



Australian Government
Productivity Commission

Telecommunications Universal Service Obligation

Productivity Commission
Draft Report

November 2016

This is a draft report prepared for further public consultation and input. The Commission will finalise its report after these processes have taken place.

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Publications enquiries

Media and Publications, phone: (03) 9653 2244 or email: maps@pc.gov.au

The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

Opportunity for further comment

You are invited to examine this draft inquiry report and comment on it by written submission to the Productivity Commission, preferably in electronic format, by **20 January 2017** and/or by attending a public hearing

The final report will be prepared after further submissions have been received and public hearings have been held and will be forwarded to the Australian Government by 28 April 2017.

Public hearings

The Commission will be holding public hearings in Cairns, Sydney, Dubbo, Port Augusta, Launceston and Melbourne in late January and early February 2017. Details regarding dates and venues will be made available on the Commission's website in due course.

Commissioner

For the purposes of this inquiry the Commissioner is:

Paul Lindwall

Terms of reference

I, Scott Morrison, Treasurer, pursuant to Parts 2 and 3 of the *Productivity Commission Act 1998*, hereby request that the Productivity Commission undertake an inquiry into the future direction of a universal service obligation in an evolving telecommunications market.

Background

Historically the standard voice telephone service has provided the basis of a ubiquitous telecommunications service which has been a fundamental part of Australian society. To ensure the benefits of this basic service are as widely available as possible, the regulated standard telephone service and payphones Universal Service Obligation (USO) provides for access to a standard telephone service and payphone services to consumers, where provision of those services might otherwise not be commercially viable. The USO is supported by a combination of ongoing funding from the Australian Government and an annual levy on carriers.

The Australian telecommunications sector has undergone significant changes over the last two decades, in market structure and technology, and will continue to evolve. There has been rapid and continuing technological development and innovation across the industry, with significant expansion in the availability, use and sophistication of mobile services, and ever increasing demand for broadband data services (including Voice Over Internet Protocol services). Demand for standard (fixed line) voice services and payphones has reduced and continues to decline.

The Australian Government is rolling out the National Broadband Network (NBN) which will use a range of technologies to provide a capped price wholesale-only broadband platform to all premises. NBN Co will deliver fast broadband to Australian premises as the infrastructure 'provider of last resort'. The availability of universal broadband will provide a platform for increased competition in the development of retail products and services for consumers.

In the context of these and other changes, the current USO arrangements may not be effective.

Scope of the inquiry

The primary policy question to be addressed in this inquiry is to what extent, in the evolving Australian telecommunications market, Government policies may be required to support universal access to a minimum level of retail telecommunications services.

This will involve a consideration of the nature, scope and objectives of a universal service obligation, whether the retail market for relevant services will deliver appropriate outcomes for consumers without Government intervention and, if not, what options should be considered by Government to deliver universal services and the costs and benefits of these interventions.

In undertaking this inquiry, should the Commission recommend the retention of Government interventions in the market, it should make recommendations on:

- what objectives are appropriate for a universal service obligation arrangement or its equivalent
- what would be the scope of the services needed to be provided to achieve those objectives
- whether particular sections of the Australian community have differing needs to which additional Government intervention should be directed e.g. low income, rural and regional
- who should bear cost or regulatory burdens from those interventions, if any
- the optimal funding model(s)
- transitional arrangements from the current USO model.

The Commission should also have regard to:

- the need for a durable framework that is flexible enough to accommodate technological changes
- the role of, and impact on competition in relevant markets
- contractual commitments that the Government has for the provision of the existing USO
- the significant investments already made by Government, including in the NBN rollout
- the current telecommunications regulatory framework and the Government's response to the 2014 Vertigan NBN Market and Regulation Report
- additional policy reviews being undertaken by Government on a broader range of telecommunications consumer protections
- relevant approaches adopted in other countries, particularly those with similar characteristics to Australia
- the report of the 2015 Regional Telecommunications Review and the Government's response to that report.

Process

The Commission is to undertake an appropriate public consultation process, including holding hearings, inviting public submissions from industry, consumer groups and the broader community and releasing a draft report to the public.

The final Report should be provided to the Government within 12 months of the receipt of these Terms of Reference.

Scott Morrison
Treasurer

[Received 28 April 2016]

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Abbreviations

ABS	Australian Bureau of Statistics
ACCAN	Australian Communications Consumer Action Network
ACCC	Australian Competition and Consumer Commission
ACE	Australian Communication Exchange
ACMA	Australian Communications and Media Authority
ADSL	Asymmetric digital subscriber line
ANAO	Australian National Audit Office
AVC	Access Virtual Circuit
BCR	Bureau of Communications Research
CCO	Copper Continuity Obligation
CSG	Customer Service Guarantee
CVC	Connectivity Virtual Circuit
DoCA	Department of Communications and the Arts
DSL	Digital subscriber line
DSS	Department of Social Services
EU	European Union
FTTB	Fibre to the basement
FTTdp	Fibre to the distribution point
FTTN	Fibre to the node
FTTP	Fibre to the premises
GB	Gigabyte
Gbps	Gigabits per second
GST	Goods and services tax
HFC	Hybrid fibre coaxial
HILDA	Household Income and Labour Dynamics in Australia
IRCA	Indigenous Remote Communications Association
ISS	Interim Satellite Service

ITU	International Telecommunication Union
kbps	Kilobits per second
LIMAC	Low Income Measures Assessment Committee
Mbps	Megabits per second
MHz	Megahertz
NBN	National Broadband Network
nbn	NBN Co Limited
NNI	Network to Network Interface
NSS	NBN Co Limited Satellite Support Scheme
OECD	Organisation for Economic Cooperation and Development
OTT	Over-the-Top
PC	Productivity Commission
POI	Point of interconnection
RFDS	Royal Flying Doctor Service
RSP	Retail service provider
RTIRC	Regional Telecommunications Independent Review Committee
SIP	Statutory Infrastructure Provider
SMS	Short Message Service
STEM	Science, Technology, Engineering and Mathematics
TCPSS Act	<i>Telecommunications (Consumer Protection and Service Standards) Act 1999 (Cth)</i>
TIL	Telecommunications Industry Levy
TIO	Telecommunications Industry Ombudsman
TTY	Teletypewriter
TUSMA	Telecommunications Universal Service Management Agency
TUSO	Telecommunications universal service obligation
TUSOP Agreement	Telstra USO Performance Agreement
USO	Universal service obligation
VoIP	Voice over internet protocol
WBA	Wholesale Broadband Agreement

Glossary

1G	First generation mobile technology. Uses analogue signals to provide voice services over wireless technology.
2G	Second generation mobile technology. Uses digital signals to provide voice services (and data with low transmission rates) over wireless technology.
3G	Third generation mobile technology. Uses broadband to support both a voice channel and internet protocol-based video and data services.
4G	Fourth generation mobile technology. Enhanced broadband to support internet protocol-based voice, video and data services. Also known as Long Term Evolution (LTE).
5G	Fifth generation mobile technology. There is currently no agreed definition or standard for 5G technology.
Access network	The ‘last mile’ of a telecommunications network which connects end users to that network.
Access seeker	A generic term that refers to retail service providers or wholesale service providers that are customers of a third party network.
Access Virtual Circuit (AVC) charge	Monthly charge levied on a per-end user basis to access the NBN.
Asymmetric Digital Subscriber Line (ADSL)	A compression technology that supports high-speed digital services over conventional copper telephone lines. It has significantly greater capacity in one direction than the other. Upload and download speeds decline as the length of the copper line increases.
Backhaul	See ‘transmission network’.
Bandwidth	A measurement of how much data can flow through a specific connection at one time. Bandwidth can also refer to the frequency ranges used to transmit a signal.
Base station	A telecommunications station installed at a fixed location and used to transmit wireless signals from mobile devices or fixed wireless broadband services.
Bits per second (bps)	Basic unit of measurement for serial data transmission capacity.

Broadband	High-speed internet access that is always on and transmits data faster than dial-up access. Broadband is implemented through a range of technologies such as fibre-optic cable, DSL, HFC, mobile wireless, fixed wireless and satellite.
Carriage service provider (CSP)	A party which uses its own or someone else's network facilities to supply communications services to the public.
Carrier	An owner of a telecommunications network unit that is licensed by the ACMA to supply carriage services to the public.
Circuit switching	A temporary direct connection of two or more channels between two or more points in order to provide exclusive use of an open channel. A discrete circuit path is set up between the incoming and outgoing lines.
Connectivity Virtual Circuit (CVC) charge	An aggregate bandwidth consumption charge to transmit over NBN infrastructure a specified quantity of data per second over a monthly period.
Copper Continuity Obligation	An obligation under the TUSOP Agreement which requires Telstra to operate and maintain its existing copper network in areas outside of nbn's fixed-line footprint for the provision of fixed voice services.
Copper wire	A legacy transmission medium used to connect a telephone or other apparatus to the local exchange. Copper wires have relatively low bandwidth and so have limited ability to carry broadband services unless combined with an enabling technology such as ADSL.
Core network	Provides services to the customers who are interconnected by the access and transmission networks.
Coverage	The geographic area or population base over which a mobile network can be accessed to a given standard.
Customer Service Guarantee (CSG)	A standard that aims to protect residential and small business customers from a poor telephone service. It sets out performance requirements for carriage service providers for connections, fault repair and appointment keeping for the standard telephone service, and provides for financial compensation when these are not met.
Dial-up internet	A service in which subscribers connect to the internet via a modem and dial-up software using the facilities of the copper access network.
Digital subscriber line (DSL)	A generic term for digital subscriber line technologies which enable broadband services over copper wires.

Digital Subscriber Line Access Multiplexer (DSLAM)	A network device, usually located in telephone exchanges, that connects multiple digital subscriber line interfaces to a high-speed digital communications channel.
Exchange	A building which houses the equipment required to deliver telephone and broadband services to premises in an Exchange Service Area.
Exchange Service Area	The geographic area covered by a Telstra telephone exchange.
Fibre	A fibre-optic tube containing tiny strands of glass that transmit data in the form of light. Fibre enables data transmission at higher rates than copper.
Fibre to the basement (FTTB)	A network where fibre is deployed from the point of interconnection to the boundary of the building, such as the basement of a multi-dwelling unit.
Fibre to the distribution point (FTTdp)	A network where fibre is deployed from the point of interconnection to the individual junction box in the street outside each property. A short run of copper then carries the signal to the premises.
Fibre to the node (FTTN)	A network where fibre is deployed from the point of interconnection to street cabinets (nodes) which are close to end users. Copper lines then carry the signal from the node to the premises.
Fibre to the premises (FTTP)	A network where fibre is deployed from the point of interconnection to the individual premises. It is also called Fibre to the Home (FTTH).
Fibre to the x (FTTx)	A generic term for any type of fibre network that is used for last mile telecommunications to end users.
Fixed wireless	A network which uses a radio access network to connect to a fixed antenna.
Geostationary satellite	A satellite that can be used for telecommunications that sits high above the Earth's surface aligned with the equator. It appears stationary as it orbits the Earth at the same speed as the Earth rotates.
GHz (gigahertz)	One billion Hertz.
Gigabits per second (Gbps)	A rate of data transfer. 1 Gbps = 1000 Mbps.
Gigabytes (GB)	One billion bytes of information.

Hotspot	A location where people can access the internet using WiFi-enabled devices. Access may be provided free or for a fee.
Hybrid Fibre Coaxial (HFC) network	Consists of fibre-optic cable supplemented by coaxial cable for the connection to the customers' premises.
Internet of Things (IoT)	Encompasses the appliances and devices (and other objects) that communicate over the internet with little or no human involvement.
Internet Protocol	The method by which data packets are exchanged over the internet.
Kilobits per second (kbps)	A rate of data transfer. 1 kbps = 1000 bps.
Latency	Communication time lag. The amount of time a signal takes to travel from one point to another.
Low Earth Orbit (LEO) satellite	A satellite system used in telecommunications that is closer to the Earth's surface than a geostationary satellite and can transmit data with lower latency. Multiple LEO satellites are often used to form a constellation.
Megabits per second (Mbps)	A rate of data transfer. 1 Mbps = 1000 kbps.
Megabytes (MB)	One million bytes of information.
MHz (megahertz)	One million Hertz.
Microwave	A high frequency form of radio transmission (generally over 1 GHz).
MMS	Multimedia Messaging Service.
Mobile broadband	Data services provided over the mobile network.
Mobile network operator	A company that operates a mobile broadband network that delivers services to customers.
Mobile virtual network operator	A company that resells services from mobile network operators directly to consumers.
National Broadband Network (NBN)	The national wholesale-only open access data network in Australia offering high-speed broadband to all Australian premises constructed by NBN Co Limited (nbn).
National Relay Service (NRS)	Provides access to the standard telephone service for people who are deaf or have a hearing or speech impairment through the relay of voice, internet or TTY communications.

NBN Co Limited (nbn)	The Australian Government-owned enterprise established to design, build and operate the National Broadband Network.
NBN fixed line	Any NBN network connection that utilises a physical line running to the end users' premises (FTTB, FTTdp, FTTN, FTTP, HFC).
NBN fixed wireless	A wireless access link from the end users' premises to a wireless base station that is connected to the NBN network.
NBN satellite	Satellite services provided to premises in Australia that are not within the fixed-line or fixed wireless footprints. These include interim measures and long-term satellite services (<i>Sky Muster</i> and <i>Sky Muster II</i>).
Network Reliability Framework	Requirement on Telstra to regularly report on the reliability of its fixed-line services, and to remediate the network in areas with particularly poor performance.
Over-the-Top (OTT) services	A general term for services delivered over a network that are not provided by that network operator. These services use the infrastructure service but are provided independently of the network operator.
Packet switching	A method of transmitting messages by subdividing them into short packets containing the data and a destination address. Each is passed from source to destination through intermediate nodes which direct each packet onwards. The packets are reassembled into the original message at the receiving end.
Payphone	A public telephone where calls may be paid for with coins, phone cards, credit cards or reverse charge facilities.
Plain old telephone service	A voice-grade telephone service that uses analogue signal transmission over copper loops.
Point of interconnection	The point at which a carrier's network links with telecommunications equipment or facilities not belonging to that network.
Port	A point of access into a communications switch, a computer, a network, or other electronic device.
Premises	An end user residence such as a house or apartment, or a commercial site such as an office or factory.
Prioritisation	The ability to give some voice or data traffic preference over other traffic.
Priority Assistance	A customer status that entitles those with life-threatening medical conditions to have priority connection and fault repair

for their home telephone service.

Public safety mobile broadband	Mobile broadband services that meet specific capacity, coverage and quality of service standards for public safety.
Public switched telephone network (PSTN)	The infrastructure for basic telecommunications services (including telephones, switches, local and trunk lines, and exchanges).
Radio	Any device that can wirelessly send and receive information over a mobile communications network.
Radio Access Network (RAN)	A part of a wireless telecommunications network which connects mobile devices or fixed wireless consumer antennas to the base station.
Reliability	The proportion of time in which a service is available.
Retail service provider (RSP)	An entity that provides telecommunications services to end users and has a direct customer relationship with end users.
Roaming	The ability to move seamlessly from one WiFi or mobile network to another with no loss in connectivity.
Services in operation (SIO)	The number of services provided at a particular time. The term can be used in the context of both fixed-line and mobile services.
SIM (subscriber identity module)	An integrated chip-based module that identifies a mobile subscriber.
Smartphone	A mobile phone built on an advanced mobile operating system, with computing capability and connectivity.
SMS	Short message service.
Spectrum	The bandwidth of a communications system, expressed in terms of the frequencies it can carry.
Standard telephone service	Defined under the TCPSS Act 1999 (s. 6) as a telephone service fit for the purpose of voice telephony. If voice telephony is impractical for a person with disability, an 'equivalent' form of communication must be provided.
Telecommunications industry levy (TIL)	A payment collected by the ACMA from telecommunications carriers with eligible annual telecommunications sales revenue of \$25 million or more. Eligible carriers pay a proportion of the TIL based on their share of total industry revenue.
Telecommunications universal service obligation (TUSO)	An obligation under the TCPSS Act 1999 to ensure that the standard telephone service, payphones and prescribed carriage services are reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business.

Teletypewriter (TTY)	Telephone typewriter designed for people with a hearing or speech impairment. It allows communication to be typed after a call is connected and calls can be connected to another TTY user or relayed and translated to voice by the National Relay Service.
Telstra USO performance (TUSOP) Agreement	Telstra universal service obligation performance agreement between the Australian Government and Telstra. One of a series of separate, yet interrelated, agreements signed by the Government, Telstra and nbn to enable the construction and operation of NBN infrastructure. The Agreement sets out contractual arrangements (including payment) for Telstra's delivery of the universal service obligation and some other public interest telecommunications services.
Transmission network	The portion of a telecommunications network that comprises the intermediate links between the core network and the access network.
Unconditioned local loop (ULL)	The copper wire between the end user's network boundary and a local or remote switch.
Universal access	Availability of a telecommunications service on a shared basis (for example, public payphones and community WiFi).
Universal service	Availability of a telecommunications service on a private basis (for example, a standard telephone in every household).
Universal service obligation (USO)	A legally enforceable requirement to provide a service (often but not always at a reasonable price and given quality) to all users within a jurisdiction.
Universal service provider (USP)	Under the TCPSS Act 1999, the Minister for Communications and the Arts determines which carrier will be the primary universal service provider. As the designated provider, Telstra is responsible for the provision of USO services throughout Australia.
Virtual Network Operator	A company which does not own the telecommunications infrastructure but resells services from other telecommunications suppliers directly to consumers.
Voice over Internet Protocol (VoIP)	The transport of voice traffic inside data packets over the internet. VoIP calls can be either 'Managed VoIP' provided by a retail service provider that is similar to traditional telephony, or 'Over-the-Top VoIP' that is provided on a best efforts basis by third parties (such as Skype and Apple FaceTime).
Wholesale Broadband Agreement (WBA)	Agreement that governs the supply of NBN wholesale products.

WiFi	A technology that allows electronic devices to connect to a wireless network.
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Zero-rating	A practice where providers do not charge end customers for data used by specific applications or internet services through their network, in limited or metered data plans.
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OVERVIEW

Key points

- Rapid developments in telecommunications technology are transforming the ways in which people live, work and play. These are also profoundly affecting how telecommunications service providers run their businesses.
- In a digital age, the voice-based telecommunications universal service obligation (TUSO) — costed at \$3 billion in net present value terms over twenty years and introduced when telecommunications consisted of basic telephones and payphones — is anachronistic and needs to change. People’s preferences for ubiquitous connectivity, their seemingly insatiable appetite for data and the high value of digital data to businesses and governments generally provide a strong case to revise Australia’s universal service policies.
- The sizable public investment in National Broadband Network (NBN) infrastructure is planned to provide universal access to high-speed broadband services to all premises across Australia by 2020 — at a quality that is far superior to what is currently available. By design, the pricing strategy adopted by NBN Co Limited will see wholesale prices capped across all its technology platforms and across all locations, thus significantly narrowing the digital divide across rural, regional and urban Australia.
- The existence of the NBN means that the objective of universal service can be reframed to provide a *baseline* (or minimum) broadband service to all premises in Australia, having regard to its *accessibility* and *affordability*, once NBN infrastructure is fully rolled out. This encapsulates access to both the internet *and* voice services as the internet will increasingly be the medium for voice communication.
 - While NBN infrastructure will deliver a high quality voice service over fixed-line and fixed wireless networks, there is a question about the adequacy of NBN services as a *baseline* service in pockets of the satellite footprint, particularly given the high dependency on the network in areas where there is no mobile coverage (affecting up to 90 000 premises).
- To the extent that there are any remaining *availability*, *accessibility* or *affordability* gaps once the NBN rollout is complete, current trends and existing policy settings suggest that these are likely to be small and concentrated, and amenable to specific social programs rather than large scale government interventions such as the TUSO.
- Any further government intervention should harness markets while closely targeting particular user needs. Government intervention should also reflect the complementary role of mobile services. In this context, the Mobile Black Spot Programme should be recast to enhance its cost-effectiveness.
- To avoid adverse impacts on competition, the costing of government programs to address any gaps should be made transparent and subject to competitive tendering processes where feasible. The narrowly targeted scope and small scale of the programs under the Commission’s proposals tips the balance towards funding from general government revenue as opposed to an industry levy.
- Transitioning to a new framework for universal service is likely to be complex. The long-term contract that the Government has with Telstra and the surrounding legislative architecture present key hurdles that will need to be carefully addressed to ensure that the benefits of timely reform outweigh the costs of unravelling existing arrangements.
- As part of this process, the Government should proceed with its planned review of telecommunications consumer safeguards as a matter of priority. It should also address any consequential amendments to the existing regulatory framework relating to universal service provision.

Overview

Telecommunications is essential to any modern economy. It plays an increasingly important role in the delivery of private and public sector services across the economy. Access to telecommunications services is also a key enabler of social inclusion — allowing people to connect with family, friends and communities — and call for assistance in emergency situations.

The telecommunications universal service obligation (TUSO) is one of several policy instruments used in Australia to meet universal service objectives. It was introduced in the 1990s as the sector was being deregulated to ensure ‘reasonable access’ to a *standard telephone service* and payphones to all Australians on an ‘equitable’ basis, regardless of where people reside or work. At that time, telecommunications centred on basic telephones and the TUSO was enacted to benefit consumers by affording them a ‘provider of last resort’ for voice telephony.

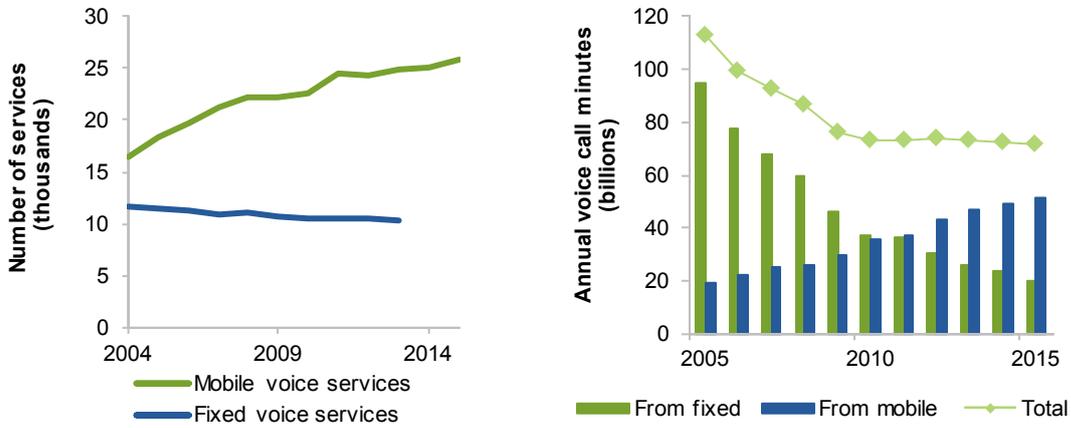
Today, it is nearly impossible for most people to imagine life without smartphones, tablets and messaging. Connectivity has pervaded homes and businesses, allowing almost instant access to information, services and people globally. The proliferation of Internet Protocol-based networks is enabling ‘convergence’ to take place — with different services now integrated over a single network, accessible through all-in-one devices, and increasingly through common appliances such as smart televisions. In view of the economies of scope and scale on offer, service providers are increasingly in the business of providing telecommunications through all media (voice, video or data) simultaneously.

From a users’ perspective, some defining trends are also emerging (figure 1). Australian consumers are revealing a growing preference for mobile devices. With 99.3 per cent of the population covered by at least one mobile network, almost one third of Australian adults now rely solely on mobile phones for voice services. Notwithstanding some variation across regions, income levels and age groups, Australians are also avid internet users. Some 190 million emails are sent through Gmail each day and more than 15 million individuals use Google Search each year in Australia.

