of diminishing government involvement in the sector following the trend to privatisation in the 1990s.44

The manner in which governments have engaged in the provision of broadband infrastructure has been diverse, reflecting the needs and limitations of different jurisdictions and markets. While each government is likely to tailor their intervention in the market to local conditions, there can be significant benefits to policymakers in studying the successes and failures of other government interventions.

Box 4.13: CASE STUDY: South African municipalities in race to provide free Wi-Fi

Municipal authorities in the South African cities of Cape Town, Tshwane and Stellenbosch have proceeded to roll out free Wi-Fi with a particular focus on low-income suburbs. Authorities in Tshwane have stated that increased opportunities to utilise broadband are seen as a priority tool to tackle systemic educational and employment problems. Free Wi-Fi is expected to be delivered by November 2013 in 5 locations across Tshwane including community centres, University grounds and the main city square in a bid to ensure internet access is available to as many residents as possible.45 Tshwane has a roadmap to deliver Wi-Fi in all schools and educational institutions by 2016.46

Stellenbosch’s CBD now has activated free Wi-Fi with the project moving into its second phase to extend the network coverage to the outer suburbs of the town. The free Wi-Fi does not support large downloads but otherwise allows for normal internet surfing and related activities. The

45 Duncan Alfreds, 24 Hour News, Tshwane to roll out free Wi-Fi, 15 August 2013. Available at: http://www.news24.com/Technology/News/Tshwane-to-roll-out-free-Wi-Fi-20130815
46 ITU, Internet for all: South Africa towns’ race for free public Wi-fi, 29 August 2013. Available at: http://www.itu.int/ITU-D/sis/newslog/2013/08/29/InternetForAllSouthAfricaTownsRaceForFreePublicWifi.aspx
initiative is seen as a vital tool in promoting entrepreneurship in the area as well as aiding in the alleviation of local unemployment.\textsuperscript{47}

Government intervention to improve broadband access can focus on reforms to regulation, market interventions or on the provision of infrastructure. Some governments may choose to intervene at each of these levels, while others may choose to narrow the focus of their intervention. The types of intervention that could be undertaken at each of these levels are set out in the table below.

\textit{Table 4.2: Options for Government Intervention}

<table>
<thead>
<tr>
<th>Level of intervention</th>
<th>Possible government interventions:</th>
<th>Anticipated effect of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory reforms</td>
<td>• governments may allowing for open access to broadband supporting infrastructure like pits and pipes, towers, points of interconnection, and international gateways; • governments could consider structural separation of telecommunications providers, between wholesale and retail arms; and/or • governments could implement fair and competitive spectrum sharing arrangements.</td>
<td>Improving the economic efficiency of broadband service delivery and increasing competition. Both of these will likely lead to lower consumer prices for services and higher user take-up.</td>
</tr>
<tr>
<td>Market intervention</td>
<td>• governments may intervene to stimulate demand in an emerging broadband market by loaning or subsidising computer hardware purchase by individuals or businesses.</td>
<td>Stimulating demand will make private sector investments in the broadband market more attractive and therefore more likely to be delivered.</td>
</tr>
<tr>
<td>Infrastructure provision</td>
<td>• governments may choose to build broadband infrastructure itself; • governments may choose to offer incentives to the private sector to build broadband infrastructure in certain areas; and/or • governments may require the private sector to roll out broadband coverage in certain areas as a licence condition, or other similar requirement.</td>
<td>Government intervention will mean that broadband infrastructure is built in places where the market would not build it otherwise.</td>
</tr>
<tr>
<td>Facilitation of public/private</td>
<td>• governments can contribute part of the initial investment in an infrastructure project; and</td>
<td>Infrastructure will be deployed in areas which would not otherwise</td>
</tr>
</tbody>
</table>

\textsuperscript{47} Ralph Muller, ‘Free Wi-Fi for Stellenbosch, My Broadband, 21 February 2012. Available at: \url{http://mybroadband.co.za/news/broadband/43829-free-wi-fi-for-stellenbosch.html}
### Level of intervention

<table>
<thead>
<tr>
<th>Possible government interventions:</th>
<th>Anticipated effect of intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Government can offer other incentives or favourable operating conditions to private entities.</td>
<td>receive it due to perceived unprofitability but at lower cost to government and lower risk to private entities than would otherwise be the case.</td>
</tr>
</tbody>
</table>

In developing broadband policy plans, policymakers may consider the approaches outlined above. Some policy interventions may prove more successful in one environment or another, giving policymakers the flexibility to shift resources to the interventions that are proving successful.

**Box 4.14: CASE STUDY: New Zealand’s multipronged approach to broadband rollout**

New Zealand has adopted an integrated approach to broadband infrastructure construction and operation. On the supply side, the government-owned Crown Fibre Holdings is contracting directly with four companies that will build and operate the broadband network. This is supplemented by grant programs like the Rural Broadband Initiative that specifically support broadband rollout in rural areas. The New Zealand Government is also involved in demand-side initiatives that support network expansion by stimulating use and application of the network service. Examples of these demand-side programs include subsidising computer hardware, broadband access and the provision of digital literacy programs.

### 4.3.2 Improving the Legal, Regulatory and Business Environments

Universal access can be driven by a combination of demand stimulation and various policy and legislative mechanisms to attract investment in and uptake of such services. Efforts to improve the legal, regulatory and business environments can provide a cost-minimising approach to extending service, by encouraging private sector expansion where market forces have not achieved this naturally. In particular, rolling out broadband services in remote regions can be incentivised through improved tax statuses and eased license conditions.

#### 4.3.2.1 Address Universal Access and Service Challenges through Policy and Regulatory Solutions

Governments can strategically adopt policies and take regulatory actions to encourage private service providers to increase the broadband coverage they offer. This approach entails mutual benefits for governments and service providers. Private providers are encouraged to invest in increasing their coverage as factors impeding their progress are identified and addressed. In turn, governments incur minimum cost as they are able to target their financial input specifically at
those areas which do not attract private providers in the first place. Potential solutions include sponsoring programs to increase demand for broadband services, financing network infrastructure and removing barriers restricting competition within the marketplace. Where a traditional framework would impose positive universal service obligations upon designated operators, this approach is less direct and encourages private initiatives.

Rural areas are a common example of unserved or underserved regions, as the costs of constructing the requisite infrastructure are high and the potential customer base is low. However, an entirely government-funded broadband infrastructure rollout may be prohibitively expensive and not necessary to persuade providers to increase their coverage. Where viable, one of the advantages of a national broadband solution over targeted regional projects is that high costs of rural rollout may cross-subsidised by savings made on lower cost urban rollout. This strategy, adopted by the Australian National Broadband Network, allows wholesale broadband access to be provided at the same price, regardless of the area served. This further reduces disincentives to rural providers, and promotes equality amongst access seekers.

**Box 4.15: CASE STUDY: Brazil’s policy and regulatory solutions to achieve broadband development**

Broadband access rates are directly linked with population density and wealth. In Brazil, high levels of wealth disparity and a vast populated land area have meant that broadband penetration is lower than in other countries of equivalent income and development levels. There is limited fixed national telecommunications infrastructure for long haul data transmission and a lack of middle mile infrastructure to connect all municipalities to national backbones. Competition in the fixed line sector is low, although there is more competition between 3G mobile networks. In addition, where service coverage is available the costs of access equipment are high due to import duties, and many of the poor depend on cybercafés and mobile 3G connections.

Universal service goals incorporated in telecommunications licensing schemes in Brazil currently do not include broadband services. However, revenues are collected from public telecommunication providers and deposited in a Universal Service Fund which creates infrastructure which can be used to support broadband services. In order to address the issues impeding access, governments at a national, regional, state and municipal level have implemented a range of strategies designed to promote network expansion and improve affordability. Examples include:

- a National Broadband Plan (PNBL) with a budget of R$1 billion (US$437 million) per year was implemented in 2010 with the aim of tripling uptake by 2014. This will bring access to at least 40 million homes (serving 68 per cent of the population) at a bit rate of at least 1 Mbps;

- the dormant former state-owned monopoly operator Telecomunicacoes Brasileiras (Telebras) has been tasked with implementing the required network expansion under the PNBL. Deficiencies in existing backbones will be addressed by bringing oil and electricity operators’ fibre networks on board to fill gaps;
the PNBL has established a monthly pricing target of R$35 (US$15) based on research that 70 per cent of Brazilians who are still offline would be willing to pay this amount for a connection;

the national telecommunications regulator, Anatel, has proposed that service providers with more than 50,000 connections be required to guarantee delivery of connections at least at 60 per cent of the headline rate, raising this to 70 then 80 per cent over the two subsequent years. Currently, operators on the Telebras network are only required to provide a minimum of 20 per cent of customers access at the target bit rate, meaning that many connections operate at significantly less than the stated rate;

in 2011 Anatel also implemented a General Plan for Competition (PGMC) which will compel large telecommunications providers to share network infrastructure with smaller players, who must be offered wholesale pricing lower than retail service pricing;

radio spectrum has been freed up to allow mobile 3G and fixed wireless services to be expanded. These solutions are particularly well-suited to meet the requirements of isolated areas where cable connections to individual premises and users may be expensive;

licence fees have been reduced and duplications across overlapping government areas simplified to encourage market entry;

public access facilities are being expanded under the national government’s digital inclusion strategy. The Serpro program, for instance, has rolled out over 8000 telecenters since 2003 and provides free broadband access across 98 per cent of municipalities. In addition, the Brazil Digital Network Database is being created to integrate telecenter management and form a database of digital inclusion initiatives in order to help shape government policies; and

a Broadband in Schools and a One Laptop Per Student program also work to facilitate access linked with education.

For a more extensive analysis, the broadband toolkit chapter on Brazil is available at: http://broadbandtoolkit.org/Case/br

A balance of incentives and regulatory requirements may be sufficient to persuade private sector investment. This attitude of quid pro quo is also demonstrated in Sweden, where government policies require recipients of public funds to operate open-access networks in a non-discriminatory manner. Similarly, in the Czech Republic, legislation has been implemented to enable the government to set aside 1 per cent of the proceeds of the privatisation of Český Telecom to co-finance infrastructure projects. Those receiving funds will be required to operate open-access networks.
4.3.2.2 Revise the Scope of Universal Access and Service to Include Broadband

Most global telecommunications laws provide for universal service obligations to be imposed on a telecommunications provider to ensure citizens’ access to services. These initially focused upon basic telephony services, but have recently been expanded to include broadband services. The United Nations aims to ensure that all countries at least include broadband access in their national service definitions by 2015.\textsuperscript{48}

Unlike a national broadband plan, a universal service definition will generally establish technology-neutral aspirational service levels, costs and coverage. This allows those called upon to provide universal service to adjust their delivery strategies in a manner appropriate to their business. Universal access and service does not necessarily demand connections to individual premises, but instead may encompass institutional or communal access, where appropriate.

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|c|}
\hline
Region & Total countries included surveyed & National policy to promote broadband in place & No national policy, but plans to adopt one & No national policy, no plans to adopt one \\
\hline
Africa & 33 & 23 & 6 & 4 \\
\hline
Arab States & 13 & 5 & 7 & 1 \\
\hline
Asia and Pacific & 30 & 24 & 2 & 4 \\
\hline
CIS & 7 & 3 & 2 & 2 \\
\hline
Europe & 39 & 37 & 0 & 2 \\
\hline
The Americas & 30 & 20 & 4 & 6 \\
\hline
Other & 1 (Hong Kong) & 1 & 0 & 0 \\
\hline
\end{tabular}
\caption{Number of economies with plans to adopt a national policy to promote broadband, 2011\textsuperscript{49}}
\end{table}

The following are examples of countries that have revised the scope of their universal service and access policies and universal service funds to include broadband services:

- as set out in Part 4.1.2, in Finland access to broadband is a legal right. Since July 2010, every person in Finland has a guaranteed right to a one Mbps broadband connection;\textsuperscript{50}

\textsuperscript{48} Target 1, Broadband Commission for Digital Development, \textit{Broadband Targets for 2015}. Available at: \url{http://www.broadbandcommission.org/Documents/Broadband_Targets.pdf}


\textsuperscript{50}
India was one of the first countries to include broadband in the Universal Service Access Fund (UASF) in 2006. The UASF allows for the support of broadband connectivity and mobile services in rural and remote areas of the country;

in Morocco, the priorities of the Universal Service Fund (USF) were expanded through a revision of the law in 2004 to include rural public telephony, installation of community internet centres, and an increase in broadband capacity through various programs;\(^{51}\)

in Switzerland, the government decided that, beginning in January 1, 2008, universal service providers must provide a broadband connection to the whole population, via digital subscriber line (DSL), satellite, or other technologies. Connections must offer bit rates of at least 600 kbps downstream and 100 kbps upstream, and the monthly subscription cannot be more than SWF69 (US$85); and

the United States aims, as part of the universal service objective, to provide access to broadband services to all people at an initial rate of 4 Mbps downstream and 1 Mbps upstream by 2020.\(^{52}\)

A number of countries, including Korea, Japan, the United Kingdom and Australia, have chosen to develop plans or strategies to ensure that broadband is available to all through other universal service policies. Since 2009, Australia has been committed to the roll out of the National Broadband Network (NBN), a wholesale-only, open access network delivering broadband to all Australian premises. Some countries have also opted to not support broadband through inclusion in universal service obligations or other commitments to provide broadband for all. Countries in this group include Denmark, Norway, Germany, the Netherlands and Ireland.\(^{53}\)

**Box 4.16: CASE STUDY: Universal Service Obligations and National Broadband Network in Australia**

The Telecommunications (Consumer Protection and Service Standards) Act 1999 creates a Universal Service Obligation (USO) in Australia. The USO obliges certain Universal Service Providers (USPs) to ensure that all people in Australia have reasonable access on an equitable basis to standard telephone services, payphones and prescribed carriage services.

In 2011 the Australian Government reached an agreement with the incumbent telecommunications provider, Telstra, for the ongoing delivery of voice and payphone services

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51 Law no. 55-01, adopted in November 2004, made important modifications in the setup of universal service in Morocco. The universal service definition was extended to include the supply of value added services, including internet. A new approach relating to the operator’s contribution to the mission of universal service was also introduced, including regional development obligations and the introduction of the “pay or play” mechanism.
53 Angela Calvo, ‘Universal Service Policies in the Context of National Broadband Plans’ (OECD Digital Economy Papers, No. 203) (2012). Available at: [http://dx.doi.org/10.1787/5k94gz19flq4-en](http://dx.doi.org/10.1787/5k94gz19flq4-en)
under the USO while the telecommunications industry transitions to the National Broadband Network. In March 2012 universal service reform legislation was passed to establish the Telecommunications Universal Service Management Agency (TUSMA). TUSMA manages the agreement with Telstra and grants to ensure that universal service obligations are met. TUSMA’s current grants include:

- the agreement with Telstra to deliver the Universal Service Obligation (value: approximately A$230 million (US$213 million));
- the agreement with Telstra to provide public payphones which are reasonably accessible to all Australians (contract value up to A$40 million per year);
- the agreement with Telstra to provide emergency call services (contract value up to A$20 million per year);
- the agreement with the Australian Communication Exchange to deliver a National Relay Service; and
- the agreement with Telstra to extend the zones where local calls are untimed to cover larger rural and regional areas.

Currently, the government business enterprise NBN Co is in the process of rolling out a new national broadband network. The NBN is a wholesale-only, open access network delivering high quality broadband to all Australian premises. The network will connect 93 per cent of Australian premises with fibre cables, while the remaining 7 per cent will receive broadband by fixed wireless or satellite service, and be completed by 2020.

As the network rollout progresses, voice customer contracts within the fibre footprint will be migrated from the existing copper and HFC networks to the NBN fibre networks. The Telstra Structural Separation Undertaking (SSU) and Migration Plan require Telstra to progressively disconnect its copper and hybrid-fibre coaxial (HFC) networks as the NBN fibre network is rolled out. Similarly, the Definitive Agreements between Telstra and NBN Co require Telstra to progressively disconnect its copper and HFC networks when they fall within the fibre footprint. As a result, in order to meet its USO and other obligations Telstra must provide customers with voice services over the fibre network, where it is present, or otherwise maintain its existing network services.

Although plans to provide universal broadband access are not included in the USO, the national broadband network will connect all homes and businesses. While the National Broadband Network is being rolled out, NBN Co must provide interim satellite service to eligible users in rural and remote areas who will be served by the NBN Co fixed wireless and satellite services, when they are completed. When the NBN is completed, it will be the responsibility of TUSMA to distribute universal service funds to ensure that both voice and broadband services are provided on a retail basis as NBN Co’s network is only supplied on a wholesale basis.
**Box 4.17: CASE STUDY: Malaysian High Speed Broadband Network**

In September 2008, the Malaysian government announced an agreement with the incumbent fixed-line operator, Telekom Malaysia for a high-speed broadband network.

Under the terms of the agreement, Telekom Malaysia is required to roll out an access network to provide a High Speed Broadband (HSBB) service to households and businesses in certain high economic impact areas. The access network uses three technologies: Fibre-to-the-home (FTTH), Ethernet-to-the-home and Very High Speed Digital Subscriber Line (VDSL2). The Public Private Partnership (PPP) is phased over ten years, with phase 1 (providing HSBB access to over 1.3 million premises) ending in 2012.