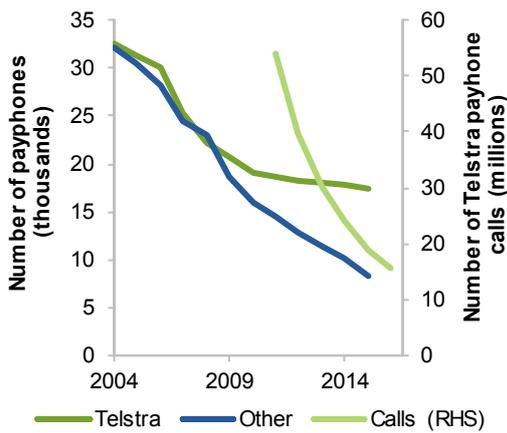
At the same time, telecommunications services are becoming more affordable — thus lowering the cost of economic and social transactions — with benefits to individuals, businesses and government. The price of telecommunications services has fallen substantially over the past decade — both in absolute terms and relative to other essential services. Over that time, quality has also continued to improve. Unlimited voice calling and messaging are now standard inclusions in many mobile phone plans, while data allowances and speeds continue to increase.

Figure 1 Key trends in the Australian telecommunications sector

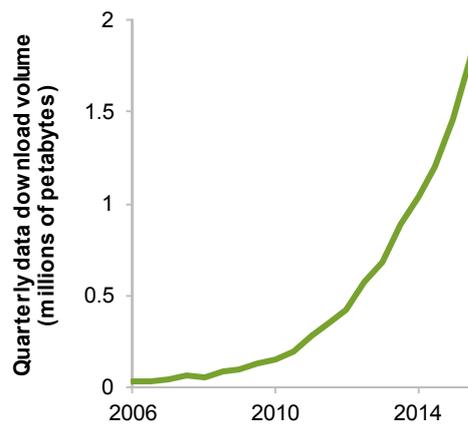
A shift from fixed to mobile services



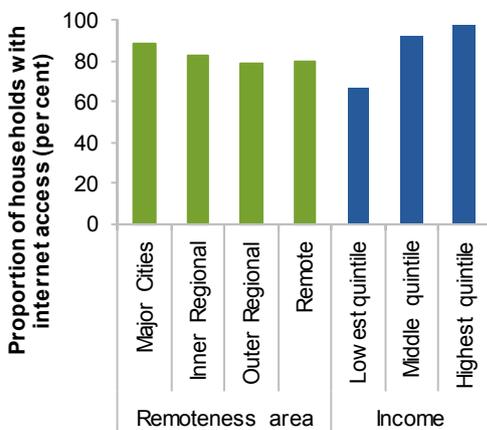
Payphones increasingly redundant



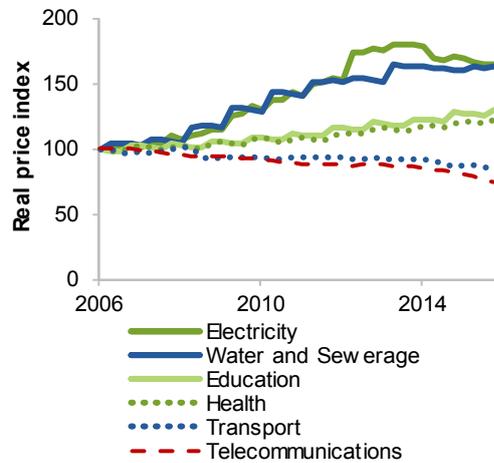
Exponential growth in data usage



Internet access varies by region and income

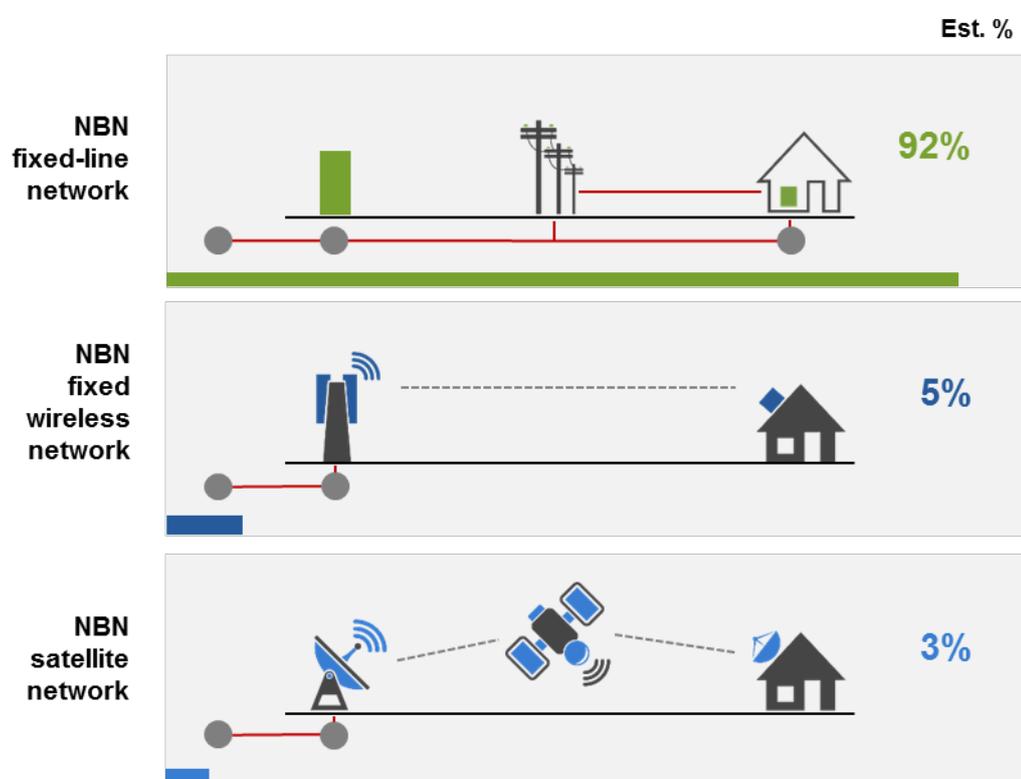


Becoming relatively more affordable



In parallel, the Australian Government is making substantial investments in a nationwide broadband network (NBN) with an expectation that NBN Co Limited (nbn) will provide high-speed broadband (peak download speeds of at least 25 megabits per second) to all households and businesses in Australia as soon as possible (by 2020). Currently, more than three million premises can connect to NBN infrastructure. nbn will have a capped national wholesale price Australia-wide, across its fixed-line (92 per cent of its total footprint),¹ fixed wireless (5 per cent of its total footprint) and *Sky Muster* satellites (3 per cent of its total footprint) networks (figure 2).

Figure 2 The NBN footprint



Against this rapidly evolving landscape, this inquiry provides a timely opportunity to review the role of government in supporting universal telecommunications services.

The Commission's approach

In line with international practice, the Commission has defined universal service to encompass the key distinct, but related elements of universality:

¹ Including fibre to the premises, to the basement, to the distribution point, to the node and hybrid fibre-coaxial.

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1. *availability* — the service is available to all people and businesses who wish to connect to that service, and the service is subject to a minimum quality
 2. *accessibility* — the service can be accessed by all people irrespective of their personal (physical, cognitive and cultural) attributes
 3. *affordability* — the purchase of the service does not place undue hardship on people, particularly those in low-income and other disadvantaged groups.

The framework adopted in this inquiry deliberately recognises that market mechanisms and commercial interests have the primary role in enabling universal access to a *baseline* quality of telecommunications services, confining any potential role for government to instances where there are *availability*, *accessibility* or *affordability* gaps in service provision, or where there is some form of market failure. However, these ‘market gaps’ or ‘market failures’ do not in themselves provide a case for government intervention, because such interventions typically generate costs as well as benefits to the community — both directly and indirectly. Governments should only intervene where there are net benefits to the community. The relative merits of policy options should then be assessed against cost-effectiveness criteria including:

- the cost to the community of achieving a minimum universal service
- technological neutrality
- impact on competition and incentive effects on service providers
- administrative costs and regulatory compliance burdens, with regard to flexibility to adjust to future developments.

Consistent with its standard processes, the Commission has drawn on publicly available information in order to provide transparency around the evidence used to inform its draft findings and recommendations. That said, the Commission’s analysis has been somewhat hampered by the commercial-in-confidence nature of some of the information it has received. In such cases, the Commission carefully considered the information and made necessary judgements.

The TUSO is past its use-by date

Australia has a plethora of policies and programs broadly designed to provide better access to telecommunications services. The Commission’s conservative preliminary estimate is that the Australian Government allocates at least \$1 billion per year to such policies (table 1). This does not include the Government’s sizable investment in NBN infrastructure (with a commitment of \$29.5 billion to date),² or the expected ongoing costs of supplying non-commercial services over NBN infrastructure. Fundamentally, these measures are aimed at ensuring that telecommunications services are available, accessible and affordable

² The Australian Government announced in November 2016 that it will loan \$19.5 billion to nbn, with the expectation that this loan will be re-financed on external markets in 2020-21.

to geographical areas or cohorts of users that may be high cost and uneconomic to serve. The TUSO is only one of these policies.

Table 1 Public transfers related to telecommunications universal service objectives
Preliminary estimates, including GST

<i>Program</i>	<i>Indicative annual funding</i>
Telephone Allowance	\$611 m
Standard telephone service USO	\$253 m
Mobile Black Spot Programme	\$48 m
Payphones USO	\$44 m
Programs to support digital inclusion	\$29 m
Emergency Call Service	\$22 m
National Relay Service	\$22 m
Voice only Customer Migration	\$17 m
Remote Indigenous telecommunications programs	\$5 m
Untimed local calls in extended zones	\$2 m
Total	\$ 1 053 m

The TUSO is a legislative requirement to provide a *standard telephone service* (or plain old telephone service) to all premises in Australia, and payphones that are generally accessible. It remains focused on the delivery of fixed-voice handsets and voice calls over fixed-line copper connections. While these services are still valued by some users, the demand for TUSO services is clearly falling, while consumer needs are overwhelmingly being met by a wide range of digital technologies and applications. Based largely on a legacy technology, the TUSO does not harness solutions that could be more cost-effective in meeting genuine community needs and expectations.

Further, as a non-contestable obligation given to one provider and partly funded by other providers, it effectively stymies competition.

As the designated universal service provider, Telstra's obligation is specified in legislation (box 1). However, in placing this obligation on Telstra, the Australian Government did not demand transparency and accountability of Telstra. The basis for funding (a total of around \$3 billion in net present value terms over the twenty-year contract to 2032) is unclear and disputed.

Telstra is not required to report on the number of non-commercial services or on the costs of any telephone service it supplies. Effectively every fixed-line customer of Telstra is treated as a TUSO customer, irrespective of whether the service is commercial or not.

Nonetheless, Telstra's active retail fixed-line services have declined by about one-quarter in the past decade, from over 8 million to just under 6 million services. While slightly less opacity applies to the number of payphones provided by Telstra, there is equally no

requirement to specify which payphones are non-commercial — that is, those that would, in theory, require a subsidy to service. Increasingly, Telstra is using its payphone infrastructure to provide free WiFi (Telstra Air) to its customers in metropolitan areas.

Box 1 The Telstra USO Performance (TUSOP) Agreement

The TUSOP Agreement, formed between the Australian Government and Telstra in 2011 and commencing in 2012, provides the basis upon which Telstra receives payment for performing its regulated obligation as Australia's TUSO provider. The Agreement is one of a series of separate, yet interrelated, agreements signed by the Government, Telstra and NBN Co Limited (nbn) to enable the construction and operation of the National Broadband Network (NBN) infrastructure.

Under the Universal Service Regime set out in the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth), Telstra has an obligation to ensure that *standard telephone services* and payphones are accessible to all people in Australia on an equitable basis, wherever they reside or carry on business.

The TUSOP Agreement reflects this regulated obligation, but outlines the terms against which Telstra would receive payment from the Government for fulfilling the TUSO until 2032, being \$253 million and \$44 million per year (including GST) for the supply of *standard telephone services* and payphones respectively. Funding is met through an Australian Government (non-indexed) contribution of \$100 million per year and through the Telecommunications Industry Levy paid by eligible carriers.

The Agreement also includes non-TUSO contractual arrangements with Telstra for the provision of the emergency call service, voice-only customer migration activities, and the migration of public interest services to NBN infrastructure. These arrangements are beyond the scope of this inquiry.

In an age where basic phones and payphones are rapidly becoming outdated, the lack of transparency and accountability makes the continuation of current arrangements difficult to justify from the point of view of those who contribute to its funding. It also makes any assessment of the value of the TUSO to the broader community challenging. These issues are compounded by the exceptionally long-term nature of the contract — a feature that sits oddly against the highly dynamic nature of the sector.

Preliminary Commission estimates suggest that the TUSO could imply an annual *standard telephone service* subsidy ranging anywhere between \$250 and \$2800 per 'TUSO' service, and an annual average subsidy of \$2500 to \$50 000 per payphone.

In many ways, these estimates are insignificant relative to the funding being injected into NBN infrastructure (or, indeed, the Telephone Allowance). While not explicitly subject to a universal service 'obligation', nbn has a mandate to deliver high-speed broadband to all households and businesses in Australia by 2020. Even though nbn is focused on providing data services, NBN infrastructure will have an intrinsic capacity to provide a high quality telephone service — Voice Over Internet Protocol (VoIP) — to premises within its fixed-line and fixed wireless footprints (97 per cent of its total footprint). This would

consequently make a *standard telephone service* (as provided for under the TUSO) effectively redundant for premises within these footprints once NBN infrastructure is fully rolled out.

Even though universal access to a minimum level of telecommunications services remains important, the weight of evidence suggests that the TUSO is no longer fit for purpose. While Telstra may have acted with goodwill in fulfilling its contractual obligations, these arrangements no longer serve the best interests of the Australian community. The Commission therefore recommends that the TUSO be phased out as soon as practicable.

A new universal service framework is needed

The ability to access internet content and services is becoming increasingly integral to the everyday life of most Australians. Access to digital data not only affects individuals by making life simpler, but also businesses and government by enabling decision making, transactions and processes to take place effectively and efficiently. It also underpins the current wave of disruptive digital technologies.

For people located in remote areas or with disability, internet access enables a level of engagement with friends, education, information and government that is otherwise not possible. For instance, *myGov* is now one of the biggest digital services in Australia, with 10 million registrations on its website and an average of 160 000 people using the platform each day. The Government's recent expansion of its digital transformation agenda is clearly intended to reinforce this trend by making access to government services more user-friendly and digital by default.

From a broad community perspective, the potential value of digital data is indeed substantial. The Commission's ongoing inquiry into data availability and use (and its June 2016 research report into Digital Disruption) highlight some of the major gains that better data collection, access and use could generate across a wide range of public and private sector functions, with benefits to society generally.

In this context, and with the sizable investment in NBN infrastructure, the Commission considers that the universal service policy objective can be reframed to provide a *baseline* broadband service to all premises in Australia, having regard to its *accessibility* and *affordability*.

This would encapsulate access to the internet *and* to voice services given that the internet will increasingly be the medium through which voice communication is delivered. By taking analogue audio signals and turning them into digital data that can be transmitted over the internet, VoIP technology effectively provides an alternative way of making phone calls (typically at a much lower cost than traditional phone systems and with additional functionality). It is notable that 4G technology for mobile phones (and in a few

years, 5G) provides voice services entirely through dedicated VoIP, also known as VoLTE (Voice over Long Term Evolution).

Consistent with international approaches, the Commission proposes that the universal service policy objective should be defined in terms of a *baseline* (or minimum) quality. This recognises that there are costs to the Australian community in providing universal services, primarily where these services would not ordinarily be provided by the market. Conceptually, a *baseline* level of service refers to a minimum acceptable level of service for broadband and voice that enables basic telecommunications-enabled functions to be undertaken successfully.

Historically, the principle of equity with respect to a basic telecommunications service has been an enduring cornerstone of policy. A wide range of participants argued that there continues to be a strong equity rationale to provide a universal service of the *same quality* to all who reside in Australia, irrespective of where they choose to live or work. They also argued that some people may experience difficulties accessing or affording available services. However, support for equity in pricing (that is, uniform pricing across all locations) was challenged by some participants on the basis that people’s decisions about where to live involve inherent tradeoffs.

The NBN (and markets) have an important role to play

Leveraging off the NBN

This inquiry takes as given that the Australian Government is building the NBN, with its rollout well under way, with an expected completion by 2020.

NBN infrastructure will enable the provision of wholesale broadband (including voice) services to all premises within Australia. The Commission’s assessment is that the service level provided by NBN infrastructure will be more than adequate to meet a *baseline* level of broadband (including voice) service *availability* for the vast majority of premises across Australia — specifically for at least the 97 per cent of premises that fall within the NBN’s fixed-line and fixed wireless footprints.

By design, regulatory settings applying to nbn are conducive to promoting competition among retail service providers to deliver broadband services on NBN infrastructure once premises have been declared ‘ready for service’. All of nbn’s wholesale services have been declared under the *Competition and Consumer Act 2010* (Cth) by way of a Special Access Undertaking and a published Standard Form of Access Agreement. Having thus been declared, nbn’s standard access obligations require it to supply its wholesale broadband services on request to access seekers — wherever it is capable of doing so within the NBN footprint.

Given this regulatory impost and nbn's uniform wholesale capped pricing model, the Commission considers that there is likely to be a retail presence throughout the NBN footprint that would enable all premises to access broadband (and voice) services. Indeed, the evidence to date suggests that there are numerous retailers (around 140) offering services to consumers on the network, and a retail presence throughout the entire network as currently completed. This includes ten retailers offering services over nbn's *Sky Muster* satellites, which targets remote Australia or the 'last three per cent'.

As universal service *availability* is being met by NBN infrastructure, any further government intervention should be closely targeted to meet particular user needs. It should harness a market-driven approach, where possible, rather than the universal service obligation (USO) approach that currently applies. Government intervention should also reflect the complementary role played by mobile services.

That said, there is merit in giving assurance to communities in regional and remote areas that NBN infrastructure is designed and intended to deliver universal access to broadband services.³ Such assurance could be given through Australian Government monitoring of retail presence on the NBN with a non-automatic trigger for it to step in and competitively tender for the delivery of retail services to a particular area where retail presence is absent. Any contracts negotiated should be carefully time-limited to allow for future developments, and not impede the adoption of new technologies or the entry of new retailers.

Given the central universal service role to be played by nbn, the Government's stated intention for nbn to be the statutory infrastructure provider of last resort should be legislated as soon as possible to provide the community with confidence about the ongoing delivery of services, especially if nbn is privatised in the future. This legislation could also provide more formal (and certain) backing to the quality of service to be provided by nbn over its networks. nbn's impact on the economic efficiency of the telecommunications market once the NBN rollout is complete should also be reviewed, and this planned review should not be conditional — as it currently is now — on the timing of any Government consideration of the privatisation of nbn.

... with targeted intervention to address specific market gaps

While the NBN is expected to fully deliver a *baseline* broadband (including voice) service within its fixed-line and fixed wireless footprints, there is a question as to whether further government intervention may be warranted for the retail provision of voice services in pockets of nbn's satellite footprint. Because of the nature of geostationary satellite

³ The Commission's consultations in remote Australia showed a level of distrust and scepticism among these communities partly based on their poor experience with the interim satellite, but also partly based on transitional problems with the rollout of the new *Sky Muster* satellites.

communications, there is a small but noticeable lag or latency,⁴ when communicating via *Sky Muster* to another satellite service, compared to the TUSO *standard telephone service*, although the sound is of a very high clarity. In effect, there is a tradeoff—premises within the NBN satellite footprint benefit from vastly improved internet access with modestly increased latency. Of the 400 000 premises within the NBN satellite footprint, at least 310 000 premises are estimated to be able to use their mobile phones, thus providing a low-latency alternative to the NBN satellite service.

There are thus up to 90 000 premises in the NBN satellite footprint that do not have mobile phone coverage. In the absence of the TUSO, they would receive a higher latency voice service compared to other technology platforms (copper, fixed wireless, fibre and mobile).

Prima facie, this does not necessarily justify further government subsidies. The crux of the matter is whether the quality of voice services over the *Sky Muster* satellites is an acceptable *baseline* for the purpose of a universal voice service or not. Also relevant is the level of reliability offered by these services. Is a 99.7 per cent reliability target (compared to 99.9 per cent for NBN fixed-line and fixed wireless networks) acceptable to the Australian community, particularly for emergency situations where private or public safety may be at risk and there is no back-up service, as rare as these events may be? But as with all such questions, there needs to be a balance between the costs and benefits of providing better and more reliable services. No service can achieve 100 per cent reliability.

Clearly, not all premises within the satellite footprint will be equally affected. The majority of premises within the footprint have an alternative voice service through mobile services and therefore would not require further support. Even for premises outside of mobile coverage, the reliability of NBN infrastructure may vary depending on their location. With an average reliability target of 99.7 per cent for NBN satellites, some premises may benefit from a higher reliability level than they currently experience under the TUSO. Signal attenuation (or rain fade), for example, may be more prevalent in parts of Australia that are more prone to heavy rain. That said, the rollout of NBN infrastructure is still progressing and actual levels of reliability are as yet unknown.

At this stage, the Commission has not made a judgment about the adequacy of nbn's satellite voice services from an acceptable *baseline* perspective, and is seeking further feedback on this issue. The Commission is also interested in information about alternatives to nbn's *Sky Muster* satellites for voice services, and their relative merits and costs.

Mobile services clearly play an important complementary role to NBN infrastructure. Many in the community see mobile services as an effective and preferable alternative to TUSO services, with the Mobile Black Spot Programme garnering much support.⁵

⁴ The latency of an NBN satellite call to a fixed-line, fixed wireless or mobile service (a 'single hop') is around 260 to 300 milliseconds, and around 520 to 600 milliseconds to another satellite service (a 'double hop').

⁵ There is a strong preference for using mobile phones for raising emergency assistance. The majority of calls to Triple Zero in 2014-15 originated from mobile phones (67 per cent), and less frequently from fixed lines (31 per cent) and public payphones (2 per cent).

Nonetheless, the Australian National Audit Office recently questioned the additionality of the program. Before it proceeds with further funding rounds, the Government should amend the program to:

- more closely target locations where significant additional mobile coverage is likely to benefit mobile customers
- revise infrastructure sharing requirements to be consistent with the Australian Competition and Consumer Commission’s findings in the ongoing Domestic Mobile Roaming Declaration Inquiry
- prioritise areas for funding based on community input — rather than on nominations from Members of Parliament.

While NBN infrastructure (combined with mobile service availability) is likely to address universal *availability* for the vast majority of Australians, there are some user groups whose specific needs are not likely to be addressed in the absence of the TUSO.

These groups include members of the community who governments have traditionally chosen to support on social equity grounds — people with disability (including 5000 to 10 000 users of the National Relay Service),⁶ or life-threatening health conditions (up to 187 000 Priority Assistance customers),⁷ people living in remote Indigenous communities (around 142 000), some older people with limited digital literacy capacity and people without a permanent fixed address (just over 100 000 homeless people). Many of the needs of these user groups pertain to the *accessibility* of telecommunications services. Measures to address these needs should be cost-effective, technologically neutral, targeted, flexible and consumer-focused, while supporting efficient competition and innovation where possible.

However, the needs of some user groups — people in regional and remote communities without mobile phone coverage, and people with no permanent fixed address and no access to a mobile phone — may also relate to the *availability* of services. A program of funding for a form of community telecommunications service (such as payphones) is an option to address these needs. The funding program should be flexible as to the form of service to be provided. It should target locations outside of mobile coverage, reflect the specific needs or preferences of a user group, and involve competitive tendering where feasible.

What about *affordability*?

Given current market trends, telecommunications services are likely to continue to be affordable for most people following the full NBN rollout and in the absence of the TUSO.

⁶ The National Relay Service provides a phone solution for people who are deaf or have a hearing or speech impairment.

⁷ Priority Assistance customers get priority for fault repairs on their home phone line.

Real prices of both fixed and mobile services have continued to decline steadily over time — by some 35 per cent for mobile services and 60 per cent for fixed voice services over the decade to 2015, and by 20 per cent for broadband services over the eight years to 2015. This downward trend is in contrast to trends evident across many other key service sectors such as electricity and water (figure 1). From an international viewpoint, Australian consumers now benefit from the eighth lowest tariff levels for mobile services.

Similarly, while overall spending on telecommunications services has increased (because consumers are using more services), household expenditure on telecommunications as a share of disposable income remains relatively small (less than three per cent). As a share of disposable income, household expenditure on telecommunications services has fallen slightly over the past decade (by 0.7 percentage points). Several household surveys suggest that most respondents view telecommunications services as affordable. Furthermore, basic fixed broadband packages are expected to become even more affordable as people migrate to NBN infrastructure.

Under its Special Access Undertaking, nbn has committed to a number of long-term price controls, including that prices of individual nbn wholesale services may increase by no more than the consumer price index increase minus 1.5 percentage points (subject to a lower bound of zero) in any year. In addition, nbn is trialling an offer of volume discounts to retail service providers on their purchase of network capacity. With anticipated competition among retail service providers on NBN infrastructure, these commitments are expected to enhance the affordability of retail telecommunications services, particularly in regional and remote areas.

That said, some people on low incomes may find it difficult to afford these services without government support. A recent survey by the South Australian Council of Social Service involving around 500 low-income Centrelink beneficiaries reported that 62 per cent of the respondents experienced either difficulty in paying for, having to cut back, or having to stop using one or more telecommunications services due to financial hardship. Due to their circumstances, some user groups — especially Indigenous people living in remote areas and people who are homeless — rely on prepaid mobile phones where the unit cost can be well above the contract rates on offer for post-paid mobile phones (a ‘poverty premium’).

There are currently several measures that directly seek to address *affordability*, including measures as part of Telstra’s carrier licence conditions, and the Australian Government’s Telephone Allowance. However, as NBN infrastructure becomes the primary channel for the delivery of universal broadband and voice services, the effectiveness of these measures should be reassessed as part a broad-ranging review of consumer safeguards. In principle, *affordability* is more effectively addressed through transfer payments under the tax-welfare system than through cross-subsidies.

How much funding and who should pay?

The way in which a universal service policy is costed and funded can affect its overall efficiency.

Determining the level of funding to be directed to a universal service program can be fraught. This is because service providers typically have better information about the costs of service provision than governments, but also because future costs are unknown and can only be estimated. Yet, having a discovery process that helps reveal the efficient cost of service provision is essential to ensure that public funds are used judiciously and that any adverse impacts on competition are minimised.

Where service provision can be contested by several providers, carefully designed competitive tendering processes can emulate the outcomes of competitive markets. Well-designed tenders can incentivise providers to keep their prices close to their best estimate of the efficient cost of delivering the service. However, where markets are thin and not contestable, tendering processes are less likely to deliver efficient outcomes. In these circumstances, measures to improve transparency and accountability become even more critical to ensuring that taxpayers and consumers get value for money. This calls for independence in determining the level of funding, as well as the use of benchmarking and transparency in reporting.

Determining who should pay is another difficult matter. The principle that those who benefit should pay does not hold for universal service policies because these policies, by their nature, benefit some people who government has assessed should not or could not fully pay for the service. This presents a challenge in developing a funding model that is optimal from the community's standpoint.

Two broad funding approaches for addressing market gaps and particular needs in universal service delivery have been considered in this inquiry — an industry levy and funding through general government revenue. Both approaches can distort investment and/or consumption behaviour in the telecommunications sector in ways that do not deliver the greatest possible benefit to the community. The issue is to identify and implement the approach that is likely to distort behaviour less.

The quantum of funding is also relevant. The larger the funding envelope, the larger the potential distortions and costs to the community. The Commission's assessment is that the scale of government intervention (and hence funding) required across all dimensions of universal service — *availability, accessibility and affordability* — is likely to be smaller following the completion of the NBN rollout than is the case under the TUSO. As such, the distortionary impacts of either funding approach can also be expected to be smaller irrespective of the funding model adopted.

This takes the assessment of the relative merits of the two funding approaches largely to issues of implementation and administrative costs.

Budget-funded measures have the advantage of clear parliamentary accountability, administrative simplicity and transparency. They are subject to contestability among agencies for scarce taxpayer dollars. Moreover, applied to programs that have a redistributive objective (such as affordability measures), funding from general government revenue means that the same targeted eligibility criteria used for many other distributive policies can be applied to telecommunications services.

In addition, an industry levy, particularly if broad-based, is likely to be difficult to design well and costly to administer in a sector such as telecommunications where the players and, hence, the levy base, are constantly changing. The emergence of Over-the-Top (OTT) services (such as Skype and Netflix) exemplifies the challenge. As a general rule, a levy should treat all providers of substitutable services in the same way. However, the different and often global nature of OTT providers makes it difficult in practice to subject them to the same rules as those imposed on traditional telecommunications service providers.

While there will always be some level of fiscal and political risk associated with budget-funded measures, the Commission's assessment is that the measures recommended in this inquiry should be funded principally through general government revenue. As with an industry levy, the risks of cost-padding and gold-plating should be managed either through competitive tendering, or through independent and transparent costing processes and regular reviews.

Transitional matters

The terms of reference ask the Commission to advise on transitional arrangements from the TUSO, taking into consideration the contractual commitments that the Government has for its provision.

Implementation of a new framework for universal telecommunications service arrangements is complicated by various factors — the most significant being the current contractual arrangements set out in the TUSOP Agreement.

Existing mechanisms for negotiating changes within the agreement are restricted to just a few clauses, which are also limited in scope. They provide few options for review, and mostly centre around finding cost-savings for Telstra. Given this, the Commission considers that, in its current form and with a 20-year term, the TUSOP Agreement presents a fundamental roadblock to the implementation of the Commission's recommendations.

Implementing these recommendations, particularly relating to the removal of the TUSO, will require a major renegotiation of the contract.

The terms of any contract renegotiation is ultimately a matter for the Australian Government and Telstra. While there will be costs to renegotiation (including a possible financial penalty to Government), a sensible transition strategy should aim to balance these costs against the benefits of introducing reforms sooner. Any transition strategy needs to be

carefully staged against key considerations around timing, stakeholder engagement and legislative requirements.

Payphones

With regard to payphones, there is a relatively strong case for immediately winding back Telstra's contractual obligations. Even though Telstra does not report on the profitability of its payphones services, evidence of the demise of payphones is clear. Juxtaposed against the extensive coverage of mobile services across Australia (to over 99 per cent of the population), it is difficult to justify the continuation of the payphones USO.

There would be benefits to both the Government and Telstra from such a move — lower levy liabilities, reduced regulatory impost on Telstra, and an opportunity for Telstra's existing payphone services to be repurposed with a more commercial, innovative focus. Importantly, from a community-wide perspective, this would allow for a better targeted allocation of funding to areas of genuine need for some form of community-based telecommunications service.

Standard telephone services

A transition from the *standard telephone service* USO is relatively more complex, given the legislative framework underpinning, and related to, the TUSOP Agreement. There are nonetheless some options for consideration and the Commission is seeking participants' views on their relative merits.

- **Option 1: Change the legislative scope.** The Government could make changes to the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth) to change the scope of the current *standard telephone service* USO, thereby forcing the parties to negotiate a payment adjustment under the TUSOP Agreement. While this may be the most direct route to reform, it may also be seen as a disproportionate exercise of legislative power by the Government, particularly if exercised at such an early stage of the contract's twenty-year term.
- **Option 2: Remove the *standard telephone service* USO in all areas once the NBN rollout is complete.** This option would see the *standard telephone service* USO removed (both the contractual and legislative mechanisms) once NBN infrastructure is deployed. This option acknowledges the role that nbn would play as the statutory infrastructure provider, and would neatly tie the timing of reforms to the NBN rollout.
- **Option 3: Commence a staged wind-back of the *standard telephone service* USO in NBN-connected areas as soon as practicable.** While this option would also tie the timing of reforms to the NBN rollout, it would be more complex to execute as it would see the gradual winding back of the *standard telephone service* USO in NBN-served areas. This rollout progress could then be reflected in a gradual reduction of the payments to Telstra under the TUSOP Agreement.

As Telstra's Copper Continuity Obligation (CCO)⁸ is integrated into its contractual obligation for providing the *standard telephone service* USO, the implications of an early cessation of the CCO would also need to be taken into account. This may have implications for nbn's fixed wireless and satellite deployment.

Equally, a range of legislative and policy factors that are closely correlated with the TUSOP Agreement (such as Telstra's carrier licence conditions) will need to be reassessed — not only to complement any changes to the TUSOP Agreement, but also to ensure that consumer safeguards are adequately considered.

The Department of Communications and the Arts indicated in its submission to this inquiry that a review into consumer safeguards will be conducted. This review — which would include a comprehensive appraisal of the Customer Service Guarantee — should be expedited to feed into any contract renegotiation between the Government and Telstra.

⁸ The Copper Continuity Obligation refers to Telstra's obligation under the TUSOP Agreement to continue to maintain and operate its existing copper network in nbn's fixed wireless and satellite footprint for the provision of voice services until 2032.

Draft recommendations, findings and information requests

An evolving telecommunications landscape

DRAFT FINDING 2.1

Technological progress is transforming the way in which people access and use telecommunications services. Individuals, businesses, governments and the community at large are benefiting from these developments. Prices of telecommunications services are falling, while service quality is improving across both fixed and mobile platforms. Moreover, these services are converging, allowing users to readily choose between fixed and mobile access, and generating additional competitive pressure on service providers.

The TUSO lacks transparency and is overdue for reform

DRAFT FINDING 3.1

There is a dearth of data on the number of premises covered by the telecommunications universal service obligation (TUSO). Telstra (the universal service provider) is not required to, and has advised that it does not collect information on the number of non-commercial telephone services, or on the costs of any telephone service it supplies under the TUSO. As such, the evidence base for assessing whether the TUSO is providing value for money is inadequate.

Commission estimates suggest that the TUSO could imply a *standard telephone service* annual subsidy ranging anywhere between \$250 to \$2800 per 'TUSO' service, and an annual average payphone subsidy of between \$2500 to \$50 000.

DRAFT FINDING 3.2

Evidence of the declining relevance of services covered by the telecommunications universal service obligation — the *standard telephone service* and payphones — is unequivocal. Over the past decade, Telstra’s active retail fixed-line services have declined by about one quarter (from over 8 million to just under 6 million services), while the number of Telstra payphones has almost halved (from over 31 000 to around 17 500). One third of Australian adults now rely solely on mobile phones for voice services.

DRAFT FINDING 3.3

In addition to its declining relevance, the telecommunications universal service obligation (TUSO) has a number of deficiencies. It is a blunt instrument with a one-size-fits-all approach to universal service provision. Telstra’s contractual obligations under the TUSO lack transparency and accountability. The basis for TUSO funding (a total of around \$3 billion in net present value terms over 20 years to 2032) is unclear and disputed.

DRAFT RECOMMENDATION 3.1

The Australian Government should phase out the existing telecommunications universal service obligation as soon as practicable.

A lack of policy coordination

DRAFT FINDING 4.2

In addition to the telecommunications universal service obligation, there is a plethora of policies and programs that subsidise the provision and use of telecommunications services across Australia and across different cohorts of users. Conservatively (and excluding the NBN), at least \$1 billion per year is allocated to telecommunications programs broadly associated with supporting universal service objectives. There would be benefits from removing duplication and moving towards a more integrated approach to meeting universal service objectives.

DRAFT RECOMMENDATION 4.1

The Australian Government, in consultation with state and territory governments, should conduct a stocktake (by the end of 2017) of all telecommunications programs that share universal service objectives to rationalise and improve their efficacy and cost-effectiveness. The Australian Government should also provide a forum for agencies and jurisdictions to promote program evaluation and share best practice.

An updated universal service framework

DRAFT FINDING 5.1

There are several possible rationales for the provision of universal telecommunications services. These revolve around: enabling markets to function well; providing access to emergency services; facilitating greater social inclusion; and enabling access to online government services.

Some of these benefits involve a public good and are likely to be underprovided by the market. Further, Australia's extended areas of low population density mean that a market presence may not exist because of high costs of service provision and limited revenue opportunities.

DRAFT RECOMMENDATION 5.1

The Australian Government should reframe the objective for universal telecommunications services to provide a *baseline* broadband (including voice) service to all premises in Australia, having regard to its accessibility and affordability, once NBN infrastructure is fully rolled out.

Leveraging off the NBN

DRAFT FINDING 6.1

After the full rollout of NBN infrastructure and in the absence of the telecommunications universal service obligation, retail broadband (including voice) services are likely to be available to all premises across Australia.

DRAFT FINDING 6.2

The quality of the broadband service supplied by NBN infrastructure will be superior to the quality of service previously available across all Australian premises.

However, as is the case under the existing telecommunications universal obligation (TUSO), the quality of voice services will vary across technologies.

- Voice services offered to premises in the NBN fixed-line and fixed wireless footprints will be of a high quality and equivalent to the standard offered under the TUSO.
- Voice services offered to premises in the NBN satellite footprint will be of an adequate quality for most purposes, but will fall short of the quality of those offered under the current TUSO in terms of latency and service repair timeframes. Up to 90 000 premises may be solely dependent on nbn's *Sky Muster* satellites for voice calls.
- Whether further government support for some alternative voice service for these premises is warranted is contingent on whether the quality of nbn's services is below the *baseline* that the broader community would regard as acceptable for a universal service.

INFORMATION REQUEST 6.1

Participants are invited to provide evidence on the adequacy of NBN's satellite voice services in relation to defining an acceptable baseline for a universal service. Information on practical and cost effective alternatives to NBN's satellite voice services in areas that currently have no mobile coverage, and their relative merits and costs is also sought.

DRAFT RECOMMENDATION 7.1

The Australian Government should introduce legislation as soon as possible to make explicit the role of nbn as a universal service provider of wholesale broadband services. The legislation should be in place before any decision by the Australian Government to privatise nbn.

DRAFT RECOMMENDATION 7.2

The Australian Government should ensure that any further intervention with respect to guaranteeing retail service provision over NBN infrastructure is minimal. This should involve monitoring by the Australian Government of retail presence on NBN infrastructure and, if necessary, contracting one or more retail service providers to service geographic areas lacking retail presence.

DRAFT RECOMMENDATION 7.3

The Australian Government should amend the *National Broadband Network Companies Act 2011* (Cth) (the Act) to ensure that the planned Productivity Commission review of nbn following the full rollout of NBN infrastructure occurs regardless of whether or not privatisation is being contemplated. The review should cover the impacts of nbn on the economic efficiency of the telecommunications sector as well as all the matters already specified in section 49 of the Act.

Addressing market gaps and particular user needs

DRAFT FINDING 6.3

In terms of the availability and accessibility of telecommunications services, certain groups of people with particular needs may experience difficulties following the full rollout of NBN infrastructure and in the absence of the telecommunications universal service obligation.

The costs of providing specialised services to these groups are likely to result in providers not offering the services, or providing them at a high price. Notwithstanding that technological advances could reduce these costs, the particular needs of some people in these groups warrant targeted government intervention.

The groups most likely to experience difficulties include: people with disability and life threatening conditions; Indigenous people living in remote settlements; some older people; people with no fixed address; and a small number of users of emergency services within the NBN satellite footprint.

DRAFT FINDING 6.4

Telecommunications services are likely to continue to be affordable for most people. However, government subsidies may be required for a small number of low-income users.

DRAFT FINDING 6.5

In the absence of a telecommunications universal service obligation, and given current policy settings and the full rollout of NBN infrastructure, the extent of market gaps and particular user needs in telecommunications are likely to be small and differ across groups. This gives weight to a targeted approach to government intervention.

DRAFT FINDING 4.1

A number of consumer safeguards apply to the provision of the *standard telephone service*. These safeguards do not apply consistently across all providers and all telecommunications services. The declining reliance on the *standard telephone service* and the increasing proportion of consumers agreeing to waive these safeguards (in particular, the Customer Service Guarantee) make the relevance of these safeguards questionable.

DRAFT RECOMMENDATION 9.3

The Australian Government should proceed with its intended review of the telecommunications consumer safeguards framework as a matter of priority. The review should include an assessment of:

- what, if any, future safeguards are necessary
- what changes should be made to Telstra's carrier licence conditions
- the future role of accessibility and affordability measures, including the Telephone Allowance, the National Relay Service and relevant elements of the National Disability Insurance Scheme
- the consumer protection roles of various bodies including: the Australian Competition and Consumer Commission; the Australian Communications and Media Authority; and the Telecommunications Industry Ombudsman
- the delineation of responsibilities for service quality (including fault repair) on the NBN.

DRAFT RECOMMENDATION 7.4

Before proceeding to the next round of funding under the Mobile Black Spot Programme, the Australian Government should implement the Australian National Audit Office's recommendations relating to that program. It should also: target the program only to areas where funding is highly likely to yield significant additional coverage; revise its infrastructure-sharing requirements to be consistent with the Australian Competition and Consumer Commission's findings in the ongoing Domestic Mobile Roaming Declaration Inquiry; and prioritise areas for funding based on community input — rather than nominations from Members of Parliament.

DRAFT RECOMMENDATION 7.5

The Australian Government should establish a funding program for a form of community telecommunications service (such as payphones) that targets locations where premises do not currently have a satisfactory alternative voice service, such as a mobile service. This program should target particular needs and be flexible for delivery to such communities. This program should involve a competitive tendering process to allocate funding.

INFORMATION REQUEST 7.1

Participants are invited to comment on the advantages and disadvantages of providing Indigenous communities in regional and remote areas with an Indigenous telecommunications program that addresses their particular needs, or whether their needs could be met through service-specific (that is, community-wide) programs.

How much funding and who should pay?

DRAFT FINDING 8.1

The amount of funding required for universal service programs following the full rollout of NBN infrastructure is likely to be smaller than the current funding amount for the telecommunications universal service obligation.

DRAFT FINDING 8.2

Whether funded from general government revenue, an industry levy or a combination of both, all funding models can distort investment and consumption decisions and involve administrative costs. An 'optimal' funding model should seek to minimise these costs, which will vary with the nature and size of the program to be funded, as well as broader market dynamics.

DRAFT FINDING 8.3

Small programs do not justify the design and administrative costs associated with a broad-based industry levy. Funding these through general government revenue is likely to be simpler and less costly to administer.

This would imply the ultimate removal of the Telecommunications Industry Levy.

DRAFT RECOMMENDATION 8.1

The Australian Government should use competitive tendering wherever feasible to deliver telecommunications universal service programs. As a first step, the Government should test the depth of relevant market segments.

Where there is no market depth and a competitive tendering process is not feasible, the Government should, at a minimum, subject all proposed program costings to an independent and transparent validation process. Where relevant performance comparators are available across programs, these should be used as a basis for benchmarking.

DRAFT RECOMMENDATION 8.2

The Australian Government should fund targeted measures to meet telecommunications universal service objectives principally through general government revenue rather than an industry levy. The Australian Government should seek to minimise the risks of cost-padding and gold-plating through contestable and transparent processes.

Transitional matters

DRAFT FINDING 9.1

The Commission's proposed changes to universal service arrangements are incompatible with the current Telstra USO Performance Agreement.

The contract's review and payment mechanisms offer limited capacity for the parties to amend the contract in a way that aligns with an improved policy approach. A significant renegotiation of the terms of the Agreement is likely to provide the most effective transition path to a fully overhauled universal service regime.

DRAFT FINDING 9.2

A transition path away from the current telecommunications universal service obligation will need to be supported by necessary adjustments to the surrounding regulatory framework. Such adjustments include changes to consumer safeguards, Telstra's carrier licence conditions, and other existing policy measures. This will ensure that consumer rights are adequately considered, while removing inefficiencies and outdated mechanisms.

DRAFT RECOMMENDATION 9.1

The Australian Government should immediately commence negotiations with Telstra to amend, and ultimately abolish, module B (Standard Telephone Service USO) and module C (Payphones USO) of the Telstra USO Performance Agreement (in line with draft recommendation 3.1).

DRAFT RECOMMENDATION 9.2

In negotiating changes to the Telstra USO Performance Agreement (draft recommendation 9.1), the Australian Government should seek an early termination of module C (Payphones USO) of the Agreement. These negotiations should be complemented by the required legislative amendments to also remove Telstra's statutory requirements in relation to the payphones universal service obligation.

INFORMATION REQUEST 9.1

Participants are invited to comment on the relative merits of the following (or other feasible) transition options for the standard telephone service USO module of the Telstra USO Performance (TUSOP) Agreement.

- Option 1: Amend the Telecommunications (Consumer Protection and Service Standards) Act 1999 (Cth) to change the scope of the current standard telephone service USO, thereby forcing the parties to negotiate a payment adjustment under the Agreement.*
 - Option 2: Remove the standard telephone service USO in all areas once the NBN rollout is complete.*
 - Option 3: Commence a staged wind-back of the standard telephone service USO in NBN-connected areas as soon as practicable.*
-

1 Introduction

1.1 Background

Telecommunications is essential to any modern economy. It plays an increasingly important role in the delivery of private and public sector services across the economy. Access to telecommunications services is also a key enabler of social inclusion — allowing people to connect with family, friends and communities — and call for assistance in emergency situations.

For these reasons, many countries have policies designed to ensure that telecommunications services considered to be essential are available, accessible and affordable on a universal basis. These policies range from market-based approaches — that support universal access objectives through effective competitive service provision — to more interventionist approaches such as establishing a government-owned business to provide these services, or by directly funding providers in return for a service provision ‘obligation’.

The telecommunications universal service obligation (TUSO) is one of several key policy instruments used in Australia to meet universal access or service objectives. Introduced in the 1990s as the sector was being deregulated, it was designed to ensure ‘reasonable access’ to a standard telephone service and payphones to all Australians on an ‘equitable’ basis, regardless of where people live or work. The TUSO is co-funded by the Australian Government and an industry levy of \$300 million per year, with a total of around \$3 billion (in net present value terms in 2012) over the life of the twenty-year contract (to 2032) between Telstra and the Australian Government.

The TUSO was conceived at a time when the delivery of telecommunications services was highly dependent on the ‘plain old telephone’, and when payphones provided an essential service. It was enacted to benefit consumers by affording them a ‘provider of last resort’ for voice telephony services.

Technology has evolved substantially over the past two decades and this momentum is likely to continue, if not accelerate, in the foreseeable future. Telecommunications has shifted from basic fixed telephony to the almost instant global transmission of large amounts of data. These developments have been accompanied by a lowering of technological barriers to entry and an increase in the level of contestability in the provision of telecommunications services. Moreover, the proliferation of Internet Protocol-based networks is leading to ‘convergence’ of and within the telecommunications sector — with different services now offered over a common platform and all-in-one devices becoming

more accessible. In practice, and especially in the near future, voice communication will effectively be data communication.

Consumers are generally benefiting from these developments through greater choice of service providers and products, better experiences and lower prices. Increasingly, they are revealing a preference for mobile devices. Australia ranks highly in terms of mobile connectivity with 99.3 per cent of the population covered by Telstra's mobile network and at least 96.9 per cent of the population jointly covered by all three mobile networks (Telstra, Optus and Vodafone).⁹ Close to one third of Australia's adult population now rely solely on mobile phones for a voice service. The average price of a mobile service has fallen by around 50 per cent over the past 15 years; many customers have effectively unlimited phone calls and text messages for a fixed price each month.

In parallel, the Australian Government is making significant investments in a national broadband network (NBN) with a mandate to NBN Co Limited (nbn) to provide access to high-speed broadband (with peak download speeds of at least 25 megabits per second) to all households and businesses in Australia as soon as possible (and expected by 2020). nbn will have a capped wholesale price Australia-wide, across its fixed-line (92 per cent of all premises),¹⁰ fixed wireless (5 per cent of all premises) and satellite (3 per cent of all premises) networks.

Further developments are forthcoming with the introduction of 5G technology (expected by 2020) which will deliver increased mobile broadband connection speeds and data volumes for consumers, and improved reliability and ultra-low latency connections (which could potentially enable life-critical medical functions, such as remote surgery).

1.2 What has the Commission been asked to do?

The overarching policy question to be addressed in this inquiry is to what extent, in an evolving Australian telecommunications market, government policies may be required to support universal access to a minimum level of retail telecommunications services.

Should the Commission recommend the retention of Government interventions in the telecommunications market to achieve universal access, the terms of reference set out a range of issues that the inquiry should make recommendations on:

- the objectives for a universal service obligation arrangement or its equivalent
- the scope of the services needed to be provided to achieve those objectives
- whether particular sections of the Australian community have differing needs to which additional Government intervention should be directed
- who should bear the costs or regulatory burdens from those interventions, if any

⁹ Mobile networks cover around 31 per cent of Australia's land mass.