The residential HSBB service will have a minimum speed of 10 Mbps, with options available up to 100 Mbps. Services to business customers are up to 1 Gbps. The expected investment costs were split between the government and Telekom Malaysia in a PPP. The government and Telekom Malaysia committed to investing RM2.4 billion (US$780 million) and RM8.9 billion (US$2.9 billion) respectively.

Certain services provided over the HSBB network are subject to access regulation through the Access List under the Communications and Multimedia Act 1998. Specifically, the Malaysian Communications and Multimedia Commission has defined two layer 2 access services (one with quality of service selected by the access seeker, the other provided on a best efforts basis) specific to the HSBB, which Telekom Malaysia must supply to access seekers on reasonable terms and conditions. The Access List also contains backhaul transmission services.

### 4.3.3 Support Private Sector Network Build-Out: Supply

Governments may adopt a range of instruments to accelerate the supply of broadband ahead of or beyond the market. These can include subsidies for investment, equity in PPPs, facilitated access to rights-of-way, preferential tax treatment, long-term loans for investment in local currency, on-lending loans, credits or grants from international development organizations, and guarantees to offset regulatory or political risk. Implementation of such policies can encourage operators to focus on deploying networks and services in unserved areas since they will be able to earn a higher rate of return on their investments over the long-term.

The most common practice is for the government to contribute money when needed to ensure that important investments in rural development are commercially viable. Governments provide one-off subsidies for investment and start-up, focusing on unserved and underserved areas. The New Zealand government, for example, will provide approximately NZ$300 million (US$245 million) towards the cost of the Rural Broadband Initiative, which aims to deliver faster broadband to rural households and schools: 97 per cent of rural households and enterprises
receiving at least 5 Mbps, with the remainder receiving at least 1 Mbps, and 97 per cent of rural schools receiving at least 100 Mbps (fibre), with the remainder receiving at least 10 Mbps.\(^{54}\)

Alternatively, governments can contribute equity to PPPs with similar objectives. For example, the government can help to build broadband backbone networks that are then made accessible in equal terms to all interested downstream providers. When well designed, these practices can mobilize substantial private sector investment, enable large projects that otherwise would not materialize, contain the cost and risk borne by the government, and jump-start sustainable markets from which the government can exit quickly. PPPs used in broadband projects include the following examples:

- **in Ireland**, the government has funded the development of publicly owned, privately operated Metropolitan Area Networks (MANs). The MANs provide wholesale access to networks of ducting, subducting and high capacity fibre optic cable in urban areas. The MANs operate on an open-access basis;

- **in the Netherlands**, Amsterdam’s open-access, wholesale FTTH network was developed as a PPP between the local municipality, housing corporations and private sector investors. Each group invested €6 million for a one-third stake in GlasvezelNet Amsterdam (GNA), the company delivering the project;

- **New Zealand** features a PPP agreement between CFH and Chorus, the structurally-separated network business which emerged from the voluntary demerger of Telecom New Zealand. The agreement provides for a 50/50 debt-equity instrument (with an investment by CFH of up to NZ$929 million) as the mechanism for Crown funding of Chorus’ fibre network rollout;

- **Qatar’s National Broadband Network (QNBN)** is a government-funded project that aims to accelerate the deployment of a FTTH network nationally. QNBN provides equal, non-discriminatory access to the FTTH network, enabling any operator to use the infrastructure to deliver services. QNBN is also part of a number of initiatives introduced to stimulate the take-up of FTTH services, notably Qatar National Vision 2030 and Qatar ICT Strategy 2025;\(^{55}\) and

- **Saudi Arabia’s Universal Service Project** provides grants for operators to provide voice and broadband access to unserved and underserved locations using wireless technology, as part of the universal access/universal service policy established in 2006.\(^{56}\)

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\(^{55}\) Qatar National Broadband Network, ‘Delivering on the vision’ September 2012. Available at: [http://qnbn.qa/qnbn_article/delivering-on-the-vision/](http://qnbn.qa/qnbn_article/delivering-on-the-vision/)

\(^{56}\) Saudi Arabia’s Communication and Information Technology Commission, Press Release: Universal Service Fund Provides Services to 482 Towns and Villages in its Pilot Project, March 2012. Available at: [http://www.citc.gov.sa/English/MediaCenter/PressReleases/Pages/PR_PRE_064.aspx](http://www.citc.gov.sa/English/MediaCenter/PressReleases/Pages/PR_PRE_064.aspx)
It may be possible to reduce the cost of broadband development by giving investors access to rights-of-way along railways or roads, on rooftops, and on other public property. Absent alternative uses for these rights-of-way, their opportunity cost to the public is negligible, and if they are made equally available to all interested parties, their use will not distort competition. Therefore, granting rights-of-way may help to reduce the total investment cost of broadband development.

One of the most significant obstacles in rolling out new communications infrastructure can be the myriad of consents and approvals that an operator needs to obtain from central and local government. In some countries such as India, government is facilitating and fast-tracking these consents and approvals to speed up the deployment of broadband networks.

**Box 4.18: CASE STUDY: Right of way permissions in India**

In India, obtaining right of way (RoW) permission is regarded as a major hurdle in rolling out new telecommunications infrastructure. Service providers have noted that local authorities take a long time to grant permission. Permission requirements also give rise to additional cost as service providers must pay for the cost to local government and/or agencies granting a RoW permission. This is recognised in the 2012 National Telecom Policy, which notes the need to review and simplify policies for RoW processes to facilitate smooth coordination between service providers and the relevant government agency.57

Granting exceptional tax treatment is another tool policymakers may be able to use. Good tax practice in general suggests that a particular economic activity should not be singled out for tax conditions that do not apply to all like activities throughout the economy. This means that taxes or duties that apply only to broadband should be phased out and, conversely, that exemptions from generally applicable obligations should be avoided. The Hungarian government, for example, took efforts to institute tax incentives to further the build-out of broadband. Specifically, Hungary’s government grants a tax reduction of 50 per cent on profits as a way to support the construction of broadband infrastructure. The concessions are available only to telecommunications companies if their expected profits exceed Ft50 million (US$250,000) and if they have invested at least Ft100 million (US$500,000). The tax allowance cannot be applied to Internet Service Providers (ISPs) if the infrastructure is built in areas where internet service is already provided or where the investment does not contribute to the growth of infrastructure.

Malaysia is another example of a government using fiscal measures to encourage private investment in broadband. The Malaysian government has introduced tax allowances on ‘last mile’ broadband equipment, which includes giving ‘last mile’ network facilities providers an investment allowance on capital expenditure spent on broadband. In addition to tax allowances, import duty and sales tax exemptions are available on broadband equipment and consumer access devices.58

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Investment in new open and competitive networks, including broadband networks, can also be supported by the actions of national and local authorities in lowering costs. The European Commission’s 2009 Guidelines on the Application of State Aid Rules (the 2009 Guidelines), for example, lay down the conditions for public financial support on nonmarket terms for broadband deployment in commercially unattractive or unviable areas.

The main objective of the 2009 Guidelines is to assist the actions of national and local authorities. The 2009 Guidelines are presented as part of the broadband package, together with the two other broadband commitments made by the Commission in the Digital Agenda for fast and ultra-fast internet:

- the Next-Generation Access (NGA) Recommendation to provide regulatory guidance to national regulators; and
- the Radio Spectrum Policy Program to improve the coordination and management of spectrum and facilitate, among other things, the growth of wireless broadband.

In the 2009 Guidelines, the European Commission recognises that broadband networks tend to cover only part of the population since they are generally more profitable to roll out where potential demand is higher and concentrated (that is, in densely populated areas) rather than in areas with less population, specifically because of the high fixed costs of investment and high unit costs. The European Commission distinguishes acceptability of state intervention among:

- areas where no broadband infrastructure exists or is unlikely to be developed in the near term. Here, support is considered to likely promote territorial, social and economic cohesion, and address market failures (so-called white areas);
- areas where market failure or a lack of cohesion may exist despite the existence of a network operator, thus requiring a more detailed analysis and careful compatibility assessment prior to allowing state intervention; and
- so-called black zones, which are defined as a given geographic zone where at least two broadband network providers are present and broadband services are provided under competitive conditions (facilities-based competition). In these black zones, the commission does not consider that there is a market failure, so there is little scope for state intervention. In the absence of a clearly demonstrated market failure, state funding for the rollout of an additional broadband infrastructure is not available.
4.4 Instruments of Fiscal Support for Universal Broadband Access

Subsidies are a common form of direct government intervention in telecommunications markets. Subsidies are likely to exist whenever the final price paid for a good or service is less than the cost of providing that good or service. Companies may, for a time, cross-subsidize one set of customers with the profits from another – however the more common form of subsidy involved a direct government contribution making up the difference between the cost of private provision of a service, and the price consumers pay for it.

This section considers how subsidies can be used to improve broadband access. In particular, it focuses on the considerations policymakers should give to subsidy design to ensure that subsidies are spent appropriately.

4.4.1 Subsidies as an instrument of Fiscal Support

Policymakers should approach subsidies with a degree of caution. The literature of economic literature has, for some time, warned of the dangers of direct government intervention in markets and the distortions such interventions can cause. Further, the fiscal pressure imposed by subsidies is not likely to be counterbalanced by the benefits they deliver, particularly in the short-term. In addition to this, most countries have bilateral and multilateral obligations to other nations that often involve commitments that limit or exclude the provision of government subsidies to national industries or discrimination in the provision of such subsidies. Policymakers should examine each of these factors before considering whether subsidies could, or should, form part of broadband infrastructure policies and plans.

Having considered these factors, policymakers may consider the use of subsidies as a tool of policy, particularly in already highly regulated industries like the supply of telecommunications, water or electrical services. In certain circumstances subsidies may prove effective in mitigating or removing the effects of market failures in these sectors.

Subsidies are a medium-intervention strategy. Although subsidies require investment of fewer resources than direct infrastructure construction or ownership by government, subsidies represent a significant commitment to market involvement. If implemented prudently, subsidies help to deliver services to groups who would otherwise miss out in an efficient manner. However,


without adequate levels of transparency, probity and fairness subsidy programs may present significant economic and political risks.\(^{61}\)

Subsidies can be financed directly from domestic government budgets or from international development assistance. They can also be a policy mechanism used by UASFs to distribute funds collected from a universal serve obligation or a levy.

### 4.4.1.1 The rationale for subsidies

The economic rationale for subsidies is demonstrated at the economy-wide level. Subsidies cover the difference between the costs of providing a service and the revenues that are then recovered from selling that service. Without a subsidy, investments in broadband infrastructure in certain areas would not return economic profit to firms, so those investments are unlikely to be made. The rationale for government providing a subsidy to make particular investments worthwhile for private businesses is that the overall benefit of increased broadband coverage is both socially and economically beneficial.

The economic impact of government investment in broadband infrastructure, through mechanisms like the provision of subsidies, can provide both immediate and long-term positive economic effects. Recent econometric analysis measured growth in 120 countries between 1980 and 2006. This analysis demonstrated that for every 10 per cent increase in penetration of broadband services across an economy the economy grew by 1.3 per cent, on average.\(^{62}\)

A particular benefit to subsidies is the fact that they provide a leveraged benefit. In providing a subsidy that covers the difference between a marginal project and a commercially profitable one, governments can induce significant commercial investment for a fraction of the cost of that investment. Rather than having to pay for the whole cost of the infrastructure, as the government would do if they built it themselves, a subsidy can deliver the benefit of the infrastructure provision for a fraction of its cost.

Broadband investments delivered through subsidies are more likely to be fiscally sound than other policy alternatives, as the market-led nature of the investments is likely to deliver greater value for money than other approaches.\(^{63}\) Private sector firms are likely to have advantages like skilled staff, a deep understanding of technological options and the ‘reach-back’ into the corporate knowledge of international parent companies that should contribute to the efficiency and effectiveness of market-led programs.


\(^{63}\) Christine Zhen-Wei Qiang, ‘Broadband infrastructure investment in stimulus packages: relevance for developing countries’ (2010) 12(2) Info, pages 41-56.
Box 4.19: CASE STUDY: Japan - ICT Grant and Collaboration with Local Governments

1. ICT Grant

Japan’s New IT Reform Strategy (IT Strategic Headquarters, 2006) and Digital Divide Elimination Strategy [MIC, 2008] both set FY2010 (March 2011) as the national target for eliminating all of its Broadband Zero Areas. A Broadband Zero Area is a region where broadband service is not available, even to households in the region that wish to subscribe. Eliminating all Broadband Zero Areas means making broadband service available to every household nationwide.

While Japan was working to meet its goal by the end of FY 2010, MIC prepared several kinds of promotion schemes, targeting both local government and telecommunications operators, in order to support broadband deployment. Promotion schemes included grants, interest aid, debt guarantees, and tax breaks.

Figure 4.3. Promotion Schemes for Nationwide Broadband Deployment (1)

<table>
<thead>
<tr>
<th>Promotion Schemes for Nationwide Broadband Deployment (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measures for Telecommunications Operators</td>
</tr>
<tr>
<td><strong>Interest Aid</strong></td>
</tr>
<tr>
<td>National Institute of Information and Communications Technology (NICT) will grant a subsidy of interest aid with a maximum interest of 2% for a loan made by a telecommunications operator from a fund for building broadband facilities, including optical fiber and DSL, in order to provide telecommunications service.</td>
</tr>
<tr>
<td><strong>Debt Guarantee</strong></td>
</tr>
<tr>
<td>NICT will guarantee 80% of a loan made by a private telecommunications operator from a fund for building broadband facilities, such as optical fiber and DSL, for providing telecommunications service.</td>
</tr>
<tr>
<td><strong>Tax Breaks</strong></td>
</tr>
<tr>
<td>1. Accelerated Tax Depreciation (National Tax) Accelerated tax depreciation is allowed for telecommunications operators building broadband facilities, such as optical fiber and DSL, in order to provide telecommunications service.</td>
</tr>
<tr>
<td>2. Reduction of Tax Bases for Fixed Asset Taxes (Local Tax) Partial reduction of the tax base for fixed asset taxes is allowed for telecommunications operators building broadband facilities, such as optical fiber and DSL, in order to provide telecommunications service.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measures for Local Governments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grants/Subsidies</strong></td>
</tr>
<tr>
<td>1. Local Information and Communications Infrastructure Development Grants (ICT Grant) Grants equivalent to one third of total project cost will be provided to local governments that will build broadband facilities to address the digital divide.</td>
</tr>
<tr>
<td>2. Local Intranet Infrastructure Facility Development Promotion Grants Grants equivalent to one third of total project cost will be provided to local governments that will build broadband or ultra-high-speed local public networks connecting public facilities such as schools, libraries, and municipal offices.</td>
</tr>
</tbody>
</table>

Local Government Financial Measures

1. Local Governments are allowed to use the Special Local Allocation Tax and to issue local government bonds, such as Depopulated Area Development Bonds, for a variety of their policy needs, and they may utilize these schemes for building broadband facilities, including optical fiber and DSL.

One such promotional scheme was the ICT Grant, a grant available to local governments for building broadband facilities to address the digital divide. Under the ICT Grant, a local government submitted its proposal to MIC and if approved, MIC paid one third of the total broadband facility installation cost. In many cases, targeted areas were also depopulated. Thus the ICT Grant could be combined with a Depopulated Area Development Bond, a local government bond providing even further reimbursement. If this bond was available, a local government would be responsible for only 20% of the total cost.
Once these broadband facilities were built, the local governments often formed long-term contracts (Indefeasible Right of User: IRU) with telecommunications operators, under which the local government let telecommunications operator use the facilities in exchange for providing broadband service to the community. In this situation, the operators did not have to pay broadband facility installation costs.

The ICT grant was technology neutral. It was up to local governments to decide which broadband type to choose based on their needs.
The ICT grant was also telecommunications operator neutral. In many cases, local governments made contract with telecommunications operators through open bidding.

The ICT Grant played a key role in ensuring that Japan reached its goal of eliminating all Broadband Zero Areas by the end of FY 2010. As of March 2009, it was estimated that about 640,000 households did not have access to broadband. This is about 1% of households in Japan. At the time of the FY2009 Supplementary Budget, MIC contacted all local governments that still had Broadband Zero Areas within their territories. About 340 proposals were submitted by the local governments, and MIC approved all them all in the early fall of 2009. The total project cost was about JPY 230 billion and about 340,000 households were expected to gain access to broadband. As for the approximately 300,000 households remaining, many of them were expected to gain access to broadband due to telecommunications operators’ service area expansion. For those areas where local governments did not submit a proposal and that still remained uncovered (about 10,000 households), they were to be provided service by satellite broadband.
2. Collaboration with Local Governments

While Japan was working on accomplishing its national target to make broadband available each household nationwide by the end of FY 2010 (March 2011), the Japanese Ministry of Internal Affairs and Communications (MIC) encouraged local governments to actively participate in this initiative.

In Japan there are 47 prefectures and about 1,800 municipalities, and as of March 2009 about 640,000 households were living in Broadband Zero Areas (areas where broadband service is not available).