¹⁰ Including fibre to the premises, to the basement, to the node and hybrid fibre-coaxial.

-
- the optimal funding model(s) and
 - transitional arrangements from the current universal service obligation model.

In undertaking its assessment, the Commission is to consider a range of issues including the need for a durable and flexible framework that can accommodate changes in technology and competition in relevant markets, and other significant investments already made by Government, including the NBN. Consideration must also be given to the current telecommunications regulatory framework and existing contractual commitments, as well as to recent and ongoing reviews and relevant international approaches.

1.3 The Commission's approach

The Commission has adopted a 'first principles' approach to considering the role of government with respect to the provision of universal telecommunications services.

Consistent with the OECD (2012) and the International Telecommunications Union (2016), the Commission has used the term universal service to encompass the key elements of universality:

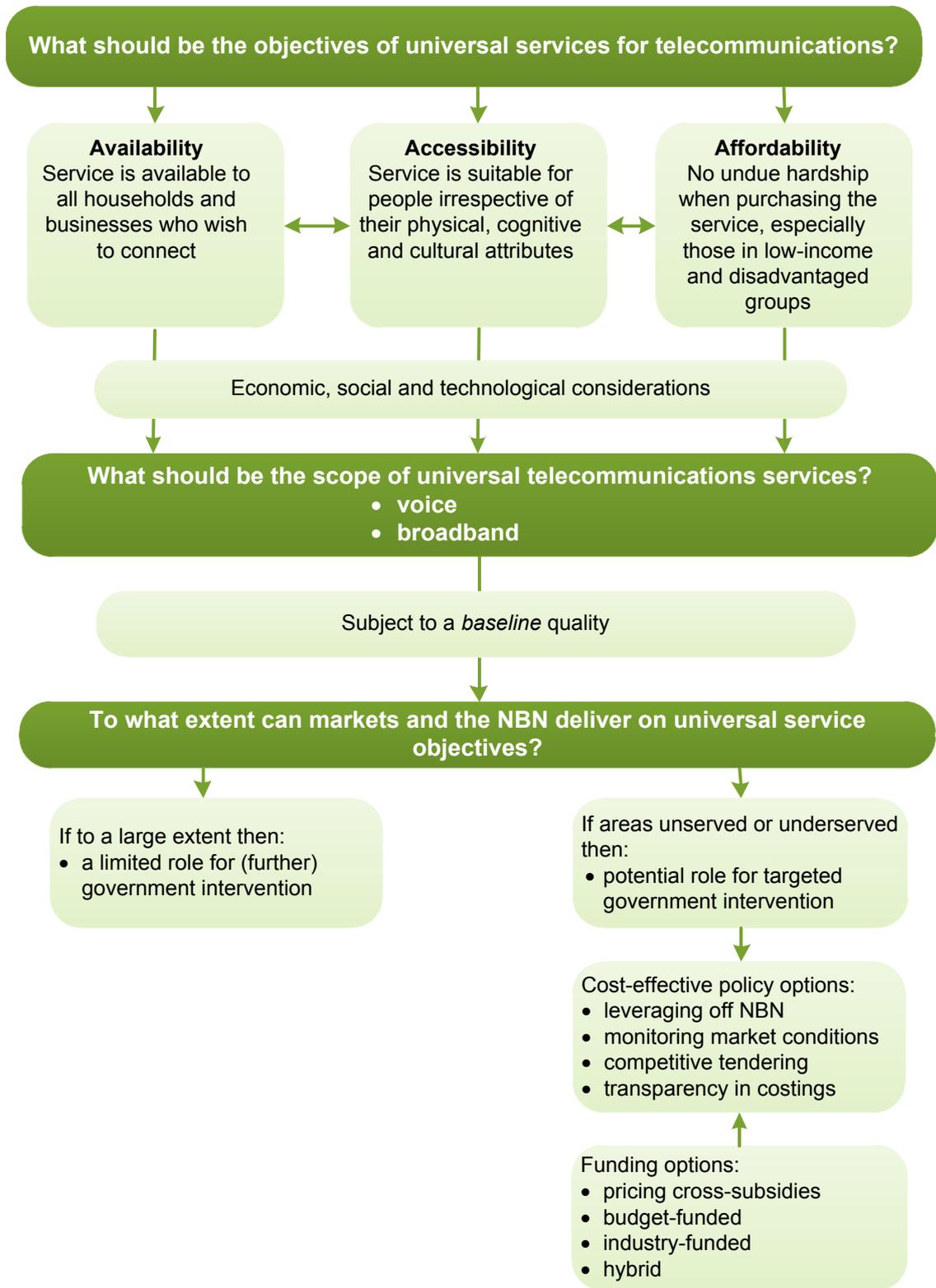
1. availability — the service is available to all people and businesses who wish to connect to a service and the service is subject to a minimum quality
2. accessibility — the service can be accessed by all people irrespective of their personal (physical, cognitive and cultural) attributes
3. affordability — the purchase of the service does not place undue hardship on people, particularly those in low-income and disadvantaged groups.

While universal service is conceptually distinct from universal access, in that the former relates to availability of a service on a private basis (for example, a standard telephone in every household) and the latter relates to availability on a shared basis (for example, public payphones and community WiFi), the term universal service is used in this report to include both concepts unless otherwise noted. These two concepts are not mutually exclusive — indeed, many countries have both universal access and universal service as complementary policy objectives.

The framework adopted in this inquiry explicitly recognises that market mechanisms and commercial interests have the primary role in enabling universal access to telecommunications services, confining any potential role for government to instances where there are availability, accessibility or affordability gaps in service provision or where there is some form of market failure (figure 1.1). However, these 'market gaps' and 'market failures' do not in themselves provide a case for government intervention because such interventions typically generate costs as well as benefits — both directly and indirectly.

Governments should only intervene where there are net benefits to the Australian community.

Figure 1.1 The Commission’s framework



In operationalising this framework, the Commission has used a number of principles to guide its assessment of the current TUSO and the configuration of options for a future telecommunications universal service policy (box 1.1).

Box 1.1 Some guiding principles

The objective of any policy intervention should ultimately be to maximise the wellbeing of the community as a whole. The Commission has therefore focused on the most efficient way of delivering on a universal service policy objective — with this objective couched in terms of delivering a *baseline* level of telecommunications services to all Australians. Key considerations guiding the Commission’s assessments include the following principles.

Principles for establishing a universal service policy objective

A telecommunications universal service objective should be:

- founded on clearly-specified and evidence-based economic and/or social policy rationales
- based on clear definitions of universal access and service and their scope
- specified in the form of measurable user outcomes
- subject to review.

Principles for designing a universal service policy

A universal service policy should be effective in meeting a universal service policy objective at least cost to the community by:

- harnessing markets where efficient to do so
- targeting areas where efficient market solutions are not feasible
- being technologically neutral
- promoting efficient contestability or competition in the telecommunications sector and being competitively neutral
- promoting administrative simplicity and reducing regulatory compliance burdens
- being sufficiently flexible to adjust to future changes.

Principles for funding a universal service policy

The funding of a universal service policy should:

- seek to reflect the efficient costs of service provision
- minimise distortions to investment and consumption choices
- be transparent
- have regard to administrative simplicity and compliance burdens
- be flexible to respond to future changes and be appropriately time-limited while providing enough certainty for investment decisions.

(continued on next page)

Box 1.1 (continued)

Principles for transitioning to any new universal service policy

Transition to any new universal service policy should:

- aim to achieve an appropriate balance between the forgone opportunities from delaying reform against the costs associated with shifting to a new arrangement
- be sufficiently transparent and subject to clear timeframes to enable effective business decision making
- incorporate effective stakeholder and community engagement strategies
- be carefully managed to mitigate the risks of loss of access to critical services.

Consistent with its standard process, the Commission has drawn upon publicly available information, including recent reviews (box 1.2), in order to provide transparency around the evidence used to inform its draft findings and recommendations. That said, the Commission's analysis has been somewhat hampered by the commercial-in-confidence nature of some of the information provided by certain participants. Where such information was received, the Commission has carefully considered the information and made necessary judgements. The Commission is also using this draft report as an opportunity to elicit additional evidence from participants.

Box 1.2 **Reviews relevant to this inquiry**

- NBN Market and Regulation Report (Vertigan Panel 2014)
- The Regional Telecommunications Review (RTIRC 2015a)
- The Productivity Commission's research report on Public Safety Mobile Broadband (PC 2015a)
- The Bureau of Communications Research review of NBN non-commercial services funding options (BCR 2015)
- The Australian Infrastructure Plan (Infrastructure Australia 2016a)
- The ongoing consultation on communications accessibility, which covers the National Relay Service (DoCA 2016a)
- The Spectrum Review Report (DoCA 2015) and ongoing consultation on spectrum reform legislative proposals (DoCA 2016b)
- The ongoing review of the Australian Communications and Media Authority (DoCA 2015a)
- The ongoing ACCC market study of the communications sector (ACCC 2016d)
- The ongoing ACCC inquiry into declaration of mobile roaming (ACCC 2016f)

The Commission has not directed its focus to an assessment of the merits of the NBN and its associated structures. Nonetheless, the establishment of nbn as a government-owned entity with primary responsibility for rolling out and operating a high-speed broadband network is a pertinent aspect of the future environment within which universal telecommunications services are to be delivered. In this context, while NBN developments are taken as given, the Commission's assessments have taken into consideration their potential ramifications for a future universal service policy framework, where relevant.

The timing of the rollout of NBN infrastructure is also important. The rollout is ongoing and is expected to be completed by 2020. As such, while participants may have reported interim or teething issues with the present NBN, the Commission is taking a longer-term perspective which assumes the completion of the NBN in line with its mandated objectives.

1.4 Structure of this report

The remainder of this report is structured as follows.

- Chapter 2 provides an overview of the evolving landscape of telecommunications.
- Chapter 3 reviews and evaluates the current TUSO against a number of criteria.
- Chapter 4 identifies other government programs that are broadly designed to meet telecommunications universal service objectives.
- Chapter 5 examines the considerations that should frame a new telecommunications universal service policy objective.
- Chapter 6 assesses the extent to which the market and NBN might address the various dimensions of universal telecommunications services.
- Chapter 7 considers some policy options to address any 'gaps' identified in chapter 6.
- Chapter 8 discusses the relative merits of alternative funding models for telecommunications universal service policies.
- Chapter 9 canvasses issues and options associated with transitional arrangements.

The following appendixes support the analysis in the main body of the report.

- Appendix A outlines the conduct of the inquiry, including consultations undertaken and submissions received.
- Appendix B provides further information on the NBN.
- Appendix C presents an overview of approaches to telecommunications universal service policies in OECD countries.
- Appendix D touches on the relative affordability of NBN services.

2 An evolving telecommunications sector

Key points

- The Australian telecommunications sector has evolved rapidly over the past several decades from providing analogue voice-only conversations on copper lines to broader communications connectivity over a wide range of technologies.
 - Technological change is enabling the convergence of the sector, resulting in increasing contestability between services.
 - With the advent of 4G wireless technology and the rollout of National Broadband Network (NBN) infrastructure, voice services are increasingly provided over internet protocols — meaning that a voice service is becoming another form of data.
- Together with rapid changes in consumer preferences and relative prices, these technological advances have led to the emergence of some key trends.
 - Increasingly, consumers are substituting mobile services for fixed services. Between 2004 and 2015:
 - ... the number of mobile voice services grew by 56 per cent, and there are now 5 per cent more mobile services than there are people in Australia
 - ... there has been a 271 per cent increase in voice calling from mobile service compared with a 79 per cent decrease in voice calling from fixed services
 - ... messaging (primarily over mobile services) has increased significantly, with a fivefold increase in short message and multimedia messaging services.
 - Although the overall volume of voice calls decreased by 35 per cent between 2005 and 2010, it has since stabilised — suggesting there is a persistent demand for voice-based telecommunications services.
 - Internet data traffic has grown exponentially, rising by over 50 per cent per annum between 2006 and 2015. Growth is now strongest over mobile broadband services, but fixed broadband services still account for 93 per cent of download traffic.
- There is increasing structural separation in the provision of fixed telecommunications services — between infrastructure and retail services — due to the rollout of National Broadband Network infrastructure and regulatory requirements for new fixed networks.
- The mobile services sector has developed largely on a market-driven basis. The three network operators — Telstra, Optus and Vodafone — have continued to improve their service coverage, with 99.3 per cent of Australia's population now having access to at least one mobile voice service provider.
- Despite continued improvements in service quality, prices of fixed voice and mobile services have fallen by over 50 per cent since 1998, and prices of fixed broadband services have fallen by around 20 per cent since 2007.

The Australian telecommunications sector (box 2.1) has evolved rapidly over the past two decades compared with slower evolution over earlier periods (box 2.2). Where once telecommunications services consisted solely of analogue voice conversations delivered over copper lines, services now enable broader communications ‘connectivity’ over a wider range of technologies. Technological advances in fixed-line and, especially, wireless technologies have underlined these developments.

The changing role of government has also contributed to the evolution of the sector. In early years the Postmaster-General’s Department provided both postal and telecommunications services. In 1975 these services were split into two agencies; the Australian Postal Commission and Telecom Australia. In 1992, Telecom and the Overseas Telecommunications Commission merged and became Telstra.

The sector was opened to limited competition with the entry of Vodafone (mobile only) and Optus (mobile and fixed) in 1991, and to full competition in 1997. Telstra (with both wholesale and retail services) was privatised in three stages — in 1997, 1999 and 2006. In 2009, the Australian Government once again became involved in the provision of telecommunications services with its establishment of NBN Co Limited (now known as nbn) to build the National Broadband Network (NBN), a national open access and wholesale-only network (appendix B). It is envisaged that the NBN will offer high speed broadband¹¹ infrastructure to all Australians from its completion (expected in 2020).

In considering whether further government intervention is needed to provide universal access to a minimum level of retail telecommunications services, it is important to understand the evolution of the telecommunications sector. This chapter examines recent developments and general trends in the Australian telecommunications sector, noting that some of these may not apply to the same extent across metropolitan, regional and remote areas. It begins with trends in the use and availability of telecommunications services (section 2.1), before discussing technological developments (section 2.2) and changes in industry structure and the competitive landscape (section 2.3).

¹¹ According to nbn (2016d, p. 1), ‘Broadband is a term used to refer to “always on” high speed internet. In the past, broadband services and technologies were defined in terms of a capability to transfer information at higher rates than traditional dial-up services. Today broadband is more commonly associated with the speeds equal to or greater than those provided by [asymmetric digital subscriber line], that is, a minimum download speed of 265 kbps and minimum upload speed of 64 kbps’. High speed broadband is considerably faster still.

Box 2.1 The Australian telecommunications sector and its services

According to the *Telecommunications Act 1997* (Cth), telecommunications is ‘the carriage of communications by means of guided and/or unguided electromagnetic energy’. This inquiry focuses on *two-way* telecommunications — where a capacity to both send and receive communications is present — which excludes radio and televisual broadcasting.

Components of the telecommunications sector can be categorised either by:

- fixed and mobile services — which focuses on the mobility of the consumer interface^a
- fixed-line and wireless technologies — which focuses on the technology used to deliver the service to the consumer.

From a consumer’s perspective, the main types of telecommunications services are voice, messaging and internet (or data). Increasingly, internet protocol based networks are being used in the provision of all services.

Telecommunications services are provided using a range of technologies.

- Voice services can be carried over both fixed-line and wireless technologies, and are transmitted through either ‘circuit switched’ or ‘packet switched’ networks. Traditional fixed and mobile telephony services use circuit switching, which involves a dedicated connection for the duration of the call. Meanwhile, voice over internet protocol (VoIP) telephony uses packet switching, where the signal ‘competes’ with other internet data. VoIP telephony can be either ‘managed VoIP’ or ‘Over-the-Top (OTT) VoIP’.
 - Managed VoIP, which is provided by a retail service provider, is similar to traditional telephony. To the extent that the provider prioritises the call over other traffic, the quality of a managed VoIP call can be as good or better than that of a circuit switched call, and at a lower cost. Managed VoIP may be used to provide a *standard telephone service* (chapter 3). All voice services supplied over the NBN will be VoIP services, and in late 2015 Australian mobile network operators began offering managed VoIP for some enabled mobile handsets, known as ‘voice over the long term evolution’.
 - OTT VoIP is provided on a ‘best efforts’ (no prioritisation) basis by third parties such as Skype and Apple FaceTime. These services are often ‘free’ in that providers do not directly collect revenue from consumers, although consumers must supply the internet connection to enable the service.
- Messaging services are usually carried between mobile devices, although some OTT messaging can be accessed through a personal computer. The short message service (SMS) and multimedia messaging service (MMS) are provided by mobile operators, and allow text and picture messages to be sent between mobile devices. As with OTT VoIP, OTT messaging uses internet protocols and is provided by third parties, such as Facebook, Wickr or WhatsApp. OTT messaging services offer additional flexibility, functionality and (in the case of Wickr) security.

Access to the internet is provided over both fixed-line and wireless technologies. Internet access is the most recent of these three service types to become available on mobile devices.

^a Defined as the point at which the consumer takes responsibility for the service. For example, the use of WiFi routers to distribute broadband internet within a home or business is considered a fixed service because the service was provided to fixed point.

Box 2.2 **Historical examples of long distance communications**

- The ancient Greeks, Romans and Chinese, and North American indigenous peoples communicated over long distances using smoke signals.
- The ancient Greeks and Romans also devised an optical hydraulic semaphore telegraph system, where water-filled vessels sent visual signals and the heliograph (mirror) via watchtowers in line of sight. The Roman Emperor Tiberius was able to send encrypted signals from Capri to Rome in this way.
- The first working electrical telegraph was invented in 1816.
- The electric telephone was invented in the 1870s, and the first commercial services were introduced in 1878.
- Between 1886 and 1888, Heinrich Hertz successfully experimented with the transmission of electromagnetic waves thus proving James Maxwell's theory about the propagation of electromagnetic radiation. This was developed further into the early 20th century by inventors such as Nikola Tesla and Guglielmo Marconi.

2.1 Trends in the use and availability of telecommunications services

Mobile voice is replacing fixed voice

Recent years have witnessed a rise in the number of mobile voice services and a fall in the number of fixed voice services.

- The number of mobile voice services in Australia grew by 56 per cent in the 11 years to June 2015 (figure 2.1), and there are now over 1.05 services per person. Meanwhile, the number of fixed voice services declined by 11 per cent between June 2004 and June 2013.
- The proportion of the adult population with a mobile service but no fixed service almost doubled between June 2011 and June 2015, growing from 15 to 29 per cent) (ACMA 2015b).

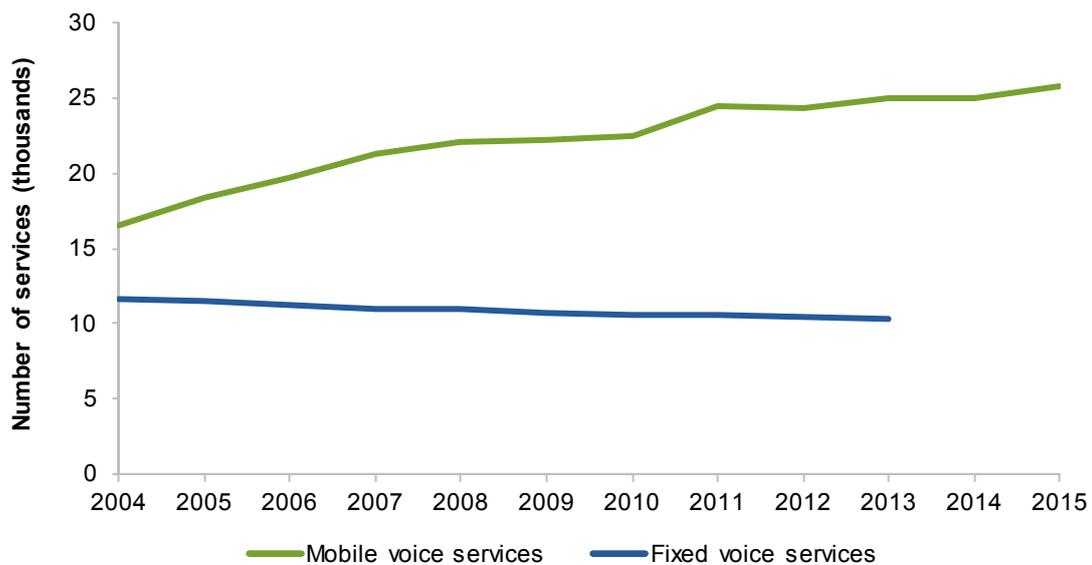
This trend has also been mirrored by an increase in the use of mobile services and a decline in the use of fixed services for voice calling.

- In the decade to June 2015, the number of voice call minutes originating from a fixed service fell by 79 per cent, while the number of minutes originating from a mobile service grew by 271 per cent, with mobiles becoming the more common source of voice call minutes after 2010 (figure 2.2).

- In the six months to May 2015, 94 per cent of adult Australians made a mobile phone call (up from 90 per cent in 2012), while 68 per cent made a phone call from a fixed service (down from 78 per cent in 2012) (ACMA 2015b). Fixed services are used on an increasingly sparing basis for voice calls, with monthly outbound voice minutes per fixed service falling by 23 per cent between 2009 and 2014, and there is now an 18 percentage point difference between the number of Australians who have a fixed telephone and those who claim to use it at least once a week (Ofcom 2015).

After falling by 35 per cent between 2005 and 2010, total voice calling appears to have now stabilised (figure 2.2). This point is reinforced when VoIP usage is also considered, with OTT VoIP services used at least once a week by almost a quarter of Australians in 2014-15, up from less than 20 per cent in 2010-11 (ACMA 2015b; Ofcom 2015).

Figure 2.1 Trends in voice services^{a,b}
Australia, June 2004 to June 2015

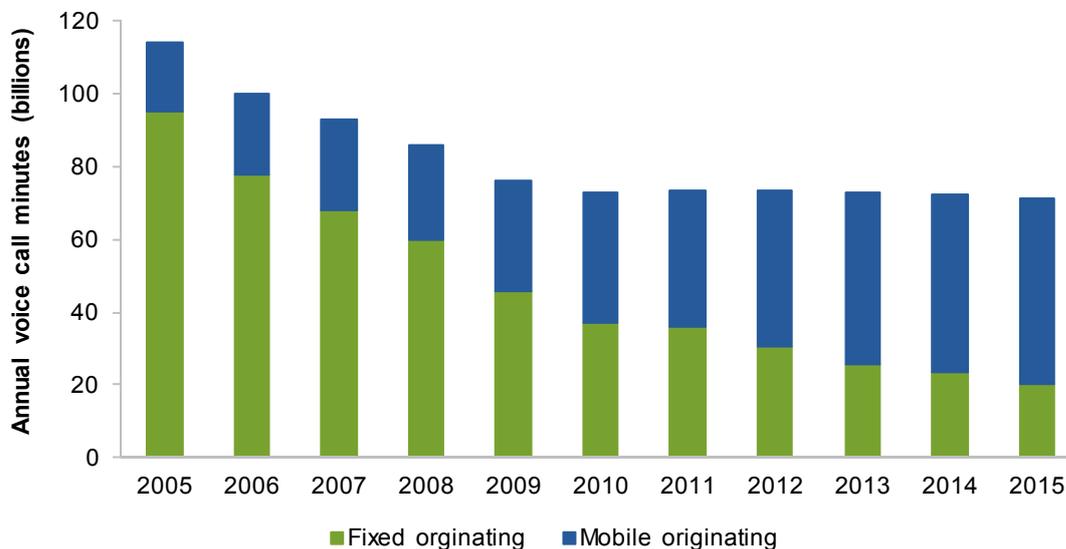


^a Comparable fixed voice services data are not available after 2013 due to a methodological change.
^b Mobile voice services are calculated by deducting mobile internet services (USB modems, data cards etc.) from total mobile services (which includes mobile internet services).

Sources: Productivity Commission estimates based on ACMA (2007, 2009, 2010a, 2012, 2015b) and ABS (*Internet Activity, Australia, December 2015*, Cat. no. 8153.0).