There were several reasons for these Broadband Zero Areas. For example, about 60% of Japan’s land areas is mountainous, and there exist hundreds of inhabited islands. Also, Japan is facing an aging and shrinking population problem, which is especially manifest in rural areas. Small rural villages are on the fringe of extinction due to aging and the migration of the younger generations to urban areas. Because of these factors, there exist certain areas where telecommunications operators cannot make a profit and thus do not provide broadband services. Since Broadband Zero Areas create a potential digital divide, it was necessary for the national government together with local governments to work towards eliminating them.

Here are two examples how the central Japanese government worked with local governments:

(a) 11 Local Broadband Promotion Committees
MIC has 11 Branch Offices nationwide. Each branch office organized a Broadband Deployment Committee to discuss how to best deploy broadband. Each Committee was comprised of MIC’s Local Branch Office, local governments (prefectures and municipalities), and telecommunications operators.

Based on their input, MIC regularly updated the Prefecture Broadband Availability Maps. These maps illustrated what kind of broadband service was available. (Note: the map shown below is an early example).

*Figure 4.7. Broadband Availability Map*

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**Broadband Availability Map**

In order to illustrate Broadband availability, *Broadband Availability Map* is prepared by MIC based on the inputs from 11 Local Broadband Promotion Committees, each of which is comprised of MIC’s Local Branch Office, Prefectures, Local Govt., and Telecom Operators.

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**(b) Prefecture Roadmap for Broadband Nationwide Development**

In 2007 the Association for Promotion of Public Local Information and Communication (APPLIC) formed the Broadband Nationwide Deployment Promotion Working Group in order to reach the national target. Members included scholars, prefectural representatives, telecommunications operators, and manufactures. MIC participated in this initiative as an observer. The WG held meetings regularly to share best practices and discuss common problems. Also, based on the input from all 47 prefectures, the WG every year updated Prefecture Roadmap for Broadband Nationwide Deployment, which illustrated each prefecture’s plan to eliminate Broadband Zero Areas.
4.4.1.2 Good subsidy practice

A World Bank research working paper published in 2004 set out three elements of good subsidy practice,\(^6\) when a subsidy is being used to deliver infrastructure to rural communities:

- service providers invest their own resources to set up facilities and provide services, at their own risk;
- government provides subsidies to help service providers meet start-up costs, assist customers connect to services, and cover customer’s costs like installation and connection charges or the cost of in-premises equipment; and
- customers pay for the service, at least at the level required to cover network maintenance and operating costs. Customers are also required to pay at least a part of the cost of the connection of the network to their premises, to confirm their demand for the service. Subsidies should ideally be limited to only the small amounts of the service which are necessary with the customer paying for the rest of their consumption.

The rationale behind these principles is that subsidies should be directed at providing access to services, with as minimal impact on market processes as possible. Subsidies can be helpful in encouraging the building of infrastructure and the connection of customers to it.

4.4.1.3 Competition for subsidies

Another crucial element of good subsidies practice is competitive selection processes. When determining which private sector enterprises government will partner with in the subsidised provision of broadband infrastructure, policymakers should consider the tangible benefits provided for by competition:

- competitive subsidy provision is likely to deliver significant savings to governments, as it ensures that the enterprises with the best business models, technological solutions and market acumen are selected to receive the subsidies;
- regular competitive processes are likely to reduce the risk of corruption or waste in government subsidy programs; and
- the level of the subsidy is determined by the market, rather than by policymakers.

A least-cost subsidy auction is a proven mechanism for introducing competition into the provision of subsidies. This approach has been used successfully by governments in their partnerships with the private sector that have delivered a range of services, particularly telecommunications, to areas beyond the current reach of the market. A least-cost subsidy auction is likely to involve the following stages:

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government outlines the scope of the program and its objectives: service levels, population coverage, geographic reach and the maximum level of subsidy on offer;

government communicates these goals to industry through a Request for Proposals process. Key terms of the subsidy offer are also likely to be communicated at this stage, including the length of the program and any special requirements government may have;

private firms prepare bids in response to the request. If firms have specific questions about the project objectives and auction process government answers them, but information is shared between all potential tendering parties – through mechanisms such as a project extranet;

private firms are free to develop their own business strategies, technological solutions and pricing structures. They communicate these plans to Government through responses to the Request of Proposals;

proposals are analysed in a fair and transparent manner. Government selects the proposal that delivers the best value for money;

government enters into an agreement with the successful private sector firm and pays subsidies in full or in instalments, linked to milestone performance;

service providers own all facilities and carry legal and financial risks associated with the delivery of the service; and

government monitors project progress and performance – tracking the effectiveness of subsidies to feed back into later subsidy design processes.\textsuperscript{65}

\textbf{Box 4.20: CASE STUDY: The Mobility Fund competitive auction in the United States of America}

On 3 October 2012, the Federal Communications Commission (FCC) announced the successful bids for the Mobility Fund Phase I auction. The fund will distribute $300 million in one-time subsidies, in exchange for the winning carriers to build either 3G or 4G networks across previously unserved areas over the next two to three years.

The FCC has not previously utilised a competitive auction mechanism to distribute funds from their Universal Service Fund. The Mobility Fund auction enabled any licensed, eligible wireless carrier to submit bids to build wireless broadband networks in areas deemed to be without such service. The program resulted in an expansion of mobile broadband networks across more than 83,494 presently unserved miles in 31 states in the United States over the subsequent two to three years.

How the Mobility Fund Auction was held

In November 2011, the FCC announced plans for the Connect America Fund, to precede the current $4.5 billion annual universal voice subsidy program. The Connect America Fund, supporting the deployment of broadband services, would consist of three fundamental components:

- a set of subsidies that would ensure the universal availability of fixed broadband service at speeds of 4 Mbps download/1 Mbps upload;
- a Remote Areas Fund that would address additional connectivity needs of the most costly areas to serve; and
- a Mobility Fund that would support the universal availability of mobile broadband service.

Phase I of the Mobility Fund was administered by a reverse auction of subsidies with the objective to expand mobile broadband networks to currently unserved areas. The process of the auction involved:

- the FCC identified and established census blocks currently without mobile broadband service;
- all eligible and licensed wireless telecommunications carriers were permitted to submit their bids for a subsidy to enable access to 3G or 4G services in those areas;
- bids submitted by providers were based on the amount of a one-time subsidy they were willing to accept in exchange for providing mobile broadband to these unserved areas. Such bids were submitted on a census block basis; and
- the lowest subsidy request per currently unserved road mile was awarded as the successful bid by the FCC.

Overall the reverse auction proved to be successful as 38 wireless companies and subsidiaries participated, submitting a combined total of 894 bids. Of these bids, the FCC accepted 795 bids in 31 different states and territories in the US. Each successful provider will receive their subsidy from the FCC once deployment of the 3G or 4G service is complete.

**Table 4.4: Summary of Results by State or Territory**

<table>
<thead>
<tr>
<th>State or territory</th>
<th>Total Qualifying “Unserved” Road Miles</th>
<th>Total Road Miles Across Winning Bids</th>
<th>Total Winning Bids</th>
<th>Average Subsidy Bid Per Road Mile</th>
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<td>State or territory</td>
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<td>Average Subsidy Bid Per Road Mile</td>
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<td>1,149</td>
<td>941</td>
<td>$2,055,840</td>
<td>$2,184</td>
</tr>
<tr>
<td>Washington</td>
<td>37,102</td>
<td>2,964</td>
<td>$10,139,521</td>
<td>$3,421</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>7,556</td>
<td>175</td>
<td>$3,041,825</td>
<td>$17,359</td>
</tr>
<tr>
<td>West Virginia</td>
<td>24,558</td>
<td>344</td>
<td>$10,611,162</td>
<td>$30,812</td>
</tr>
<tr>
<td>Wyoming</td>
<td>26,874</td>
<td>13,577</td>
<td>$22,831,980</td>
<td>$1,682</td>
</tr>
<tr>
<td>Total</td>
<td>650,393</td>
<td>83,494</td>
<td>$299,998,632</td>
<td>$3,593</td>
</tr>
</tbody>
</table>

Source: Connected Nation, Mobility Fund Phase I Auction Results.\(^{66}\)

Governments often deploy policies to stimulate broadband demand to compliment supply-side programs. Introduction of online services and information by the government itself is a demonstrative example of the beneficial effects broadband can provide both citizens and

businesses. Incentives for the adoption of broadband services can also include the provision of increased access to broadband services at public stations such as libraries or schools.