Figure 2.2 Trends in voice calling^a

Australian voice call minutes by origin, June 2005 to June 2015



^a Data from 2005 to 2010 are sourced from the Australian Competition and Consumer Commission (ACCC) Regulatory Accounting Framework Record Keeping Rule and include only Telstra, Optus, Vodafone, AAPT and Primus. Data from 2011 onwards are from the Division 12 Record Keeping Rule which includes a broader set of providers. Most forms of managed VoIP are not included, and OTT services are not included.

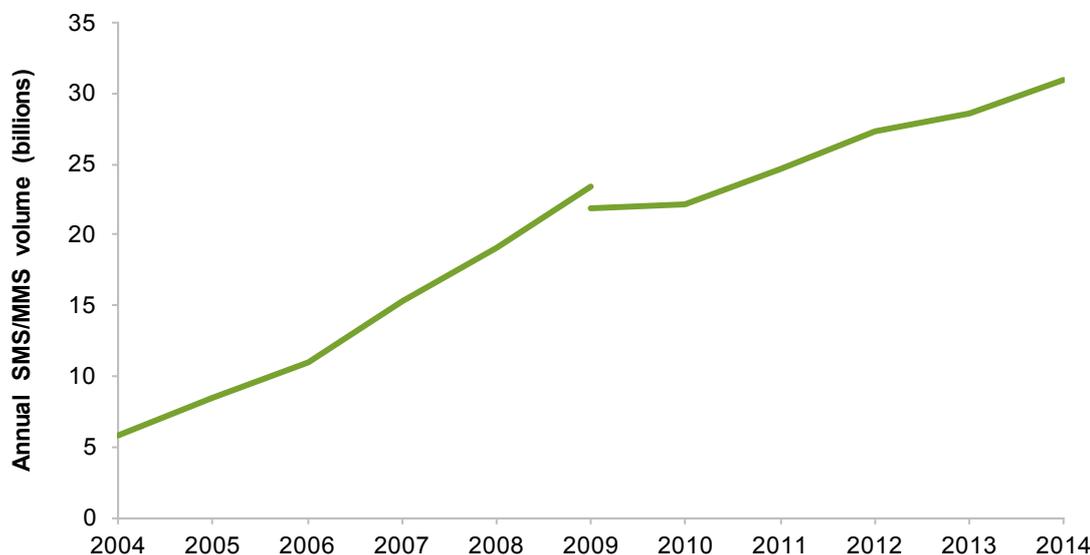
Sources: ACCC (2012, 2016b).

Messaging has risen

The use of mobile messaging services — through both SMS/MMS and OTT messaging services such as WhatsApp, Facebook Messenger, and Wickr — has grown strongly in recent years. SMS/MMS traffic grew fivefold between 2004 and 2014 (figure 2.3). Although equivalent data relating to OTT messaging traffic are not available, a 2015 survey found that 64 per cent of Australians with mobile phones use OTT messaging services (compared with 89 per cent who use SMS) (Ofcom 2015). Moreover, Deloitte (2015) found that the use of OTT messaging services increased by almost 70 per cent between 2014 and 2015.

Although it is not yet the case in Australia (figure 2.3), international trends suggest that OTT messaging services may bring about a fall in the use of SMS/MMS. In countries such as the United States, the United Kingdom, Italy, the Netherlands and South Korea, SMS/MMS traffic has declined on a per person basis in recent years, with Ofcom (2015) attributing this to the increased use of email and OTT messaging services. Given the superior functionality offered by OTT services, it remains to be seen as to whether the growing ubiquity of unlimited SMS mobile phone plans (ACCC 2016b) may prevent SMS/MMS use declining in Australia.

Figure 2.3 **SMS/MMS volumes have grown strongly^a**
Australian SMS/MMS messages sent, 2004 to 2014



^a SMS/MMS data from 2004–2009 are Productivity Commission estimates based on Ofcom (2010) and ACMA (2015b). SMS/MMS data from 2009–2014 are Productivity Commission estimates based on Ofcom (2015) and ABS (*Australian Demographic Statistics, Sep 2015*, Cat. no. 3101.0).

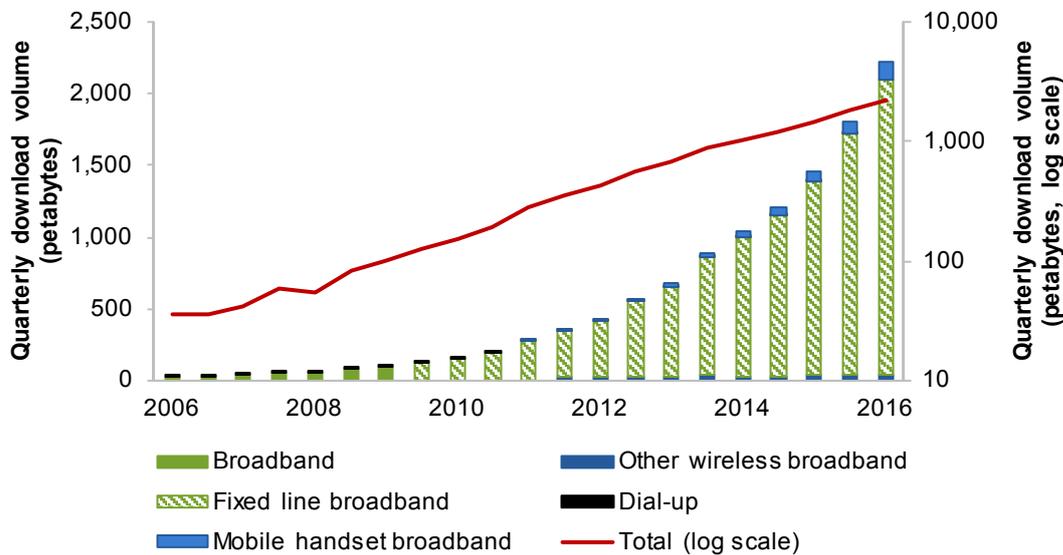
Sources: Productivity Commission estimates based on ABS (*Australian Demographic Statistics, Sep 2015*, Cat. no. 3101.0), ACMA (2015b) and Ofcom (2010, 2015).

The demand for data has grown

Data download traffic grew exponentially over the decade to June 2016, rising by around 6000 per cent, or over 50 per cent per annum (figure 2.4). In the three years to June 2016, annual growth was strongest in mobile handset broadband (83 per cent), followed by fixed-line broadband (48 per cent) and other wireless broadband (21 per cent). The rapid expansion in mobile data usage corresponds with a tripling of the average post-paid mobile plan data allowance between 2011-12 and 2014-15 (ACCC 2016b) and an additional 22 per cent of Australian adults accessing the internet on their mobile phone over this period (ACMA 2015b). However, despite stronger growth of traffic over mobile broadband services, fixed-line broadband services still accounted for 93 per cent of download traffic in June 2016.

The growth in data consumption from fixed services has, in recent years, been underlined by the rapid uptake of OTT subscription video on demand services, such as Netflix, Presto and Stan (ACCC 2016b). Indeed, Netflix and YouTube collectively account for more than half of all global internet traffic (Hall 2016). The Australian Competition and Consumer Commission (ACCC) (2016b, p. 19) considered that ‘the data intensive nature of this content is likely to lead to a significant increase in the already robust growth in fixed broadband data consumption’.

Figure 2.4 Data consumption has grown exponentially, with fixed-line broadband services accounting for the bulk of the traffic^{a,b}
 Data download traffic, Australia, June 2006 to June 2016



^a The wireless/fixed-line division was not reported prior to December 2010. Fixed line includes DSL, HFC and fibre, other wireless includes satellite, fixed wireless, mobile wireless via datacard, dongle, USB modem and tablet sim card. ^b Comparable mobile handset data not available prior to June 2011. ^c Includes internet service providers with more than 1000 subscribers only.

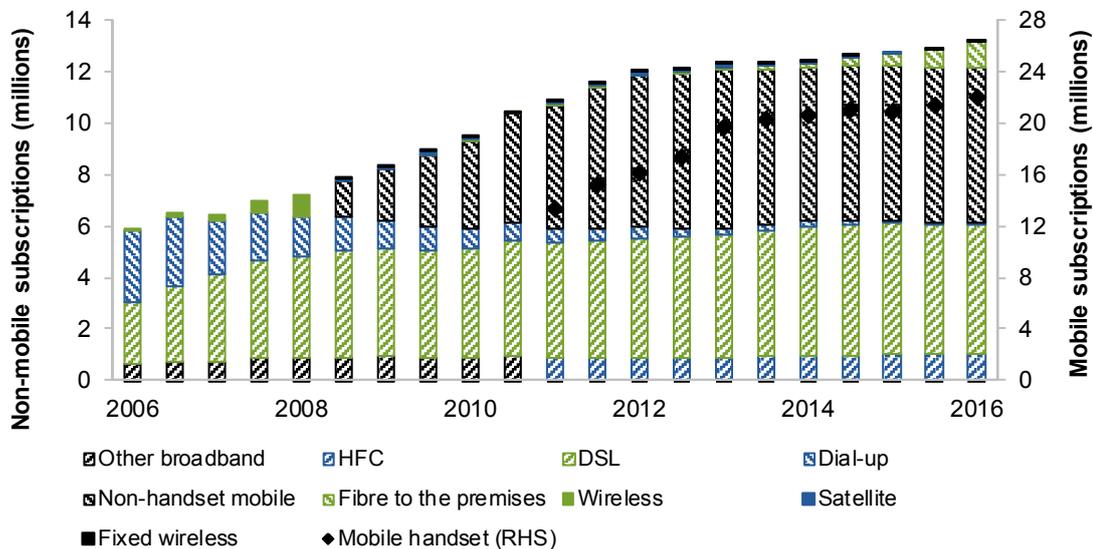
Sources: ABS (*Internet Activity, Australia, December 2010*, Cat. no. 8153.0); ABS (*Internet Activity, Australia, June 2016*, Cat. no. 8153.0).

Nonetheless, broadband consumption is highly asymmetric in nature. In 2013-14, around 90 per cent of premises in the United States were below average users of fixed broadband, and the bottom 50 per cent of premises accounted for just 10 per cent of total consumption (James 2016). Assuming similar trends carry over to Australia, this suggests that the needs of some households may be adequately catered for with mobile broadband.

The way Australians access the internet has changed over time and varies across the community

Internet subscription volumes have grown over the past decade, driven by the growth of handset and non-handset mobile broadband, with fixed subscriptions (through dial-up, hybrid fibre coaxial (HFC) cable, fibre to the premises (FTTP), digital subscriber line (DSL), fixed wireless and satellite) at saturation levels (figure 2.5). Non-handset mobile broadband subscriptions grew by 440 per cent between 2008 and 2015, while mobile handset broadband subscriptions grew by around 160 per cent between 2011 and 2015 to now significantly outnumber all other forms of internet subscription. The rate of take-up of both of these services has slowed in recent years, indicating that these markets are now also approaching saturation.

Figure 2.5 The changing nature of internet access^{a,b,c,d}
 Internet access subscriptions, Australia, June 2006 to June 2016



^a Other broadband includes ‘other broadband’ as reported and non-dial-up/broadband connections of unspecified type calculated as the difference between total non-dial-up/broadband connections and non-dial-up/broadband connections of specified type. ^b Wireless disaggregation (into non-handset mobile, mobile handset and fixed wireless) not reported prior to December quarter 2008. Non-handset mobile includes mobile wireless via datacard, dongle, USB modem and tablet SIM cards. ^c Comparable mobile data not available prior to June quarter 2011. ^d Includes internet service providers with more than 1000 subscribers only.

Sources: ABS (*Internet Activity, Australia, December 2010*, Cat. no. 8153.0); ABS (*Internet Activity, Australia, June 2016*, Cat. no. 8153.0); Productivity Commission estimates.

While total fixed subscription volumes have stabilised, the market has not been static. Consumers have shifted away from slower dial-up subscriptions toward mostly DSL subscriptions (figure 2.5). While the proportion of Australians who reported having an internet connection in the home (including wireless) grew from 79 to 86 per cent in the four years to June 2015, the proportion who reported a non-broadband home internet connection fell from 10 to 1 per cent over the same period (ACMA 2015b).¹² More recently, annual growth in FTTP subscriptions has been close to 100 per cent due to the ongoing rollout of NBN infrastructure (appendix B), with DSL subscriptions decreasing for the first time (albeit by less than 2 per cent) over the six months to December 2015 (figure 2.5).

Australians are increasingly using multiple devices to connect to the internet. In the six months to May 2015, 26 per cent of Australian adults who accessed the internet did so using five or more devices, up from 23 per cent one year previously, and 86 per cent used

¹² The proportion of Australians with a home non-broadband internet connection is calculated as the difference between the proportion of Australians with a home internet connection and the proportion with a home broadband internet connection.

more than one device (ACMA 2015b). Of these, 79 per cent used a mobile phone, 74 per cent a laptop computer, 61 per cent a desktop computer, 58 per cent a tablet computer, 27 per cent a TV or Smart TV, 17 per cent a non-portable game console, 12 per cent an mp3 player and 7 per cent used a portable game console (ACMA 2015b).

These trends are indicative of the complementary nature of fixed and mobile broadband access (ACCC 2016b; BCR 2016b). Australians appear to strongly prefer fixed broadband for downloading bandwidth intensive content (such as video) (ACCC 2016b), while mobile broadband is used more frequently (BCR 2016b) but with less intensity. This reflects the very large differences in price and, especially, data quotas offered by these services. Reviewing several recent international studies, analysis by Ockerby and Wongsosaputro for nbn (sub. 47, attachment, p. 24) finds that ‘the most likely service where fixed to mobile substitution will continue is for voice and lower bandwidth broadband services.’ However, to the extent that mobile data quotas expand, there may be increased substitutability between these services in the future (section 2.3).

Cross-sectional variation

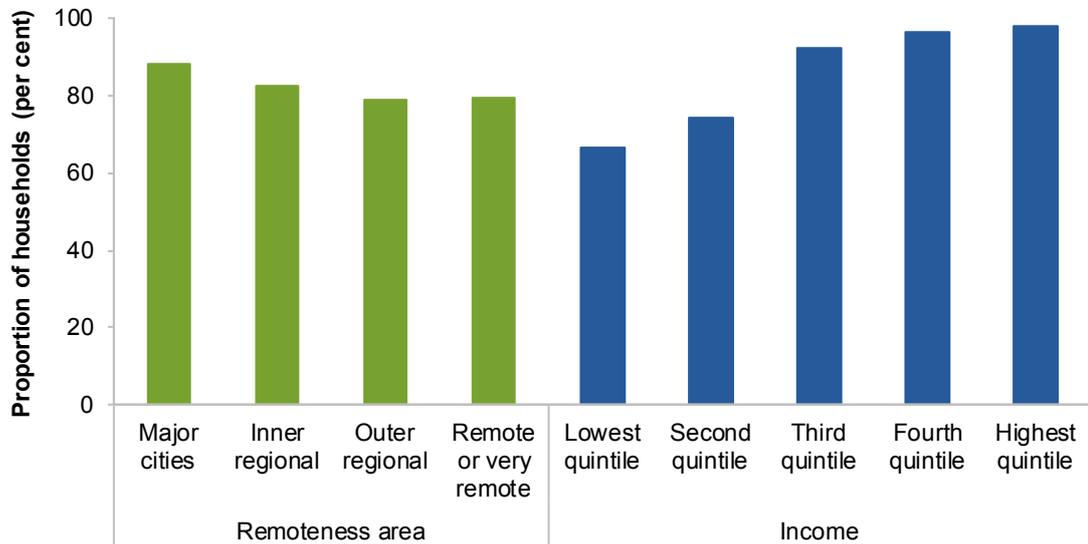
The proportion of Australians with internet access in the home decreases with remoteness and increases with household income (figure 2.6). In 2014-15, 88 per cent of households in major cities had internet access, compared with 79 per cent of households in remote or very remote areas. Meanwhile, 67 per cent of households with income in the lowest quintile had internet access, compared with 98 per cent of households in the highest quintile. Internet access also varies by age (chapter 6).

The medium of internet access also varies with remoteness. This variation is greater for access through mobile handsets and tablets than for personal computers (figure 2.7), which likely reflects more differential access to quality mobile broadband as remoteness increases.

Likewise, mobile handset internet access varies to a greater extent with income than fixed internet access. The use of both personal computers and mobile handsets to access the internet increases with income among households with internet access, but the range is 85 to 96 per cent for personal computers and 75 to 95 per cent for mobile handsets (ABS 2016d).

Across all remoteness classes, a higher proportion of Australians are using the internet for banking and social networking than for other purposes (figure 2.8). While for most services usage rate falls with remoteness, in remote or very remote areas a relatively high proportion of users access the internet to purchase goods or services and for banking purposes.

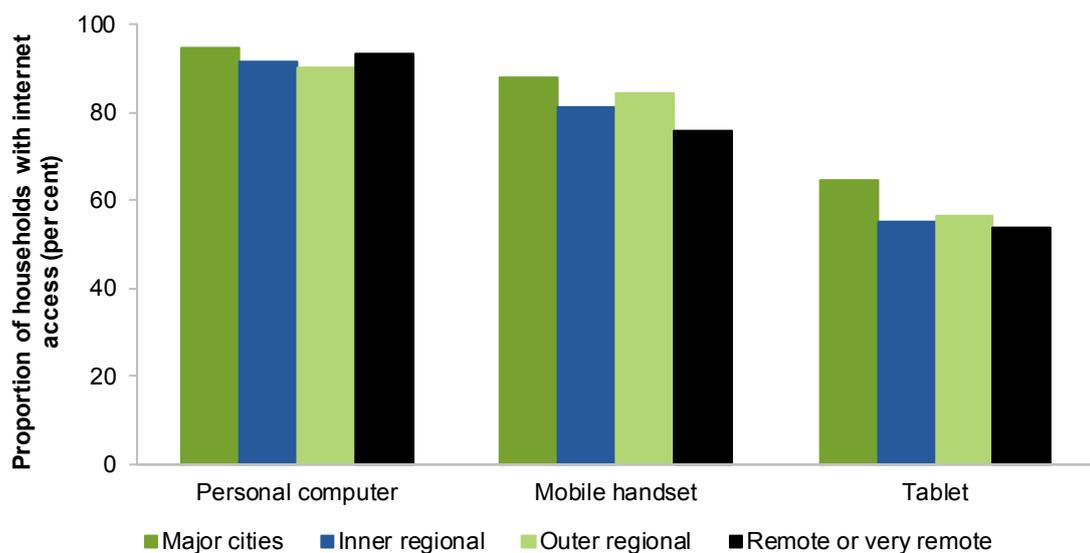
Figure 2.6 Internet access varies by remoteness and household income^a
 Proportion of households with internet access at home, 2014-15



^a Internet access through both fixed and mobile services.

Source: ABS (*Household Use of Information Technology, Australia, 2014-15*, Cat. no. 8146.0).

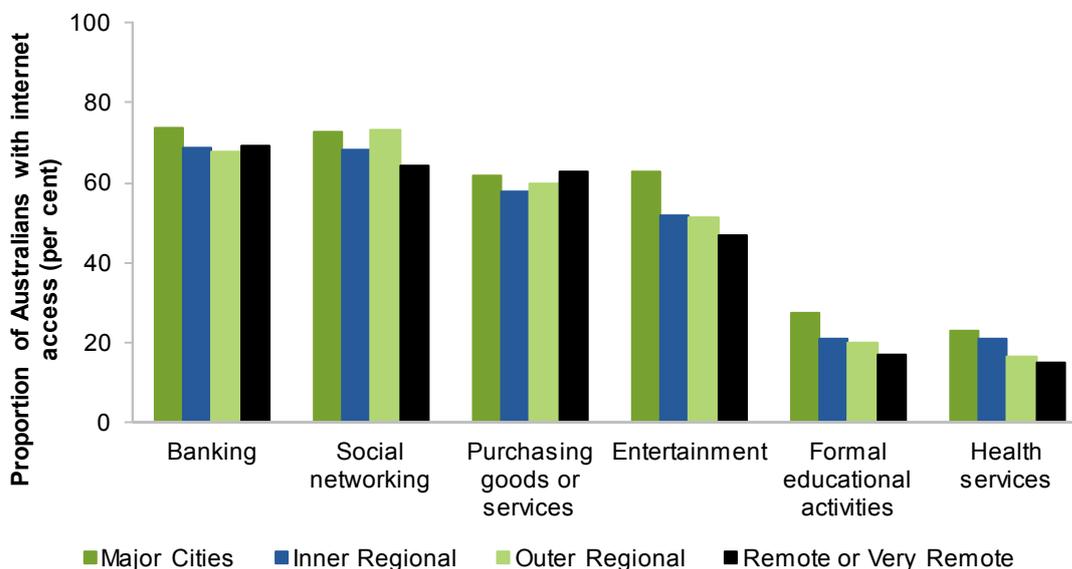
Figure 2.7 Types of internet access vary by remoteness
 Medium of internet access by internet-connected households, 2014-15



Source: ABS (*Household Use of Information Technology, Australia, 2014-15*, Cat. no. 8146.0).

Figure 2.8 Australians use the internet for a variety of reasons

Online services accessed by internet-connected Australians in a three month period, 2014-15



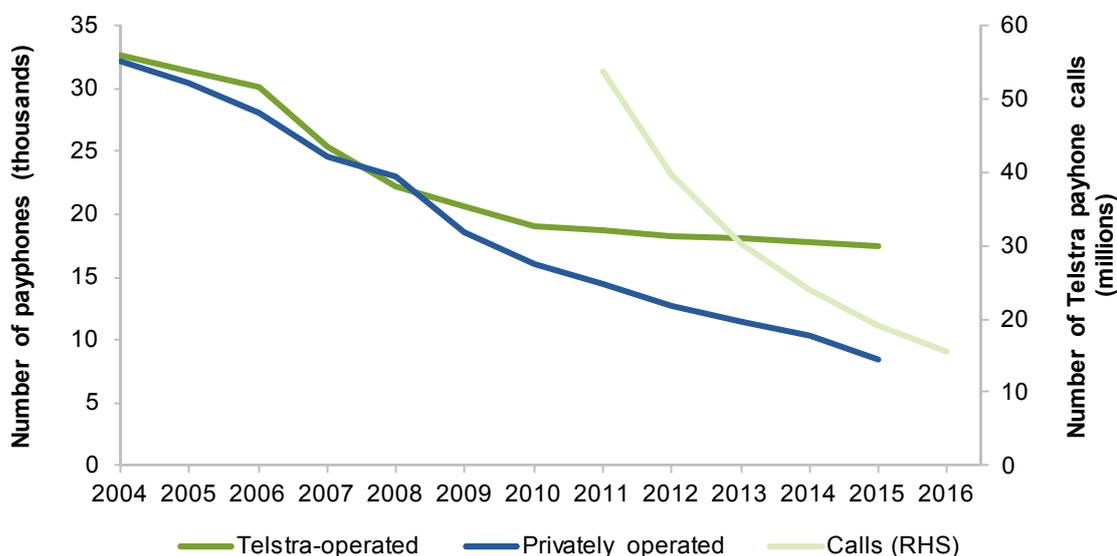
Source: ABS (*Household Use of Information Technology, Australia, 2014-15*, Cat. no. 8146.0).

Payphones are in decline

Payphones — both those supplied by Telstra under the telecommunications universal service obligation (TUSO) and those commercially supplied by other private providers — have declined in number over the past decade, and calls from Telstra payphones have declined at a faster rate (figure 2.9). The number of Telstra- and other privately operated payphones fell by 46 and 74 per cent between June 2004 and June 2015, respectively, while the number of calls made from Telstra payphones declined by 71 per cent in the six years to June 2016.

Other privately operated payphones are concentrated in urban areas to a greater extent than Telstra-operated payphones, and Telstra’s share of the payphone market (64 per cent at June 2015) is at its lowest in urban areas. Other privately-operated payphones are often located in hotels, clubs and convenience stores (ACMA 2015b), while Telstra-operated payphone locations are determined on the basis of proximity to residential and commercial areas and other payphones, and commercial viability — as set out by the Australian Communications and Media Authority’s (ACMA’s) guidelines (chapter 3). Although the total number of Telstra-operated payphones is in decline, Telstra continues to install new payphones to meet its obligations under the TUSO with 67 new payphones installed in 2014-15 (TUSMA 2015). This was against the removal of 361 payphones in that year, generating a net decline of 294 payphones (ACMA 2015b). Telstra also uses some of its payphones as WiFi hotspots, as part of its ‘Air Network’ (Telstra 2015a).

Figure 2.9 Payphones are in decline^a
 Number of Australian payphones by provider and number of calls placed at Telstra payphones, June 2004 to June 2016



^a Number of calls made from Telstra payphones not available prior to 2011.
 Sources: ACMA (2009, 2010a, 2015b); Telstra (pers. comm., 31 August 2016).

2.2 Technological changes

Trends in the use and availability of telecommunications services discussed above have been enabled by continual and rapid technological advances. These advances are driving the ‘convergence’ of the sector, with different devices and networks moving toward performing similar tasks. Convergence is most evident in improvements to wireless networks, which provide increasingly similar services to fixed networks.¹³

Fixed-line technologies

The majority of Australian premises receive fixed voice and broadband services over fixed-line networks — terrestrial networks featuring fixed-line access infrastructure (box 2.3). Although wireless technologies are increasingly used to supply fixed services, the NBN will still use fixed-line technologies to supply broadband access to 92 per cent of Australian premises.

¹³ Another clear example of convergence in telecommunications is the emergence of OTT subscription video on demand services, which are challenging traditional broadcasting models (BCR 2016b). However, this trend is not discussed here due to the Commission’s focus on two-way communications (box 2.1).

Box 2.3 Telecommunications networks

Telecommunications networks (fixed-line and wireless, including satellite) consist of two basic components — access infrastructure and transmission infrastructure (also known as backhaul).

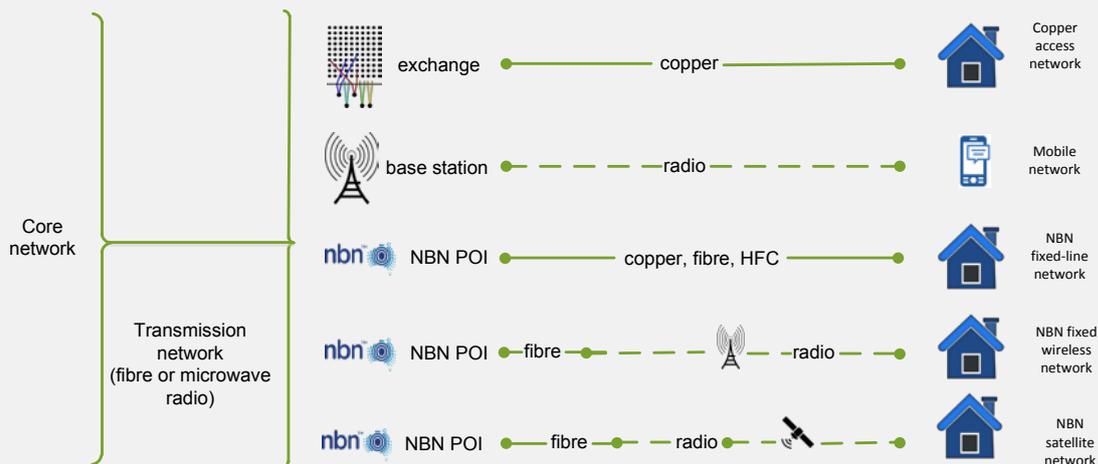
Access infrastructure carries data from consumers to aggregation points (in a generic sense), where it is aggregated and carried to retail service providers’ core networks. Fixed-line and wireless networks are largely distinguished by their access infrastructure.

- Fixed-line access infrastructure uses wired cabling. Older networks, such as the ubiquitous copper access network, use copper cabling, while modern networks typically use optical fibre cabling, which allows data to be transmitted at much faster speeds.
- Wireless networks use radiofrequency signals to transport data at this level.
 - For a mobile network, this is known as the radio access network (box 2.4).
 - To provide satellite voice or broadband, signals are either ‘bounced’ off a satellite to an aggregation point, or the satellite itself may serve as an aggregation point.

Transmission infrastructure carries data from aggregation points to retail services providers’ core networks, and is becoming an increasingly important component of networks due to the exponentially increasing demand for data over both fixed and mobile services. Most transmission infrastructure is fibre-based, although microwave and satellite links are also used.

Because aggregation may occur at many different levels, the boundary between access and transmission networks may be somewhat arbitrary. For the purposes of this report, the Commission has made the following distinction:

- when considering the NBN, points of interconnection (POIs) mark the boundary between the access and transmission networks. Because traffic is passed from nbn to retail service providers at the POIs, nbn is considered an access infrastructure provider^a
- when considering mobile networks, base stations mark the boundary between the access and transmission networks.



^a Not accounting for nbn’s potential expansion into the transmission market (chapter 6).

Fixed-line technologies have progressed in two dimensions. First, the development of DSL technology has allowed existing fixed-line infrastructure to be used in a more technically efficient manner. Using the same copper network, the theoretical maximum download speed that can be reached with an asymmetric digital subscriber line (ADSL) 2+ connection is over 400 times greater than that of dial-up internet access (which was the most common form of internet access in Australia until September 2006 — figure 2.5).¹⁴

However, the extent to which the copper access network can be used to deliver DSL broadband is limited. Generally speaking, DSL cannot be delivered over a copper run exceeding five kilometres, so premises must be situated sufficiently close to the exchange (DoC 2013).¹⁵ Moreover, DSL broadband requires the installation of a DSL access multiplier at the exchange, either by Telstra or a competing retail service provider. But exchanges may be ‘capped’, meaning that no further DSL services can be supported; there may be no free space for third parties to install a DSL access multiplier; or multiple standard telephone lines may be carried over a single copper wire, which limits the extent to which DSL broadband can be provided (DoC 2013). The Department of Communications (2013) estimated that around nine per cent of premises in Australia were unable to receive a DSL broadband service in 2013 (table 2.1). Availability decreases with remoteness, with almost 95 per cent of premises in major cities having access compared to less than 70 per cent in very remote areas (DoC 2013).

Table 2.1 Premises unable to receive DSL broadband and contributing factors^{a,b}
2013

<i>Contributing factor</i>	<i>Number of premises affected</i>	<i>Proportion of total premises</i>
No access multiplier installed	384 000	3.5 per cent
Too far from exchange	307 000	2.8 per cent
Limited port availability	1 090 100	10.2 per cent
Capped exchange	102 900	1 per cent
Premises unable to receive DSL broadband	979 000	9 per cent

^a Not all premises affected by limited port availability and capped exchanges are unable to receive a DSL service. ^b Premises may appear in multiple categories.

Source: DoC (2013).

¹⁴ 56 kilobits per second (kbps) for dial-up versus 24 megabits per second (Mbps) for ADSL2+.

¹⁵ Rural areas are often serviced with heavier gauge cable that can support ADSL on runs as far as 8.6km (DoC 2013).

Newer technologies¹⁶ allow for faster transmission of data over copper than ADSL2+ but can only operate over short copper runs, which precludes their use over the copper access network. However, nbn is running tests of some of these technologies and already implementing others in areas where its access networks have a copper component (appendix B).

Second, existing networks have been upgraded and new networks have been constructed with greater use of fibre-optic — rather than copper — cabling, which allows data to be transmitted at much faster speeds and to much higher volumes. Telstra and Optus deployed HFC networks in the 1990s, which were originally for the purpose of supplying cable television services but have since been upgraded to supply broadband. Prior to the establishment of nbn, Telstra’s network was capable of serving approximately 2.5 million premises in Sydney, Brisbane, the Gold Coast, Adelaide and Perth, while Optus’ network was capable of serving around 1.4 million premises in Sydney, Melbourne and Brisbane (Vertigan Panel 2014); although there are significant overlaps in the coverage of these networks.

The NBN infrastructure rollout involves both upgrades to existing networks and construction of entirely new networks. Its fixed-line networks (reaching around 92 per cent of premises) will be composed of a mixture of FTTP, fibre to the node (FTTN), fibre to the distribution point (FTTdp) and fibre to the basement (FTTB) technologies — named according to the extent to which they replace the copper with fibre cabling — and HFC. To allow this, the ownership of Telstra’s copper and HFC networks and Optus’ HFC network is progressively transferring to nbn as the NBN is rolled out, although nbn (2016f) announced in September 2016 it will not recondition Optus’ HFC network as part of the rollout. Around five per cent of premises will be reached by fixed-wireless technologies, with the *Sky Muster* satellite service covering the remaining three per cent. Collectively, these technologies should be able to meet the Australian Government’s expectation that nbn will provide peak wholesale download rates of at least 25 Mbps to all premises and at least 50 Mbps to 90 per cent of premises in the fixed-line footprint (Fifield and Cormann 2016b). More detailed information on the NBN can be found in appendix B.

Wireless technologies

Wireless technologies (box 2.4) have advanced dramatically in recent years, and are now increasingly used in the provision of both fixed and mobile services. The NBN will offer fixed-wireless and satellite broadband to eight per cent of premises when completed.

¹⁶ These include (in order of increasing speed) very-high-bit-rate DSL (VDSL), G.fast and XG.FAST.

Box 2.4 **Wireless technologies**

Wireless technologies include mobile- and fixed-wireless (terrestrial wireless) as well as satellite.

Mobile- and fixed-wireless

As noted in box 2.3, terrestrial wireless networks are distinguished by the use of radio access networks for the access network component (box 2.5). Fixed wireless networks can support superior speeds and data allowances as each base station services a fixed number of stationary receivers and because fixed wireless antennas can be optimally positioned.

Multiple network operators can share radio access network infrastructure. Sharing is considered 'passive' or 'active' depending on the required degree of operational coordination between providers. Site and mast sharing arrangements (where mobile network operators share antennas) are passive in that they require minimal coordination (because competing mobile network operators are licensed to use different spectrum frequencies), while any further sharing involving signal processing and transmission sharing requires increasing degrees of network compatibility (GSMA 2012). The most comprehensive form of sharing is known as 'roaming', where traffic from multiple providers is carried over a single network. Retail mobile service providers who solely roam over other operators' networks and do not own any radio access network infrastructure (including spectrum) are known as mobile virtual network operators.

Satellite

Satellites are used to deliver voice and broadband services in areas of very low population density or challenging geography, where fixed-line and terrestrial wireless services are not economically viable. For this reason, they often play a 'technology of last resort' role. Although satellite services are limited in capacity and costly to upgrade, they can provide coverage on a much lower cost per unit area basis.

Most telecommunications satellites are geostationary or low earth orbit satellites. Geostationary satellites (including nbn's Sky Muster and Sky Muster II, and Telstra's USOSat) deliver higher throughput through each satellite, while low earth orbit satellite constellations offer services with lower transmission delay (latency) due to their location closer to the Earth.

In addition, satellites may be optimised to provide different services. For example, Telstra's USOSat satellite is designed to provide voice services, while nbn's Sky Muster satellite is designed to provide broadband services. Hence, Sky Muster provides for far greater quantities of data to be transmitted at faster speeds, while USOSat features 'meshing' technology which reduces the latency of data transmitted between two satellite connections. Higher latencies reduce the quality of real-time user-to-user communications (such as voice calling and online gaming), but have less effect on web browsing and video streaming where most traffic is unidirectional.

Direct radio communication

Two-way radios continue to be used for communications, especially in remote areas, aviation (118 to 136 megahertz) and maritime (156.0 to 162.025 megahertz). Several bands in the 'high frequency' (3 to 30 megahertz), 'very high frequency' (30 to 300 megahertz) and 'ultra-high frequency' (300 to 3000 megahertz) ranges are class licenced to allow public use (box 2.6). Because these devices communicate directly with one another (and all others tuned into the spectrum band), they require no physical network infrastructure.

Box 2.5 Radio access networks

A radio access network consists of ‘base stations’ (also known as cell towers) and consumer radio antennas, which are contained within mobile devices (originally just mobile phones, but now also smartphones, tablets and mobile internet USB dongles and data cards) in the case of a mobile network or attached to the outside of premises in the case of a fixed wireless network.

Base station antennas can be mounted on either purpose-built towers or the rooftops of existing buildings, and are typically positioned between 15 to 50 meters above ground.

The coverage provided by a base station (known as the cell coverage or cell size) depends on the power of the base station antennas, the frequency of the radio spectrum in use and the geographical features of the cell. Generally, a cell size with a radius of between around 0.3 and 22 km is achieved, but distances of up to 200km are possible in some circumstances. In densely populated areas, smaller cells are necessary to handle network congestion — as more consumers are contained within a cell, the demands on the base station become greater. There is a general trend toward smaller cell sizes, as these are necessary to provide consumers with faster broadband speeds and greater data allowances.

The radiofrequency spectrum used for a radio access network (box 2.6) is a scarce resource. Lower frequency spectrum bands are especially valuable, as they allow signals to be transmitted over longer distances with greater building penetration; however the trend toward smaller cell sizes is increasing the relative value of higher frequency spectrum bands.

Sources: ACCC (2016f); ACMA (2014b); Mobile Network Guide (2016a).

Box 2.6 Allocating radiofrequency spectrum

In Australia, the Australian Communications and Media Authority (ACMA) is responsible for managing radiofrequency spectrum. It does so by issuing three types of licences:

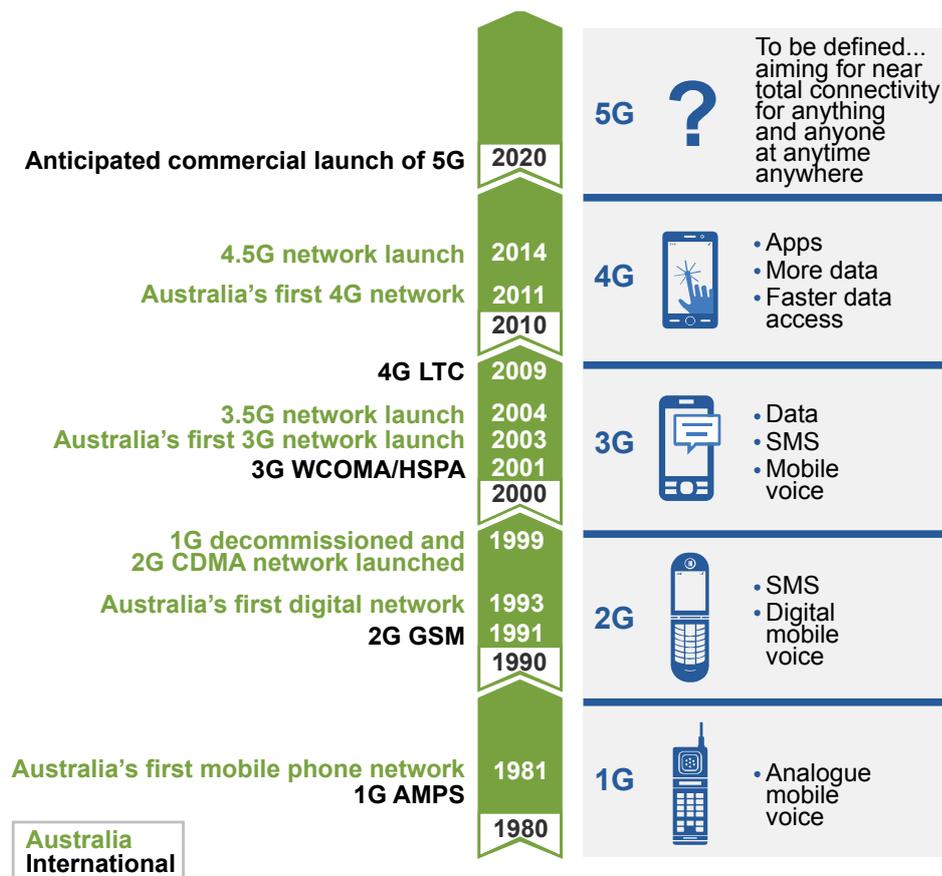
- *spectrum* licences allow the holder to transmit within a specified frequency bandwidth and geographical area. They are allocated by auction for a period of up to 15 years and can be traded. Spectrum bands used in the provision of most wireless networks are allocated in this way
- *apparatus* licences grant permission for a licensee to use a particular frequency bandwidth in a particular area for a specified purpose for a period of up to five years. Holders pay an annual licence tax. Radio and televisual broadcasting is generally carried out using this form of licence, and nbn holds apparatus licences (in addition to spectrum licences) to operate its fixed-wireless network
- *class* licences are designed for small-scale local transmissions, such as WiFi. They are not issued to individual users and involve no fee; rather they act as an industry standard for applicable products.

Sources: ACMA (2013a, 2015a, 2016d).

A key development in mobile and fixed wireless technologies is the evolution of their underlying capabilities from 1G (the first generation) in the 1980s to 4G (the fourth generation) today, with 5G currently in development and expected to be launched commercially in Australia in 2020 (figure 2.10).¹⁷ In Australia, all mobile network operators provide 4G service for the majority of their consumers (section 2.3), and NBN fixed wireless uses 4G technology.

5G is expected to bring significant further advances in mobile technology through improved mobile connectivity (in terms of broadband speed and data allowances) (figure 2.10; box 2.7). It is also expected to result in mobile broadband expanding into new areas. For example, the scope of the Internet of Things (box 2.8) is likely to expand once 5G mobile connectivity becomes available. Improvements in bandwidth and energy efficiency will allow more devices to be connected at all times, while improved reliability and ultra-low latencies will enable potentially life-critical automotive and medical functions such as automated vehicles and remote surgery (ACMA 2016a).

Figure 2.10 The evolution of mobile networks



Source: ACMA (2016a).

¹⁷ The International Telecommunications Union is responsible for setting the standards that govern the technical aspects of each generation to ensure compatibility between devices and networks.

Box 2.7 Expected characteristics of 5G networks

The ACMA (2016a) lists the following seven characteristics of 5G networks:

- *Data rates* — increased to 1000–10 000 Mbps^a, which is a step change for mobile networks and is expected to facilitate a high quality and a more seamless user experiences. By comparison, 4G networks in Australia provide advertised data rates of between 2–100 Mbps.
- *Ultra-low latency* — reduced to a 1 millisecond end-to-end round-trip delay. This is also a step change for mobile networks. By comparison, 4G networks can theoretically achieve a minimum round-trip latency of 10 milliseconds.
- *Bandwidth* — increased by 1000 times per unit over existing mobile networks. This will support faster data rates and increase network capacity to support data intensive applications in both the uplink and downlink.
- *Connections* — 10 to 100 times more connected devices than are now supported by existing networks. This is theoretically possible on 4G networks. Mass connectivity is identified as a key enabler for the Internet of Things.
- *Always on* — available everywhere (100 per cent coverage) at all times (99.999 per cent of the time) within designated locations. This requirement is also theoretically achievable using 4G technologies. It is necessary for high mobility applications and coverage indoors and outdoors as well as high reliability requirements for services where network outage could have catastrophic consequences.
- *Energy usage* — network energy usage reduced by 90 per cent.
- *Battery life* — of up to 10 years for low power, machine-type devices. Both the energy usage and battery life requirements are theoretically achievable using 4G technologies and are aimed at ensuring future networks are cost-effective for network operators.

^a However, the International Telecommunication Union's official roadmap states that 5G could achieve speeds of up to 20 Mbps (ACMA 2016a).

Box 2.8 The Internet of Things

The Internet of Things (also known as the 'internet of everything') describes the wireless connection of devices and sensor-embedded objects — 'things' — to the internet. These can monitor the location, health and activities of people and animals, the state of the natural environment and much else.

The Internet of Things has growing consumer, producer and societal applications, usually through the collection and real-time analysis of data and the automation of processes. 'Smart' homes can automatically unlock doors for occupants, adjust light and heating settings and even order groceries, while automated production methods can reduce production costs and create safer working environments. In the future, some health services (both monitoring and treatment) could be delivered remotely or even automatically. In rural areas, smart monitoring system allow for the precise application of water and fertilizer to reduce waste and optimise yield.

Source: OECD (2015).

Another key development in wireless technologies is in WiFi technology. This technology, originally developed for short range non-commercial communications (on a private and public basis), is now being used on a commercial basis to supplement fixed and mobile broadband.

Telstra's 'Air Network' features thousands of WiFi hotspots around Australia, including many co-located with payphones. Telstra fixed broadband customers are entitled to access their data allowance at these hotspots, and receive additional data for allowing their private WiFi hotspot to be used as part of the network. iiNet has a similar system in place for its customers.

In addition, new providers such as Lightning Broadband are using a WiFi-based access network to deliver fixed wireless broadband. As WiFi spectrum bands are class-licenced, this allows the provider to avoid paying spectrum licence fees. However, there is insufficient WiFi spectrum to support mass-market products of this variety (Tsang 2016b).

WiFi technology is also adapting to allow features associated with traditional mobile networks. Features such as WiFi calling (also known as voice over WiFi) over both commercial and non-commercial WiFi networks will soon be available through all Australian mobile network operators (Optus 2015; Pearce 2016; Reichert 2016b).¹⁸ Further, a new WiFi connectivity standard called Hotspot 2.0 (also known as WiFi Certified Password) has been developed, which allows users to seamlessly roam between public WiFi networks without having to connect with each individually. This should dramatically reduce problems with 'dead spots' under existing mobile networks.

Advances in both geostationary and low earth orbit satellite technology are allowing for improved telecommunications outcomes in remote areas. Advanced high throughput geostationary satellites include nbn's *Sky Muster* and *Sky Muster II* satellites, which each feature 101 distinct spot beams covering Australia, allowing for more efficient spectrum re-use. The satellites also operate in the higher frequency 'Ka' band (26 500-40 000 megahertz), which allows for faster data transfer rates.

Several advanced low earth orbit satellite networks have been proposed or are currently under development, including those of OneWeb and SpaceX. The OneWeb constellation (expected to be available from 2019 or 2020) is anticipated to consist of 648 satellites, while the SpaceX network is anticipated to feature 4000 satellites (BCR 2015). Both networks are intended to supply global broadband coverage.

2.3 Industry structure

Technological and policy developments are shaping the structure of the telecommunications sector. While technological factors tend to influence the provision of both fixed and mobile services in a similar manner, the Australian Government has played

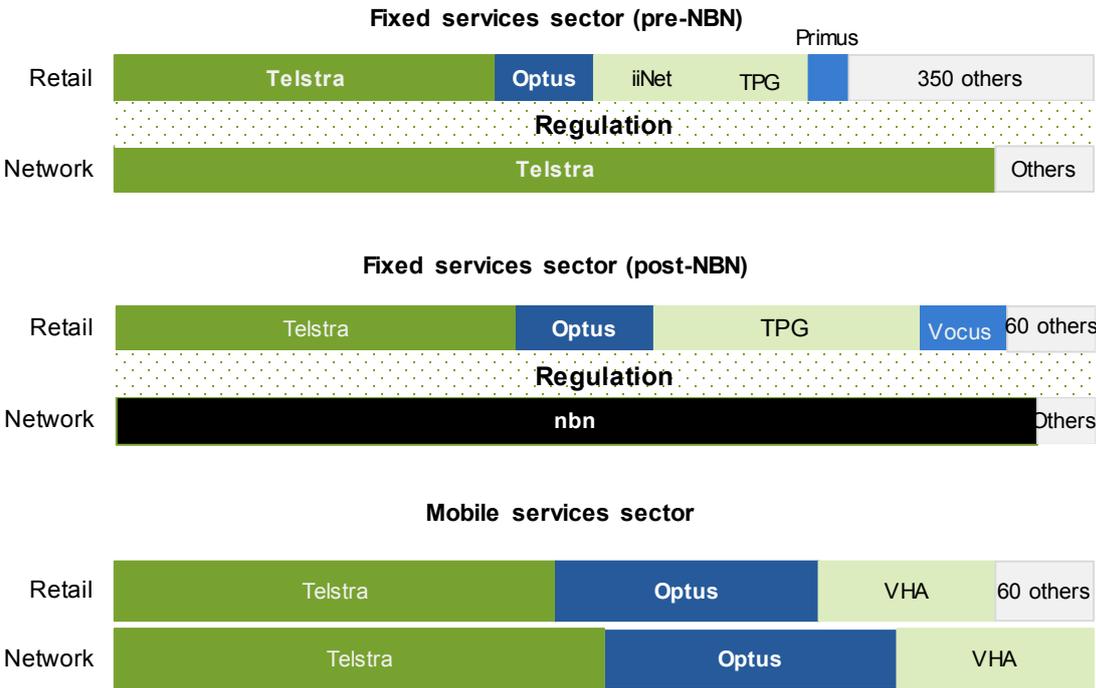
¹⁸ While these services are new in that they offer voice calling over WiFi which mimics traditional mobile voice calling, WiFi voice calling through OTT providers was previously possible.

a far larger role in the provision of fixed services than in mobile services. Most significant is the establishment of nbn, underwritten by the Australian Government. As well as providing the infrastructure for faster fixed broadband connections, nbn will cement a wholesale-only infrastructure provision regulatory framework in the fixed services sector.