### 4.4.1.4 Public Private Partnerships

In some geographic areas broadband rollout is considerably less viable than in others. In these, hardest to reach places, specialised government and industry partnerships are often required. A strategy that has been utilised to provision services in disadvantaged or commercially non-viable areas are PPPs. The concept involves the cooperation of a government and at least one private sector firm, carrying out projects that are in the public benefit but deliver a return on investment to the private sector. The EU Green Paper on Public Private Partnership characterises a PPP by the following:

- a long-term relationship between public and private partners;
- funding includes at least some private participation;
- the role of the public sector is mainly to define objectives and monitoring, while implementation is left to the private sectors; and
- the private sectors assume at least part of the financial risk.\(^{67}\)

The World Bank has approved approximately US$1.2 billion in technical and financial support for connectivity initiatives a significant amount of which relied on PPP structures.\(^{68}\) In high-risk markets such as rural telecommunications markets PPP initiatives create a ‘win-win’ situation with the government better able to allocate scarce public resources while still ensuring a customer oriented end product delivered with industry skill which encourages private sector investment.\(^{69}\) Below is a table summarising the main categories of PPPs:

**Table 4.5: Models of Public Private Partnerships**\(^{70}\)

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperative</td>
<td>All sector operators (MNOs, ISPs) unite to form a private company (special-purpose vehicle) for the purpose of building, owning, and operating the national backbone as a wholesale operator. The government contributes a subsidy with no related ownership to ensure national coverage, including rural access points, open access, nondiscrimination, and low-cost pricing.</td>
<td>Burundi national backbone project, 2007</td>
</tr>
<tr>
<td>Equity</td>
<td>Similar to the cooperative model except that the government obtains equity and shareholding ownership rights in exchange for its</td>
<td>The Gambia, Guinea, Liberia,</td>
</tr>
</tbody>
</table>

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69 Ibid.

70 Doyle Gallegos, Partnerships for Broadband: Innovative public private partnerships will support the expansion of broadband networks, *Information and Communication and Technology, Note 02*, June 2012, page 3, Table 1.
<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concession</td>
<td>Traditional build-operate-transfer approach, whereby the government issues a public tender to select a private sector operator to build and operate the national backbone or specific national and cross-border links. The agreement is in the form of a long-term concession (15–25 years) that requires the transfer of the networks back to the government at the end of the concession.</td>
<td>São Tomé and Príncipe, Sierra Leone</td>
</tr>
<tr>
<td>Bulk capacity purchase</td>
<td>The government, acting as an “anchor client,” issues a public tender for the long-term (10–15 years) supply of bulk capacity (+ 1 gigabit) bandwidth. This model stimulates investment by the private sector through the aggregation of demand. In this case, the partnership is governed by a PPP agreement or supplier contract that establishes the rights and obligation of each party.</td>
<td></td>
</tr>
<tr>
<td>Management contract</td>
<td>Standard management contract agreement whereby the government issues a public tender to select a private operator to build, operate, and commercialize the national backbone (or specific national or cross-border links) for a fee.</td>
<td></td>
</tr>
<tr>
<td>Passive</td>
<td>Build-out of the Next Generation National Broadband Network (NGNBN) segmented into three components. BOO model. SingTel (incumbent) outsources first layer (passive) to OpenNet, second layer (wholesale) to Nucleus Connect, retail to retail service providers (RSPs).</td>
<td>Singapore (being unwound)</td>
</tr>
<tr>
<td>Wholesale / Passive</td>
<td>Build-out of the Qatar National Broadband Network (Q.NBN) as the FTTH carrier. Q.NBN (100% owned SPV) to provide wholesale and passive infrastructure to retail operators.</td>
<td>Qatar</td>
</tr>
</tbody>
</table>

A public-private partnership can be implemented through a contractual agreement between the public and private parties, or alternatively by creating a new legal entity with allocated ownership. Such an entity can house assets that were formally publicly owned and the scope for external stakeholder contribution is also apparent.

Investment contributions from the public sector may enable the development of communications infrastructure in commercially disadvantaged areas, or areas considered unprofitable for private investors. Implementation of a PPP strategy may be required in areas where the provision of a simple subsidy would not be enough to attract private sector investment in a project.

The viability of PPP investments is made more difficult in times of lower liquidity, when the capital raising costs of private firms may make their participation in PPP less viable. The inability of a private sector to finance its originally agreed contribution may disrupt the foundation for future growth in output, employment and productivity. Furthermore, it is often necessary for the

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government to implement legislation or policies which both enable the PPP project to take place but which also create a regulatory environment attractive to private sector investors.⁷²

**Box 4.21: CASE STUDY: public private partnerships in Romania broadband access**

Romania’s poorest rural communities which were previously under serviced in terms of broadband access have begun to enjoy the benefits of broadband as a public private partnership called the “knowledge based economy” has begun to connect community libraries, schools and town halls to broadband infrastructure. “Knowledge disadvantaged communities were identified and targeted for broadband rollout subsidised by the government in partnership with private telecoms operators.”⁷³

### 4.4.2 Sources of Funds to Support Broadband Development

#### 4.4.2.1 Government Programs

When markets fail to deliver broadband to areas of lower profitability or higher technical difficulty, governments have an important role in financing this important infrastructure. The benefits of this infrastructure can be social, economic and even cultural; making it an attractive investment opportunity for all levels of government.

The following case studies consider two models of successful government involvement in the provision of broadband infrastructure.

**Box 4.22: CASE STUDY: Extending Broadband Coverage in Rural Canada**

With around one in five Canadians living in rural areas, extending broadband access in rural areas has been a priority for the Canadian central Government for some time. In its recent Economic Action Plan, the Canadian Government invested $C225 (US $217) in a rural broadband extension strategy, with more than half of this funding directed into the Connecting Rural Canadians program. The purpose of this program was to provide government grants to encourage private development of broadband infrastructure in areas the market had not yet extended to.

This program began with an extensive mapping exercise, conducted by the Industry Canada department, to determine geographic areas that were unserved or underserved by broadened coverage. This was followed by a competitive call for nominations for private telecommunications providers.

⁷² Doyle Gallegos, Partnerships for Broadband: Innovative public private partnerships will support the expansion of broadband networks, Information and Communication and Technology, Note 02, June 2012, page 4.

providers to rollout infrastructure to these areas. Applicants could receive funding of up to 50 per cent of eligible costs for projects in these areas. In some First Nation communities, funding of up to 100 per cent of project costs was available.

Between June 2009 and April 2012 a total of 84 projects received funding. The project extended broadband coverage to 218,000 Canadian households that did not previously have broadband access. Each of the projects was tailored to the needs of the locality it set to serve, deploying the most appropriate technology in each area. The range of technologies deployed included: fixed wireless, satellite, wireline, DSL and mobile wireless.

Following the success of the program, the Canadian Government has announced its future plans to extend broadband coverage, taking a different policy approach. In 2013 and 2014 the Canadian Government intends to auction spectrum in the 700 MHz and 2.5 GHz bands with rollout obligations attached as conditions of these auction sales. Companies that buy more than one block of the 700 MHz band will be required to rollout services to 90 per cent of the population in their coverage area within five years of the spectrum auction, and to 97 per cent of the coverage area within seven years. This policy approach will not require direct investment of government funds in broadband extension; rather, it pushes the incentive to rollout services onto the companies competing for spectrum licences.

Box 4.23: CASE STUDY: Extending Broadband to Rural Municipalities in France

In the early 2000s the French government financial organisation, the Caisse des Dépôts, began offering attractively priced loans to local French government authorities to improve broadband access in their areas. These loans were primarily used to finance backhaul loops that connected local areas to the national fibre backbone.

This investment was coupled with significant regulatory reform. Over the past decade France has been progressively implementing the EU directive to unbundle local loops, allowing further competition on local networks. As at the middle of 2012, approximately 6,257 exchanges have been unbundled, representing more than 85 per cent of the existing lines.  

A good learning from the French experience has been to take a technology neutral approach to government incentivised investment. In 2006, the French telecommunications regulator called for an application for wireless local loop licences in the 3.4 – 3.6 GHz band. The intention was to enable telecommunications providers to use the spectrum to provide broadband access using WiMAX technology. Although spectrum take-up was high, roll out has been slow – with strong

74 Autorité de régulation des communications électroniques et des postes, ‘Press Release: Electronic communications market observatory (broadband and ultra-fast broadband wireline and wireless services) in France in Q2 2012: healthy market momentum’ (September 2012). Available at: http://www.arcep.fr/index.php?id=8571&L=1&tx_gsa&lunteer_pi1%5Buid%5D=1538&tx_gsa&lunteer_pi1%5Bannee%5D=&tx_gsa&lunteer_pi1%5Btheme%5D=&tx_gsa&lunteer_pi1%5Bmotscle%5D=&tx_gsa&lunteer_pi1%5BbackID%5D=26&cHash=9c769b2585037e5bd1334167baebd429
competition from other technologies like copper pair, optical fibre, satellite, and local Wi-Fi networks.75

Governments cannot always accurately predict what technologies will best suit market and community needs. So, in structuring government programs, technology neutrality should be an important design feature. Such an approach allows the private sector to select and deploy the most appropriate technological solution in each situation.