An overarching technological trend is that of convergence between fixed and mobile services. The fixed services sector is facing increasing competition from the mobile sector, placing downward pressure on retail prices. This trend will continue into the future, most notably with the introduction of 5G wireless technology.

Figure 2.11 shows the structure of the fixed and mobile telecommunications markets. The fixed services market is shown both before and after the emergence of the NBN. Even though convergence is increasingly allowing consumers to access the majority of telecommunications services through mobile devices, there are significant structural differences between the fixed and mobile services sectors.

Figure 2.11 The Australian telecommunications sector^{a,b,c}
Key players and market shares



^a Proportions are indicative of market shares. Pre-nbn is as at June 2010. Post-nbn network market shares are based on 2022 forecasts by the BCR (2015), while retail shares are as at June 2015. Only retail service providers with more than 1000 customers are shown. ^b 'Regulation' represents the access regulation detailed in box 2.11. ^c iiNet was acquired by TPG in 2015 and Primus was acquired by M2 in 2012, which was itself acquired by Vocus in 2015.

Fixed services

The provision of fixed services is undergoing a transition. Previously, fixed services (voice and broadband) were provided over Telstra's network by either a non-integrated retail service provider purchasing (regulated) wholesale access to Telstra's network, or by Telstra itself — the integrated infrastructure and retail service provider (RSP). With the rollout of NBN infrastructure, however, the market is moving toward the provision of access infrastructure on an open access and wholesale-only basis.

There is a separate market for the provision of transmission infrastructure that enables retail service providers to connect their core networks to Telstra or nbn's access networks. However, because of the high (and increasing) degree of integration between transmission infrastructure and retail service provision, these are considered together in this section.

A time of transition in the provision of access infrastructure

Prior to the commencement of the NBN infrastructure rollout, Telstra was the near sole provider of fixed access infrastructure in the form of its ubiquitous copper access network (box 2.9), built before the sector was opened to competition in 1997. In June 2010, just prior to the commencement of the NBN rollout, over 89 per cent of fixed voice services were supplied over Telstra's copper access network.¹⁹ The network is still used in areas not yet covered by the NBN for the provision of fixed voice and DSL broadband services.²⁰ At 30 September 2016, the NBN infrastructure rollout had reached just over one quarter of all Australian premises, with completion forecast for 2020 (appendix B).

Box 2.9 The copper access network

The copper access network is the largest fixed access network in Australia. It was largely constructed under the auspices of the Postmaster-General's Department, which was responsible for the provision of telecommunications services prior to telecommunications reforms of the 1970s. At liberalisation in 1997, the network was owned by Telstra and became privately owned as Telstra was privatised, a process completed in 2006.

The network consists of around 5000 Telstra exchanges, with copper lines connecting premises to their local exchange. Prior to the commencement of the NBN rollout, the network was capable of providing fixed voice services to 99.75 per cent of all premises (McKinsey & Company and KPMG 2010).

When the NBN is completed, nbn is likely to hold a significant share of the fixed wholesale market. The Bureau of Communications Research (2015) estimated that the proportion of superfast broadband (normal download speeds in excess of 25 Mbps)

¹⁹ Commission estimate based on table 2.3 in ACCC (2011a).

²⁰ Under the 'Copper Continuity Obligation', the copper access network will be used to deliver USO services outside of the NBN fixed-line footprint. See chapter 3 for more information.

services in operation using the NBN is likely to reach 90 per cent in 2018 and 94 per cent in 2022. Alternative infrastructure providers will predominantly operate in new housing developments and some profitable metropolitan areas (BCR 2016b). A summary of current fixed-line superfast broadband infrastructure providers is listed in table 2.2.

Table 2.2 Superfast fixed-line broadband providers^a
As at October 2015

<i>Network operator</i>	<i>Network technology</i>	<i>Premises ready for service</i>	<i>Notes</i>
nbn	FTTP, FTTN, FTTdp, FTTB, HFC	897 000	Forecast to increase to 10.9 million premises by 2020.
OptiComm	FTTP	147 000	Operating in around 100 sites.
Telstra	FTTP	118 000	Velocity and South Brisbane networks. Telstra's Velocity (Fibre Access Broadband) service is available in 130 sites.
iiNet	FTTdp, FTTP	65 000	The former TransACT network services the Canberra region and contains largest VDSL2+ network in Australia.
iiNet	HFC	80 000	The former TransACT network services the regional Victorian centres of Ballarat, Geelong and Mildura.
Other greenfield operators	FTTP	50 000	Includes OPENetworks, Pivit and other private FTTP greenfield networks operators.
TPG	FTTB	3 200	Passes 352 multi-dwelling units in metropolitan centres. TPG has announced plans to connect a total of 500,000 premises to this network.

^a All NBN connections were FTTP at October 2015.

Source: BCR (2015).

Access infrastructure is increasingly provided on a wholesale-only basis

While two of the superfast network operators listed in table 2.2 also provide retail services (TPG and iiNet — now owned by TPG), and Telstra operates as a vertically integrated infrastructure/retail provider in areas not yet served by NBN infrastructure, the sector is moving toward a model of wholesale-only access infrastructure. This shift is due to government policies, rather than market forces:

- nbn is not permitted to offer retail services. Moreover, access by RSPs to the NBN must be provided on a non-discriminatory basis
- non-NBN superfast networks built after 1 January 2011 must operate on a wholesale-only basis (box 2.8).

In addition, the ACCC regulates access to access infrastructure (box 2.10).

Box 2.10 Access regulation of fixed services

The Australian Competition and Consumer Commission (ACCC) regulates third party access (price and non-price terms) to fixed access infrastructure. Eight non-NBN fixed line services are 'declared'. These are the unconditioned local loop service, line sharing service, fixed originating access service, fixed terminating access service, wholesale line rental, local carriage service, wholesale asymmetric digital subscriber line, and local bitstream access service.

Although NBN services can also be declared, the ACCC accepted a 'special access undertaking' from nbn in December 2013, which established principles for regulating access to the NBN until June 2040. In addition, nbn publishes 'standard forms of access' agreements relating to its services, which declares those services according to the terms of the agreements.

The ACCC also oversees the 'structural separation' of Telstra — the process whereby Telstra end-users are migrated to the NBN — through its 'structural separation undertaking'. The undertaking outlines how Telstra will progressively cease supplying services over its copper and HFC networks and commence supplying these services over the NBN, and also provides that it will in the interim continue to supply regulated services to its wholesale customers and own retail business units on equivalent terms (in line with previous operational separation arrangements).

Access to non-nbn superfast broadband networks is regulated through a variety of means.

- Networks built, upgraded or altered after 1 January 2011 are subject to 'level playing field' provisions set out in the *Telecommunications Act* 1997 (Cth) as subsequently amended and the 'local bitstream access service' declaration. Services must be supplied on an open access and wholesale-only basis as a 25/5 Mbps service at \$27 per month.
- Telstra's FTTP networks in South Brisbane and 'Velocity estates', and iiNet/TPG's FTTN network in the ACT and extensions to its HFC network in regional Victoria are subject to Ministerial exemptions from these instruments, but are required to offer a wholesale level service (with no price regulation).
- Networks in existence prior to 1 January 2011 and altered to provide services to residential consumers (but not sufficiently so to be deemed subject to level playing field conditions or the local bitstream access service declaration) had their carrier licence conditions altered in 2014 to require functional separation and the supply of wholesale open access services of 25/5 Mbps at \$27 per month. This intervention was targeted at TPG's FTTB network.
- In July 2016, the ACCC declared a 'superfast broadband access service', which will cover remaining networks. An inquiry into the price and non-price terms of the declaration is ongoing.

Sources: ACCC (2016b, 2016f).

... and NBN wholesale prices are capped

Wholesale access to NBN infrastructure involves three charges, each of which features a price cap which is the same across the entire network:

- for each connected consumer, the RSP must pay an Access Virtual Circuit (AVC) charge. This also includes a 0.15 Mbps of prioritised channel to allow a reliable managed VoIP service

-
- RSPs purchase bandwidth by paying the Connectivity Virtual Circuit (CVC) charge. How much bandwidth to purchase and how the bandwidth is divided between consumers is at the discretion of the RSP, which allows for a degree of product differentiation
 - at each connected POI, the RSP pays a Network to Network Interface (NNI) charge.

More information on these charges can be found in appendix B.

Retail service and transmission infrastructure providers have consolidated and integrated

Consolidation of retail providers of both fixed voice and fixed broadband services has occurred, involving mergers between, or acquisitions of, mostly small and medium-sized RSPs to create larger RSPs (box 2.11). The number of retail internet service providers in Australia with more than 1000 subscribers declined from 104 to 62 over the five years to December 2015 (ABS 2016e, 2016f), and the ACCC noted ‘A feature of the fixed broadband market over a number of years has been consolidation through acquisition, with no large-scale new entry or significant organic growth’ (2015, p. 12).

Box 2.11 Major mergers and acquisitions in the fixed services sub-sector

Between retail service providers

- iiNet acquired Westnet in 2008, Netspace in 2010, AAPT’s retail division in 2010, Internode in 2012 and Adam Internet in 2013.
- TPG acquired iiNet in 2015.
- M2 acquired Primus Telecommunications in 2012, and Dodo in 2013.
- Vocus and M2 merged in 2016.

Between retail services providers and transmission infrastructure providers

- TPG acquired PIPE Networks in 2009 and AAPT in 2013.
- iiNet acquired TransACT (access infrastructure) in 2011.
- Vocus acquired Amcom in 2015 and NextGen Networks in 2016.

Industry maturation may account for the acquisitions of smaller local providers by larger national providers that occurred in the mid to late 2000s, but more recent activity can be attributed to the increasing economies of scale on offer in the retail market as the NBN is rolled out. Relevant factors include:

- nbn’s national wholesale price cap, which allows RSPs to develop broadband plans on a national level. Indeed, where possible, RSPs are already offering such plans (ACCC 2016b)

- nbn's CVC charge, which results in RSPs with fewer customers at a POI paying higher per-customer wholesale rates (ACCC, pers. comm., 9 September 2016)
- the number of NBN POIs. There are 121 nbn POIs compared with 570 POIs for Telstra's network (ACCC, pers. comm., 9 September 2016). Hence, marginal transmission costs of servicing additional consumers are lower on nbn's network.

In addition to consolidation in retail services provision, RSPs have also sought to acquire transmission infrastructure, usually through the acquisition of wholesale transmission networks (box 2.12). Moreover, transmission markets have also consolidated as single RSPs have purchased multiple wholesale transmission providers.

Box 2.12 Infrastructure sharing between Australian mobile network operators

- Beginning in 2004, Telstra and Hutchinson (prior to its merger with Vodafone in 2009, and branded as '3') shared a 3G network on equal terms. Known as the 3GIS network, it had a population coverage of approximately 56 per cent. Hutchinson's customers were also permitted to roam over Telstra's Next G (more advanced 3G) network and 2G networks in other areas. The 3GIS network was decommissioned in 2012.
- In 2012, VHA and Optus announced an agreement to share 500 new 4G base stations and some existing base stations, including around 500 of VHA's base stations. VHA also gained some roaming access to Optus' network in areas where Telstra also has network coverage as part of the agreement.
- VHA and Telstra have a roaming arrangement that allows VHA customers to access Telstra's 2G network on eight highways in Victoria and 12 in Tasmania. However, Telstra's 2G network will be decommissioned on 1 December 2016 and VHA now offers mobile coverage on many of these highways.

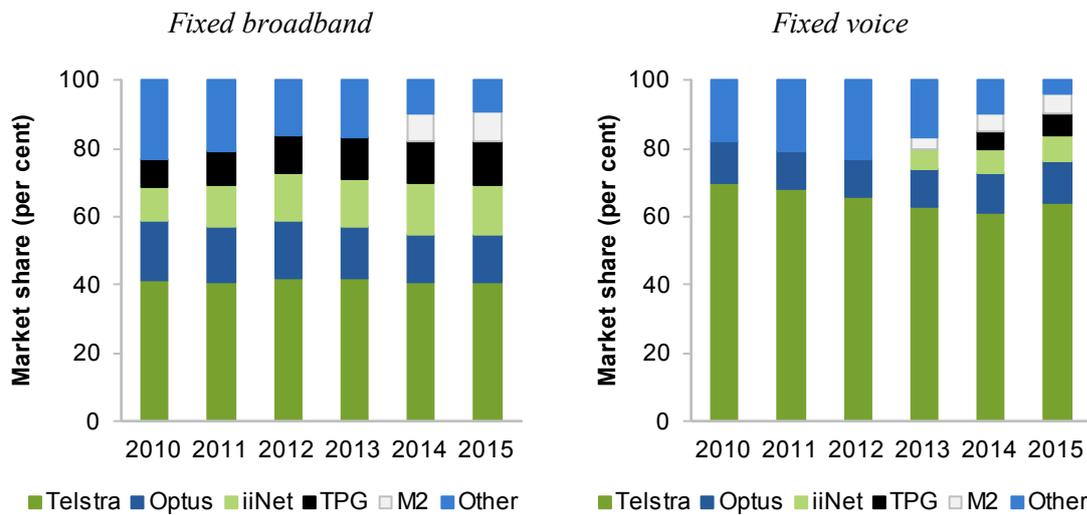
Sources: Angrove (2012); Hutchinson (2012); Telstra (2015b); VHA (2016b).

As a result of these developments, retail and transmission services are now largely provided by four vertically-integrated national providers that collectively hold 91 per cent of the fixed broadband services and 96 per cent of the fixed voice services retail markets (ACCC 2016b), and over 90 per cent of transmission contracts (ACCC 2016h) — Telstra, Optus, TPG/iiNet (referred to hereafter as TPG) and Vocus/M2 (referred to hereafter as Vocus). However, there are 140 retail service providers supplying services over the NBN (nbn 2016e) and 62 RSPs with more than 1000 subscribers (figure 2.11).

At the retail level, TPG and Vocus' market shares (including acquisitions) have increased over the five years to June 2015, mostly at the expense of Telstra in the fixed voice services market and Optus in the fixed broadband services market (figure 2.12) — although Telstra still holds the largest share of both markets, with 64 per cent of the fixed voice services market and 41 per cent of the fixed broadband services market. Telstra's share of the NBN fixed broadband market is higher, at 47 per cent for FTTP, 52 per cent for FTTB and 58 per cent for FTTN. However, this is likely due to the NBN rollout

reaching rural and regional areas before metropolitan areas (Boyd 2016) and, hence, can be expected to subside over time.

Figure 2.12 Fixed services retail market shares^{a,b}
Based on subscriber volumes, June 2010 to June 2015



^a Companies in 'other' category vary over time. ^b TPG and iiNet merged in 2015.

Sources: ACCC (2011a, 2016b).

Mobile services

Whereas developments in the fixed services sector have been driven by high levels of government-funded infrastructure and regulation, the mobile services sector has been mostly market-driven with limited government intervention.

The provision of mobile services is undertaken by vertically-integrated mobile network operators who own networks, and mobile virtual network operators who resell wholesale mobile services. There are currently three mobile network operators in the Australian market — Telstra, Optus and Vodafone Hutchinson Australia (VHA) — and over 60 mobile virtual network operators (ACCC 2016f). Infrastructure sharing between mobile network operators is limited (box 2.12), although co-location is actively promoted by the ACCC through its Facilities Access Code.

In addition to their mobile networks, Telstra and Optus both own significant transmission networks, while VHA leases some transmission infrastructure from other providers.²¹ There is a degree of transmission infrastructure sharing between the fixed and mobile

²¹ For example, in September 2015 TPG and VHA signed an agreement for TPG to supply transmission infrastructure and network services to over 3000 VHA base stations over 15 years. (TPG 2015).

services sub-sectors, although the precise extent to which this occurs is unclear. As with the fixed services sub-sector, many transmission services are covered by the domestic transmission capacity service declaration, which provides for wholesale access at regulated prices in areas not deemed sufficiently competitive. After reducing regulated access prices in April 2016, the ACCC (2016a) anticipated that competition in downstream markets (which include mobile networks) will intensify.

The three networks vary in their attributes, and — for consumers positioned to access all three — each offers a degree of differentiation to their customers. Telstra’s network has the greatest population and geographical coverage, at 99.3 per cent and 30.6 per cent, respectively (table 2.3).

Table 2.3 Australian mobile networks^{a,b}
Main technologies and features

3G or 4G	Coverage, latency and reliability	Telstra	Optus	VHA
All	Population coverage	99.3 per cent	98.5 per cent	96 per cent
	Landmass coverage	>31 per cent	15.58 per cent	3G: 7.5 per cent 4G: 3.6 per cent
3G	Population coverage	99.3 per cent	98.5 per cent	95.5 per cent
	Metro population coverage	100 per cent	100 per cent	99.7 per cent
	Non-metro population coverage	98 per cent	98 per cent	83.7 per cent
	Average download speed	3.95 Mbps	4.35 Mbps	4.76 Mbps
	Latency	94.47 milliseconds	87.39 milliseconds	72.02 milliseconds
	Reliability	94 per cent	95 per cent	95 per cent
4G	Population coverage	98 per cent	95 per cent	93.7 per cent
	Metro population coverage	95 per cent	98.5 per cent	99.5 per cent
	Non-metro population coverage	74 per cent	89 per cent	78 per cent
	Average download speed	23.60 Mbps	19.18 Mbps	18.49 Mbps
	Latency	56.26 milliseconds	51.88 milliseconds	54.71 milliseconds
	Reliability	99 per cent	98 per cent	97 per cent

^a Bolded values indicate superior scores. ^b Telstra metro/non-metro breakdowns are from 2014, and may understate actual coverage figures.

Sources: OpenSignal (2016); Optus (pers. comm., 31 October 2016); RTIRC (2015b); Telstra (pers. comm., 4 November 2016); VHA (pers. comm., 1 November 2016).

For access to superior network coverage and faster 4G download speeds, Telstra’s customers pay a premium of, on average, around \$9 per month (CIE 2015). Moreover, Telstra was the first network operator to launch its 4G network (in September 2011), ahead of Optus (April 2012) and Vodafone (June 2013). VHA and Optus offer lower-priced services but with reduced network coverage and speeds.

Each network operator provides access (on a voluntary, commercial basis) to virtual network operators — third party operators who resell wholesale services from the network operators’ networks, typically through a roaming arrangement. It is common for virtual network operators to be provided access to only a limited portion of their host network, such as only the 3G network where 4G is available, or to restricted network coverage. Hence, virtual network operators are typically budget-priced providers, adding further degrees of differentiation to the market. Most virtual network operators roam over only one network, but some have agreements with multiple network operators (such as Macquarie Telecom which uses the Optus and VHA networks, and Southern Phone which uses the Optus and Telstra networks), but offer consumers access to only one of these networks. Optus and VHA host the greatest number of virtual network operators at 29 and 18 respectively, with Telstra offering wholesale services to just 8 virtual network operators (Mobile Network Guide 2016b). In addition, all Telstra-serviced virtual network operators are limited to Optus’ 98.5 per cent population coverage — allowing Telstra to maintain its market dominance outside of these areas. The arrangement between Optus and its virtual network operator Virgin Mobile is unique — Virgin Mobile has been a wholly-owned subsidiary of Optus since 2006, and now effectively operates as its budget brand.

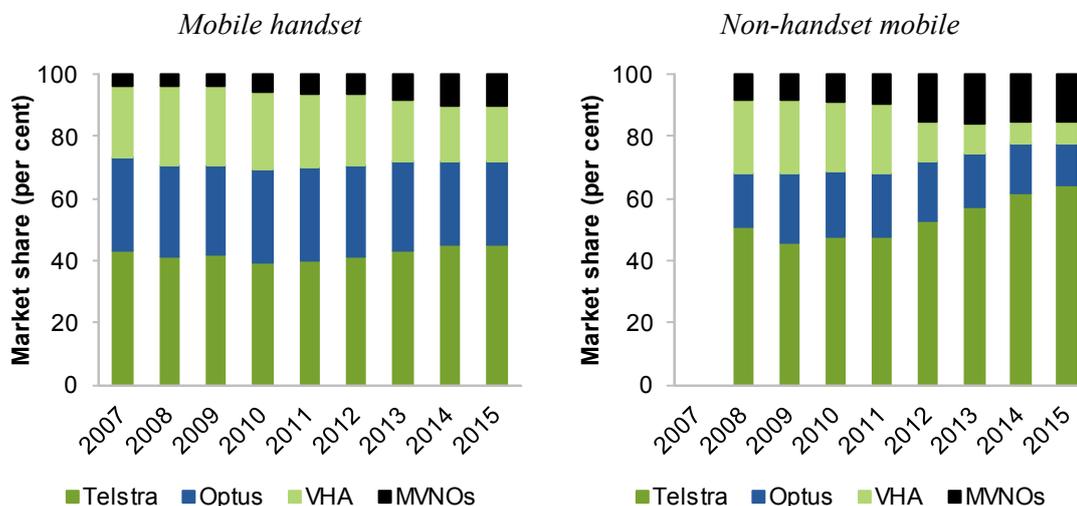
All network operators and virtual network operators offer national pricing regimes (ACCC 2016f). Telstra mobile plans (both pre- and post-paid) start at around \$35 per month, while virtual network operators offer budget plans starting at around \$15–20 per month. Implicit in these pricing structures is a level of cross-subsidisation between low-cost users typically based in metropolitan areas and high-cost users in non-metropolitan areas.

Telstra and the virtual network operators’ market shares are growing

In both the mobile handset and other mobile broadband markets, the market shares of both Telstra and the virtual network operators have increased since 2007, at the expense of VHA and, to a lesser extent, Optus (figure 2.13). Telstra held 45 per cent of the retail mobile handset services market in June 2015 (up from 40 per cent in June 2011) and 64 per cent of the retail wireless broadband market (up from 47 per cent in June 2011). The market share of virtual network operators increased from 4 to 10 per cent in the mobile handset market in the eight years to June to 15 per cent in the other mobile broadband market. Takken (2016) attributes the increase in the virtual network operators’ market share to the rising popularity of ‘bring your own device’ mobile plans, which lower customer acquisition costs for providers.

Figure 2.13 **Mobile services retail market shares^a**

Based on subscriber volumes, June 2007 to June 2015



^a MVNOs are mobile virtual network operators.

Sources: ACCC (2011a, 2016b).

Investment by mobile network operators is significant

All three network operators are investing heavily in the development and upgrade of their networks. In 2015, Telstra announced it would increase its total capital expenditure in its mobile network to 15 per cent of sales, and that in the three years to June 2017 it planned to invest over \$5 billion in its mobile networks (Telstra 2015a). Later in 2015, following Optus' announcement of an increase in annual capital expenditure to \$1.85 billion, Telstra announced that it would raise spending as much as needed to remain Australia's leading mobile services provider (Ramli 2015). As a result of widespread network difficulties in late 2010 (Hanlon 2014), in 2014 VHA invested almost \$1 billion in network capital expenditure — comparable to Telstra's \$1.2 billion (Ramli 2014). Subsequently, VHA has invested a total of around \$3 billion in the three years to July 2015. (ACCC 2016f).

Mobile investment in regional areas is increasing, both as a result of market forces and government support. The 2015 Regional Telecommunications Independent Review Committee (RTIRC) (2015b, p. 4) found that 'current investment plans and competitive dynamics are likely to provide additional regional coverage in the near future'. Meanwhile, the Australian and state and territory Governments have committed \$247.35 million to expanding mobile coverage in regional areas through the first two rounds of the Mobile Black Spot Programme (chapter 4).

2.4 What has this meant for consumers?

Consumers have generally benefited from developments in the telecommunications sector through enhanced choice, better products and lower prices.