4.4.2.2 Mandatory Contributions

Financing broadband projects through direct investments from government budgets is not without risks. Government priorities change, competing fiscal demands emerge and external shocks can all rapidly alter the budget resources available for broadband projects. An attractive alternative for policymakers, that avoids these risks, is to raise the funds for broadband projects from mandatory contributions by telecommunications operators. These funds are generally placed in a Universal Service and Access Fund (UASF), which sits outside the government budget and is assigned to be used exclusively for broadband investments.

Telecommunications operators are generally willing to contribute reasonable amounts to UASFs, provided certain conditions are in place: the funds are managed transparently, the money in the funds is distributed to worthy projects, and operators are eligible to work on the projects funded from UASF resources.

Box 4.24: CASE STUDY: Jamaica’s broadband funded by UASF

Jamaica’s Prime Minister announced in 2011 that the island nation would invest half a billion Jamaican dollars (US$490 million) in a high speed broadband backbone network funded from the Universal Access and Service Fund. It was acknowledged by the government that private entities had a tendency to favour investments in densely populated areas which in the past had left rural areas of Jamaica without adequate internet services and that the government had to promote universal access directly.76

Commentators have noted that the Jamaican Universal Service and Access Fund has accrued J$7.8 billion since levies were first introduced in 2005 which is also being used to fund Jamaica’s e-learning project which aims to ensure all high school educational facilities and teacher training colleges have internet access.77

Critiques of UASF schemes point to the inefficiency of spending and outcomes in UASF projects, along with the potential for public infrastructure to ‘crowd out’ private investment. However

some level of inefficiency is unavoidable, as the purpose of the funds is to delivery services that
the market had deemed to be inefficient in the first place. Inefficiencies and delivery challenges
can be managed through attentive and adaptive program delivery.

*Implementation challenge: calculating the levies to be charged*

Determining the level of the levy and the manner in which it is calculated are important elements
in the development of a UASF policy. The global trend has been to calculate UASF levies as a set
percentage of gross revenue, applied to all firms in a sector. There are two weaknesses with this
approach.

First, a levy as a set percentage of revenue operates is an inefficient tax. When a levy is imposed
on all carriers it is likely to be passed through directly to consumers in the form of higher prices
for telecommunications services. The higher prices will mean that some consumers who would
otherwise have purchased telecommunications services would not enter the market. If the levy is
set too high, private investment in telecommunications infrastructure may be discouraged,
making the challenge of extending universal service even harder for governments. These effects,
described as ‘deadweight losses’, ultimately run counter to the purposes of a UASF.

The second weakness to a set percentage levy approach is that there is no relationship between
the quantum of funds flowing in, and the quantum of funds required to be paid out. This could
result in the fund either collecting more than what is required to deliver universal service, or less
than what is required.

To overcome these challenges, a best practice UASF levy needs considerably greater flexibility
than a set percentage levy approach. The diagram below sets out the structure of a dynamic levy
model, which involves the following policy design features:

- Government defines the success metrics for the UASF. It sets out the coverage,
  penetration and uptake levels that it considers to be the baseline that the UASF
  will provide;

- The telecommunications industry makes contributions through a flexible levy
  mechanism, set year-to-year and apportioned across market participants on the
  basis of an equitable method;

- The funds that flow into the UASF support projects to deliver access in accordance
  with the defined goals. These projects are delivered by the telecommunications
  industry, on the basis of a competitive process like a least-cost subsidy auction;
  and

- The success of the projects is measured, with the levy adjusted to account for the
  anticipated future needs of the UASF to deliver its defined metrics.
4.4.2.3 International Loans, Credits, and Grants

A range of international organizations support the development of communication services, particularly in developing countries. The table below considers the focus of each of the main organisations in this sector, but is not an exhaustive list of all agencies providing assistance in this area.

Table 4.6: Summary of Results by State or Territory

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Description</th>
<th>Links</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Telecommunications Union (ITU)</td>
<td>The ITU is the United Nations specialized agency for information and communications technologies. In addition to 193 Member States, ITU membership includes ICT regulators, leading academic institutions and around 700 private companies. The ITU’s Telecommunication Development Sector works to ensure that the benefits of ICTs are shared by all of the world’s inhabitants.</td>
<td><a href="http://www.itu.int/en/Pages/default.aspx">http://www.itu.int/en/Pages/default.aspx</a></td>
</tr>
<tr>
<td>World Bank (infoDev)</td>
<td>infoDev is a global partnership program within the World Bank Group which works at the intersection of innovation, technology, and entrepreneurship to create opportunities for</td>
<td><a href="http://www.infodev.org/en/Index.html">http://www.infodev.org/en/Index.html</a></td>
</tr>
<tr>
<td>Organisation</td>
<td>Description</td>
<td>Links</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>-------</td>
</tr>
<tr>
<td>infoDev</td>
<td>assists governments and technology-focused small and medium sized enterprises (SMEs) to grow jobs, improve capacity and skills, increase access to capital and markets, ensure that the appropriate policy and regulatory environment are in place for business to flourish, and test out innovative solutions in developing country markets.</td>
<td></td>
</tr>
<tr>
<td>European Bank for Reconstruction and Development</td>
<td>The EBRD provides project financing tailored to the specific economic and social context and needs of each particular country. The EBRD usually provides up to 35% of the project finance needed for a given undertaking.</td>
<td><a href="http://www.ebrd.com">http://www.ebrd.com</a></td>
</tr>
</tbody>
</table>
| Regional development banks for Africa, Asia, Europe, and Latin America | African Development Bank  
Asian Development Bank  
Council of Europe Development Bank  
Inter-American Development Bank  
[www.adb.org/](http://www.adb.org/)  
[www.iadb.org/](http://www.iadb.org/)  
| The U.K. Department for International Development | | [www.dfid.gov.uk/](http://www.dfid.gov.uk/)  
| Japan International Cooperation Agency | | |
| Swedish International Development and Cooperation agency (SIDA) | SIDA administers almost half of Sweden’s development aid budget and is active in communications development projects.  
CIDA’s goal is to promote sustainable growth in developing countries to eliminate poverty and it has been active in the ICT sphere. | [http://www.sida.se/English/](http://www.sida.se/English/)  
| Canadian International Development and Cooperation Agency (CIDA) | | |

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4.4.3 Universal Access and Service Funds for Broadband Development

While UASFs can be effective in ensuring the availability of proper funding for broadband projects, implementation of these funds in developing countries presents a number of specific challenges.

The first of these challenges is putting in place appropriate transparency and accountability protocols. This can be difficult for governments that do not already have in place appropriate financial management and accountability mechanisms. In such contexts, it may be more appropriate for the fund to be established independent of government and overseen by a board and staff of appropriately qualified individuals. Accountability mechanisms, like public disclosure requirements and parliamentary oversight, could assist to ensure the transparent operation of this type of organisation. In a handful of cases, there have been reports of USAFs which had highly over-regulated and complex decision-making, governance and review structures, with Nigeria and Peru noted by the GSMA as examples of this particular challenge.79

A second challenge faced by all governments operating UASFs is calculating the level and types of payments which should be made from funds. Elements of these difficult decisions include determining the types of equipment to include in cost estimates, the redemption periods and depreciation schedules for this equipment and the process for determining geographical service areas.

The European Commission has developed practical advice to its member states, which can assist all states, in developing policies to encourage the rapid deployment of Next Generation Access broadband networks. The types of conditions the guidelines set out are good policy safeguards that, if implemented, can help to encourage competition and avoid the ‘crowding out’ of private investment.80 Adopting these policy elements will help governments ensure that appropriate payments are made from the funds, and they are at the right level, to ensure broadband networks are rolled-out without unnecessary market distortion.

Box 4.25: CASE STUDY: Uganda’s Universal Service Fund and its effect on competition

While Uganda’s Universal Service Fund, the Rural Communications Development Fund (RCDF) is often cited as an excellent example of management of USAFs in emerging economies, it has often exclusively partnered with the telecoms provider MTN to deliver its projects to rural parts of Uganda. MTN holds approximately 60% of the Ugandan mobile market while the fixed line market is dominated by the state-owned fixed line incumbent Telekom Uganda Limited. While competitive bidding processes are now a feature of the RCDF’s distribution of funds, the reality of the matter is that there are only two operators who can effectively bid for RCDF projects, a situation which had the potential to further ingrain MTN’s strong position in the market.81

A third challenge faced by governments in administering Universal Access and Service Funds is determining what types of equipment to include in the cost estimates lodged by potential project bidders and to set the redemption periods and depreciation schedules for this equipment.

Defining the success metrics for UASF projects is an important first step, so regulators can these baselines to check the capability of the technology proposed against its baseline service goals. In this way regulators can identify ‘gold plating’ behaviour from firms, which may seek to deliver more expensive technological solutions than are necessary. These types of behaviours can be discouraged through competitive processes for awarding work contracts, like lowest-cost subsidy auctions.

Once a telecommunications company has been selected to do the work, policymakers should carefully select the terms on which this work is done. A redemption period is the period of time the infrastructure remains owned by a party, be it the government or a telecommunications provider, before the ownership of that assets transfers to the other party. In determining this period, policymakers should consider the effective life of the asset or system, the commercial viability of its usage and the likely future demand for the service it provides.

Determining the depreciation schedule for the asset, the manner in which its value can be written down by its owner, policymakers should also have due regard for the commercial circumstances of prospective owners and operators. It may be appropriate to combine both accounting and economic method of depreciation, taking into account the weighted average cost of capital borne by the telecommunications provider, in establishing the arrangements for how the assets can be written down.

4.4.4 Best Practice for Effective Management of Flow of Funds

Any best practice scheme for proper management of funds will centre around three core principles; transparency, efficiency and accountability. The centrality of these principles to any UASF is a crucial factor to the legitimacy and success of the fund.

Efficiency requires a fundamental understanding of the market as it currently operates, as well as accounting and review mechanisms. Efficient programs maximise the impact of the resources invested in them, ensuring that the maximum possible outcomes are achieved. One way government can incentivise project efficiency is to structure contracts with market participants that share risk and rewards.

For example, a contract may be structured to allow a contractor to keep half of the funds saved on a project delivered under budget; while imposing penalties payments for projects that slip over time or budget. This structure allows government to benefit from market knowledge and expertise, and also achieve a saving, through properly aligning contractual incentives.

Accountability requires reporting and monitoring mechanisms, as well as a clear authority structure. These structures may already exist within governments; however, in partnering with market participants through UASF projects, structures may need to be adapted. Governments should regularly audit projects and ensure project milestones are met, and tested against, before incremental project payments are made. Furthermore there should be detailed dispute resolution
procedures made available with adequate safeguards to ensure that in the event of an aberration or discrepancy in reporting there is an impartial and objective method for determining the outcome of the dispute.

One way government can assist industry participants in this respect is to provide for the protection of information which is legitimately ‘commercial-in-confidence’. Giving companies certainty that ‘commercial-in-confidence’ information will be handled appropriately, will make them more likely to share such information with government. Conversely, if companies fear that sharing information with government will lead to its wider distribution, information may not be as readily provided.

*Transparency* requires appropriate awareness about project goals, progress and outcomes across the range of stakeholders involved in the program. It may require ensuring that project bidders receive the same information and access to discussion, providing information about the recipients of government funding to the wider community, and ensuring that government oversight bodies like appropriately vetted and transparently selected parliamentary committees are able to review into the program and recommend improvements. Most Parliamentary systems require Members to register their business interests such as their shareholdings, interests in real estate and any companies that they have been officers or directors of. In order to ensure they do not suffer from a conflict of interest when sitting on such committees.\(^{82}\)

Documentation of project rules and processes is another important element to transparency. Manuals or handbooks for project participants can be a useful tool, to ensure that project participants understand their obligations and commitments through the program.

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**Box 4.26: CASE STUDY: Columbia’s UASF success story**

Columbia’s USAF has gone from strength to strength achieving the goals laid down in its mission statement with admirable success. The fund is under the authority of the appropriate ministry, but is legally and financial autonomous, with strict progress and financial reporting requirements on an annual timescale. The fund is further split into three separate arms, each with different goals; one focuses on online governance, another, Compartel, focuses on telecommunications penetration in remote and rural areas while the last arm aims to improve the competitiveness of small and medium Columbian enterprises through digital initiatives and access. Compartel has installed 12,797 rural community telephony lines/access points using 9,745 sites built into rural locations and has begun a fibre optic project to ensure that the poorest three million Columbians have access to fibre.\(^{83}\)

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4.4.5 Reviewing the Flow of Funds

To ensure that a UASF is being used for the purposes it was created for, governments should establish strict mechanisms to review the flow of funds out of the UASF. At a fundamental level, this involved appropriate accounting practices with a focus on disbursements. Matching payments to progress, through a structure of milestone payments, is one way to ensure this. However, this approach has the disadvantage of placing cash-flow constraints on the business undertaking the project work.

Regulators must also make important decisions about when to accept information provided by fund recipients, and when they independently test and verify that information. A balanced approach to this verification process is most likely to achieve the best results. If regulators spend too much time evaluating information they run the risk of wasting valuable project resources, though if too few checks are made the projects suffer from lack of oversight. A schedule of random checking may be appropriate, to signal to contractors that the information they provide may be checked, without imposing an onerous burden on regulators.

Another challenge is to ensure that money actually flows out of the UASF and into access programs. This has been a major challenge for several universal obligation funds, particularly in developing countries.

Box 4.27: CASE STUDY: the struggle to spend funds collected by India and Pakistan’s funds

The Indian Universal Service Obligation Fund (USOF) was established in 2002. In the past decade it has collected over US$8 billion from the telecommunications industry through imposing a levy of 5 per cent of the Adjusted Gross Revenue of telecommunications providers. Less than US$3 billion from the fund has, to date, been spent on projects.84

A similar problem also exists in Pakistan, where the Universal Service Fund (USF) had collected almost $7 billion in 2009, but only spent around $1.5 billion.85

An important effect of reviewing the flow of funds can be the identification of unusual or disingenuous directions of funds. These can be caused by fraud or corruption, but can also be the result of adverse impacts of political processes on decision-making. A good example of this can be seen in the politically influenced direction of funding to telecommunications projects in the Australian state of Tasmania.

Box 4.28: CASE STUDY: disproportionate public telecommunications funding to the Australian state of Tasmania

In order to pass legislation to privatise Australia’s government-owned telecommunications provider Telstra in 1997, the Australian government needed to secure the support of a non-

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Government Senator from the state of Tasmania, Senator Brian Harradine. The bill was passed, and the company was privatised, on the condition that $250 million (approximately US$232 million) from the initial sale would be allocated to the Networking the Nation program.

More than one fifth of the funds from the first iteration of the Networking the Nation program were directed to Tasmania, the home state of Senator Harradine. Despite being Australia smallest state, both on the basis of geography and population, it received the largest share of the funds under the program. Senator Harradine would later claim that he secured a total of $353 million for Tasmania from the Telstra sales processes.

While these funds were not from a UASF, they demonstrate the problem with legislators ‘earmarking’ funds from telecommunications programs to their own constituencies. A process of project approval that is independent from policy makers, or improved probity procedures is necessary to avoid such distortions.

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Attachment A

The following table compares internet users per 100 people in countries in selected countries in the years 2005-2011. The data includes both fixed and wireless internet usage. The colour coding identifies the income level of the countries.

Almost all countries show an increase in internet users over the 6 years period.

Table 4.7: Internet users per 100 people in selected countries 2005 – 2011 (In order of most users)

<table>
<thead>
<tr>
<th>Country</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>1.1</td>
<td>1.9</td>
<td>1.8</td>
<td>1.7</td>
<td>3.2</td>
<td>3.7</td>
<td>4.6</td>
</tr>
<tr>
<td>Algeria</td>
<td>5.8</td>
<td>7.4</td>
<td>9.5</td>
<td>10.2</td>
<td>11.2</td>
<td>12.5</td>
<td>14.0</td>
</tr>
<tr>
<td>Angola</td>
<td>1.1</td>
<td>1.9</td>
<td>3.2</td>
<td>4.6</td>
<td>6.0</td>
<td>10.0</td>
<td>14.8</td>
</tr>
<tr>
<td>Argentina</td>
<td>17.7</td>
<td>20.9</td>
<td>25.9</td>
<td>28.1</td>
<td>34.0</td>
<td>40.0</td>
<td>47.7</td>
</tr>
<tr>
<td>Australia</td>
<td>63.0</td>
<td>66.1</td>
<td>69.6</td>
<td>71.7</td>
<td>74.1</td>
<td>75.9</td>
<td>78.9</td>
</tr>
<tr>
<td>Austria</td>
<td>58.0</td>
<td>63.6</td>
<td>69.4</td>
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89 Purple represents high-income countries; orange represents mid-to-high-income countries; green represents low-to-mid-income countries; and blue represents low-income countries.
90 World Bank, Internet Users (per 100 people) (2012). Available at: http://data.worldbank.org/indicator/IT.NET.USER.P2
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