There is more choice

Telecommunications markets are delivering increasing choice to consumers with the range of offerings expanding both across mobile and fixed platforms. In the mobile sector, consumers can choose between budget-priced virtual network operators at one end of the spectrum (with the majority operating off Optus' network) and Telstra's premium network at the other. In the fixed services sector, the NBN offers multiple speed tiers, and it is anticipated that all consumers will have at least two RSPs to choose from.

Further, fixed and mobile services are converging, so that consumers can increasingly choose between a fixed and a mobile service to perform a desired function. Consumption patterns reflect this shift, with consumers treating voice calls via a mobile service as largely a substitute for voice calls via a fixed service (section 2.1).

Convergence is also evident in the provision of broadband services, although not to the same extent as voice services. Average 4G download speeds in Australia are comparable to fixed download speeds,²² but average fixed data allowances (as at June 2015) are 60 times higher than average mobile data allowances (ACCC 2016b). Hence, the ACCC noted when analysing trends in fixed and mobile broadband usage:

... the majority of consumers are using a mobile broadband service as a complement to a fixed line broadband service, rather than as a direct substitute ... Consumers appear to strongly prefer to use fixed broadband networks when downloading bandwidth intensive content such as video. (2016b, p. 20)

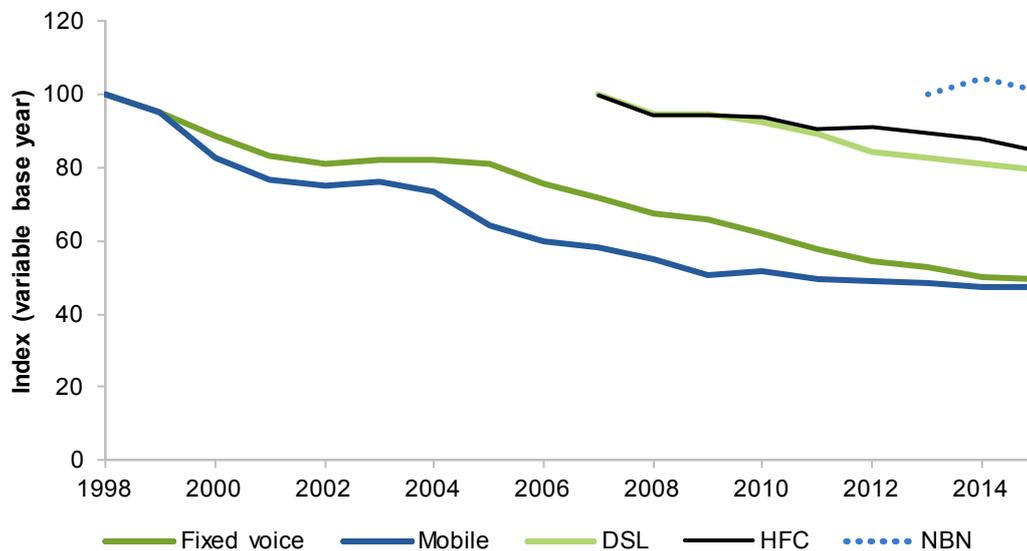
However, mobile broadband data capacity is expected to expand significantly with the introduction of 5G technology (box 2.7).

Prices are falling and service quality is increasing

At the same time, prices of telecommunications services have fallen across both fixed and mobile sectors. The average monthly price of fixed voice and mobile services fell by 51 and 53 per cent respectively between June 1998 and June 2015, while DSL and HFC broadband service prices fell by 21 and 15 per cent, respectively, between June 2007 and June 2015 (figure 2.14).

²² Table 2.4 shows that average 4G download speeds are around 18 to 23 Mbps depending on the network, while Cisco (2016a) calculated average broadband speeds on fixed services to be 18.4 Mbps in 2015.

Figure 2.14 **Prices of telecommunications services have fallen^{a,b}**
June 1998 to June 2015



^a Base year is 1998 for mobile, 2007 for DSL and HFC, and 2013 for NBN. ^b Mobile services include voice, SMS/MMS and data as these have become available.

Source: ACCC (2016b).

A number of factors have underpinned these price reductions.

- The increasing convergence of the sector has led to competition *between* fixed and mobile services.
- The ACCC has repeatedly reduced the prices of declared services that are used in the provision of fixed voice services (indicative of falling costs). For example, the regulated local carriage service price per call fell from 19.26 cents per call in 2002 to 8.9 cents per call in 2011 (ACCC 2002, 2011b).
- Competition in the provision of DSL broadband services using Telstra’s copper network and RSPs’ infrastructure in Telstra exchanges strengthened over the period in question.²³ The number of these services more than doubled in the six years to December 2015 (ACCC 2016e) and the Vertigan Panel (2014, p. 36) noted that this had led to a ‘highly competitive provider sector and significant benefits for consumers’.

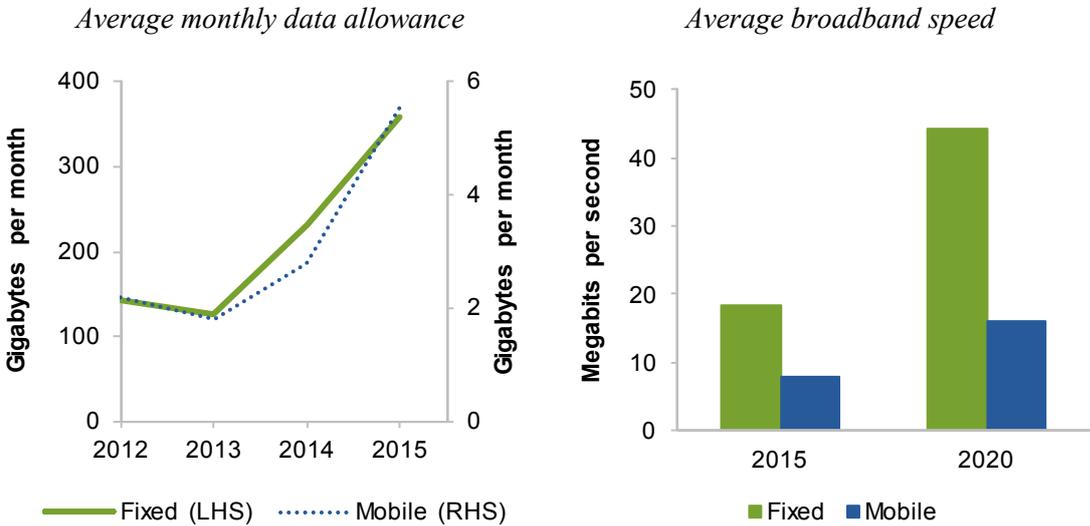
However, several industry commentators (for example, Slattery (2016) and Tsang (2015)) have expressed concern that nbn’s CVC charge may lead to retail broadband prices increasing dramatically over time. These commentators argued that as the CVC charge is levied on bandwidth consumption, RSPs’ costs will increase as they seek to supply

²³ Known as ‘DSLAM-based competition’ this involves an RSP installing a digital subscriber line access multiplexer (DSLAM) in a Telstra exchange, then using this to provide a service over a (declared) unconditioned copper service known as an ‘unconditioned local loop service’.

increasingly large data allowances to keep pace with demand. In response to these concerns, nbn in June 2016 commenced a trial of the ‘dimension based discount’ model, which reduces the CVC price as the bandwidth consumption increases across the entire network on a per-user basis. nbn has indicated that the discount will move toward a RSP-specific discount model in 2017 (Reichert 2016a).

In conjunction with lower prices, service offerings have also improved. Possibly as a result of competitive pressures from OTT providers, unlimited voice calling and messaging is now a standard inclusion in most post-paid and many pre-paid mobile plans, with data allowances becoming the key point of differentiation (ACCC 2016b). Meanwhile, average data allowances for both fixed and mobile services grew by around 150 per cent in the three years to June 2015 (figure 2.15). Average fixed and mobile broadband speeds are forecast to increase by 140 and 100 per cent respectively between 2015 and 2020, with the faster acceleration in fixed broadband speeds attributable to the ongoing rollout of the NBN. This trend may then reverse around this time, however, as the completion of the NBN is forecast to occur around the same time as the commercial rollout of 5G mobile technology.

Figure 2.15 Data allowances over fixed and mobile services have increased, and fixed broadband speeds will accelerate faster than mobile in the near future



Sources: ACCC (2016b); Cisco (2016a).

Australia's mobile services sector performs well by international standards

Because of the wide range of factors that can influence telecommunications performance (such as geography and population density), international comparisons must be treated with caution. Moreover, it is difficult to determine whether cross-country differences are the result of different market and regulatory structures, or different technologies.²⁴ Nevertheless, a clear pattern has emerged of Australia's mobile service sector performing relatively better than its fixed services sector.

Australia's mobile infrastructure performs well, especially in metropolitan areas. The *GSMA Mobile Connectivity Index* (2016) placed Australia fifth in the world for mobile infrastructure and seventh for network performance,²⁵ behind mostly higher population density South-East Asian and European countries. Moreover, OpenSignal (2016) concluded that:

If anything, Australia is *too* far ahead when it comes to network innovation. Telstra and Optus have built LTE-Advanced networks capable of theoretical speeds far faster than its subscribers can access. Smartphone technology is still catching up. (p. 1)

In terms of prices, the *GSMA Mobile Connectivity Index* (2016) placed Australia eighth in the world by mobile tariffs, and the World Economic Forum's Global Information Technology Report (2016) places Australia 19th by prepaid mobile tariffs.

... but the fixed services sector is lagging

By international standards, Australia's fixed services perform relatively poorly with respect to prices and broadband speeds. In terms of retail prices, the *World Economic Forum's Global Information Technology Report* (2016) places comparable countries (in terms of income and population density) Iceland (44th) and Canada (81st) ahead of Australia (100th) for fixed service broadband tariffs. Australian fixed service broadband tariffs are, on average over 70 per cent higher than Icelandic rates.²⁶

²⁴ These factors are not independent of one another. Superior market and regulatory structures will better promote the uptake of new technologies.

²⁵ Australia placed first overall due to higher scores in criteria which are not directly related to telecommunications, such as gender equality and taxation.

²⁶ Based on the World Economic Forum's (2016) purchasing power parity measures.

DRAFT FINDING 2.1

Technological progress is transforming the way in which people access and use telecommunications services. Individuals, businesses, governments and the community at large are benefiting from these developments. Prices of telecommunications services are falling, while service quality is improving across both fixed and mobile platforms. Moreover, these services are converging, allowing users to readily choose between fixed and mobile access, and generating additional competitive pressure on service providers.

What could the future hold?

The telecommunications sector has evolved rapidly, and will continue to evolve in the future. The early 2020s will likely see the completion of the NBN infrastructure rollout and the launch of 5G technologies, which will entail a significant improvement in both fixed and mobile telecommunications. 5G technologies will require denser mobile networks and deeper transmission networks to match, which may lead to greater integration between fixed and mobile networks (Entwhistle 2016; James 2016).

Technological advances will unlock new roles for telecommunications. High-speed broadband will enable more immersive consumer experiences through applications such as the Internet of Things and virtual reality. The Commission's recent research report *Digital Disruption: What do governments need to do?* discussed some of these developments further. In particular, it highlighted the impacts of advanced manufacturing processes and transport technologies (including automated vehicles), both of which will make rich use of wireless connectivity.

3 The telecommunications USO

Key points

- Australia has a plethora of policies and programs designed to enable access to telecommunications services for all. Fundamentally these measures are aimed at ensuring that telecommunications services are provided to regional and remote areas that tend to be relatively high cost to serve and are often non-commercial.
 - The telecommunications universal service obligation (TUSO) is one of these policies.
- The TUSO has taken various forms over time, but has barely evolved relative to considerable developments in technology, markets and consumer preferences.
 - In its current form, the TUSO is a legislative requirement to provide a *standard telephone service* to all premises in Australia and payphones that are generally accessible. The TUSO remains focused on the delivery of fixed voice services, mainly over fixed-line copper connections, while customer communications needs are overwhelmingly being met by a wide range of digital technologies and applications.
- Telstra is the designated universal service provider. Telstra's obligations are in accordance with legislation and its twenty-year agreement with the Australian Government (to 2032). Telstra receives gross annual funding of around \$300 million to deliver the TUSO. Funding is met through an Australian Government (non-indexed) contribution of \$100 million per year and through the Telecommunications Industry Levy, paid by eligible carriers.
- Telstra is not required to (and does not) collect data on the number of non-commercial telephone services or on the costs of any service it supplies under the TUSO. As such, the evidence base for assessing whether the TUSO provides value for money is inadequate.
 - However, the demand for services covered by the TUSO — the *standard telephone service* and payphones — is falling.
 - Using the number of non-commercial premises for the NBN as a proxy for the number of non-commercial premises for the TUSO, preliminary estimates suggest that the current TUSO has an average subsidy of around \$250 per 'TUSO' service per year.
- While access to telecommunications services is viewed as important and some users still value the TUSO, the majority of participants considered that the TUSO as it stands is either not fit-for-purpose or is no longer needed.
- The TUSO has a number of other deficiencies. It is a blunt instrument with a one-size-fits-all approach to universal service provision, and suffers from a lack of transparency and accountability. The basis for TUSO funding (a total of around \$3 billion in net present value terms over twenty years) is unclear and disputed. While recognising that the TUSO is subject to a contract between the Australian Government and Telstra until 2032, the Commission is proposing that the obligation be phased out as soon as practicable.

Internationally, as well as in Australia, a universal service obligation (USO) is one of a number of policy mechanisms that can be used to deliver either universal telecommunications access or universal telecommunications services (appendix C).

In general, a USO is a legally enforceable requirement to provide a service (often but not always at a reasonable price and given quality) to all users within a jurisdiction (appendix C). A USO can be delivered by a single universal service provider, or by multiple providers. The purpose of such an obligation is to ensure the provision of services (sometimes at a regulated price) that would otherwise be economically unviable, to correct a market failure and/or to address gaps in under-served markets (chapter 6).

This chapter provides information on universal service policies, with a particular focus on the telecommunications USO (TUSO) in Australia. It commences with an examination of how Australia's TUSO has evolved over time and its current scope (section 3.1). Section 3.2 is focused on the Commission's assessment of various concerns with the TUSO, supported by input from inquiry participants.

3.1 Australia's approach to universal service

Universal service has long been a feature of telecommunications in Australia. There is a wide range of programs at the Australian, state and territory and local government levels broadly associated with supporting universal service objectives (chapter 4). Fundamentally, these measures are aimed at ensuring that telecommunications services are available, accessible and affordable to geographical areas or cohorts of users that may be high cost and uneconomic to serve.

One of the key instruments through which universal service is facilitated in Australia is the telecommunications universal service obligation. The obligation aims to ensure reasonable access to fixed voice services (primarily using a fixed-line technology) for all Australians on an equitable basis, regardless of where people reside or work. The TUSO has taken various forms over time, but has evolved little relative to regulatory and structural reforms (figure 3.1), and advances in technology, market developments, and consumer preferences (box 3.1). Despite these developments, the TUSO has always centred on delivering fixed voice services to Australians.

Box 1.1 History of the TUSO in Australia

Early TUSO and government monopoly

Arguably the first example of universal telecommunications service provision in Australia was established by the Postmaster-General's Department in 1901 (Corner 2012) where much of Australia's fixed-line infrastructure was progressively rolled out.

However, it was not until the enactment of the *Telecommunications Act 1975* that the TUSO (the 'Community Service Obligation') was formally introduced. This legislation required Telecom Australia to provide telecommunications services that best met 'the social, industrial and commercial needs of the Australian people' and were 'available throughout Australia for all people who reasonably require[d] those services' (s. 6). Telecom Australia operated as a vertically-integrated government monopoly, and the Australian Government was able to provide relatively straightforward regulatory oversight of the TUSO (Gregory 2015).

Deregulation and privatisation

The Government deregulated the telecommunications sector in the 1990s to develop an internationally competitive, low cost and innovative industry (Ross 2004). Telecom Australia was gradually replaced by Telstra in 1992, and the Government began to licence competing carriers in the fixed and mobile services markets. During this period, the Government determined that Telstra would provide its services to all Australians at standardised prices and would be responsible for fulfilling the TUSO (DoCA 2007).

Telstra underwent partial privatisation in 1997 and became fully privatised in 2006. Since opening to full competition, the number of telecommunications services and platforms has greatly diversified. Twenty-one licenced carriers operated in Australia by the late 1990s, and 248 carrier licences are active today (ACMA 2016i).

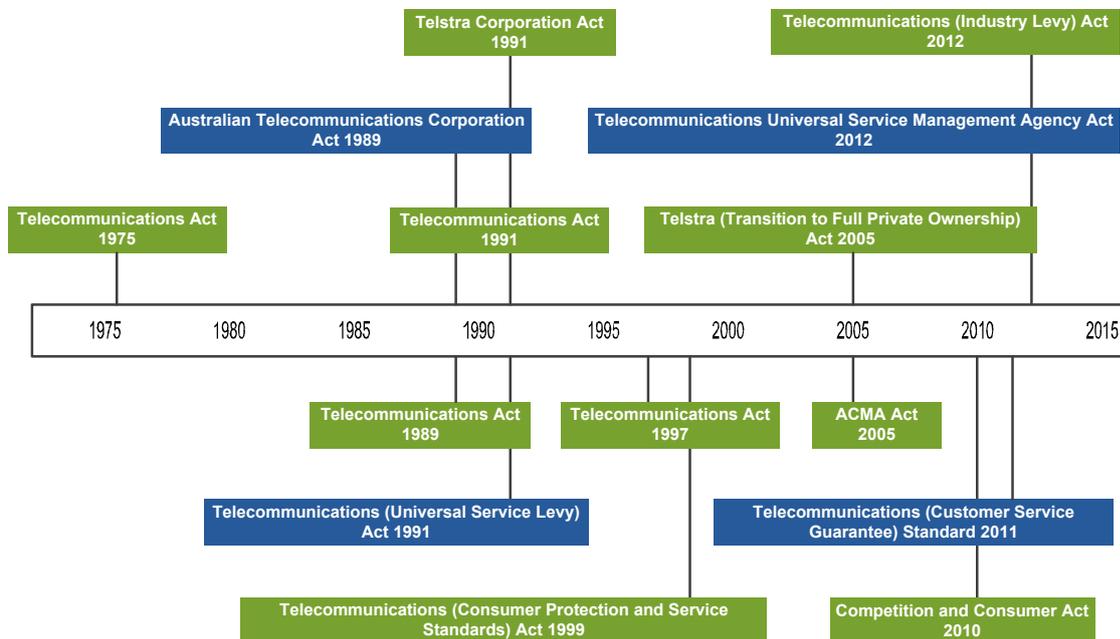
Funding and bidding for the TUSO

As competition developed, the monopoly model of internal cross-subsidisation of TUSO services became more complex. Competition lowered prices, particularly in metropolitan markets. Price controls were also imposed on Telstra to prevent leveraging of market power in rural markets (DoCA 2007). Telstra was compensated for providing non-commercial services under the TUSO — funded by a combination of an internal industry cross-subsidy (the Universal Service Levy) and a direct payment from the Australian Government.

In 1999, the Government established the 'Australian Universal Service Obligation Fund' to encourage competition in universal service provision. They identified two underserved 'net cost' regional areas to act as pilot projects, but failed to attract any of Telstra's competitors to provide this service (ACMA 2000). To become more technology relevant, the TUSO definition was expanded to include data and services to enable better access for people with disability. However, the digital data service obligation was later removed from the TUSO's scope.

TUSO funding has varied significantly over time, reflecting the different modelling approaches to calculate its costs (Fletcher 2015). The use of detailed cost models in estimating the cost of the TUSO was largely discontinued, and (prior to 2012) the Minister for Communications, based on advice from the Australian Communications and Media Authority (ACMA), set the annual level of TUSO funding (Coutts 2015). In 2012, the USO levy and the National Relay Service levy were combined to create the 'Telecommunications Industry Levy' (TIL). The agreement set the annual level of TUSO funding (and the Government's contribution) to a fixed amount, significantly higher than the average received in years prior (Fletcher 2015).

Figure 3.1 Timeline of legislation relevant to the TUSO



The current TUSO

The current TUSO is a legislative requirement under the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (TCPSS Act), with respect to the *standard telephone service* (box 3.2), payphones and prescribed carriage services. Its objective is to ensure that these services are ‘reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business’ (s. 9). This Act consolidated the various consumer safeguards²⁷ into a single piece of legislation.

Under the TCPSS Act, the Minister for Communications determines which carrier will be the ‘primary universal service provider.’ As the designated provider, Telstra is responsible for the provision of USO services throughout Australia. Telstra is currently the sole universal service provider, however, competing carriers may also provide the *standard telephone service* (but do not receive public funding) (ACMA 2016m). Telstra’s obligations are in accordance with the legislation and the Telstra USO Performance (TUSOP) Agreement it has with the Australian Government (box 3.3).

²⁷ Previously contained in the *Telecommunications Act 1997* and the *Telstra Corporation Act 1991*.

Box 3.2 What is a standard telephone service?

The TUSO includes the obligation of the primary universal service provider to supply a *standard telephone service* to people in Australia upon reasonable request. The service is defined^a as a ‘telephone service fit for the purpose of voice telephony.’ If voice telephony is impractical for a person with disability, an ‘equivalent’ form of communication must be provided.^b

The legal requirement for Telstra to provide a standard telephone service was first introduced as a ‘community service obligation’ under the *Australian Telecommunications Corporation Act 1989* (s. 27). This ensured that Telstra (then Telecom) would supply a public switched telephone service ‘between places within Australia,’ as ‘efficiently and economically as practicable.’ The design of the standard telephone service also recognised the social importance of reasonable access to telecommunications, and the importance of quality and performance standards that met the ‘social, industrial and commercial needs of the Australian community.’

Details regarding the conditions, charges and specifications for the service are contained within the ‘General Conditions’ and ‘Public Switched Telephone Service’ sections of Telstra’s Customer Terms^c (ACMA 2016m).

While supplying the *standard telephone service*, Telstra is required to provide users with:

- the ability to make and receive automated national and international voice grade telephone calls 24 hours-per-day
- 24 hour access to emergency service numbers free of charge
- a unique telephone number (allocated in accordance with the *Telecommunications Numbering Plan 1997*) with a directory listing, unless otherwise requested
- access to operator assisted services (such as assistance for directory assistance, national and international call connection and reporting of service difficulties)
- itemised billing, including itemised local calls on request (for a fee).

^a Under the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (s. 6). ^b In order to comply with the *Disability Discrimination Act 1992*. ^c Requests for, and supply of the *standard telephone service*, are governed by the *Telecommunications Universal Service Obligation Standard Telephone Service - Requirements and Circumstances Determination (No.1) 2011*.

In conjunction with the *standard telephone service*, the TUSOP Agreement stipulates that Telstra will supply a basic telephone handset upon request for an additional cost, with end-users given the option of hiring or purchasing the handset. In addition, the TUSO ensures access to the *standard telephone service* for people with disability or impairments relating to hearing, speech, vision, dexterity or mobility. Where necessary, Telstra is obliged to provide equipment to support an alternative form of communication, such as volume control phones, hands-free phones, or a teletypewriter (TTY).²⁸ The universal service provider is also required to supply equipment to allow those with disability to access the separately funded National Relay Service (NRS).²⁹ In order to meet NRS obligations, Telstra is required to provide equipment to facilitate text-to-text

²⁸ These technologies can be provided through Telstra’s Disability Equipment Program or through other suppliers that meet the requirements of the ACMA.

²⁹ Specified in the *Telecommunications (Equipment for the Disabled) Regulations 1998*.

communication (for example, a TTY), data transmission (for example, a modem), and data transmission and its transfer into Braille (for example, a telebraille) (Telstra 2016h).

Box 3.3 The Telstra USO Performance (TUSOP) Agreement

The TUSOP Agreement sets out Telstra's contractual obligations in relation to the universal service obligation and some other 'public interest telecommunications services.' The Agreement's duration is twenty years — commencing on 1 July 2012 and ceasing on 1 July 2032. If the Agreement were to run its full course, with no reduction in costs, it would ultimately cost \$5.4 billion (in undiscounted terms) or around \$3 billion (in 2012 net present value terms), with the Australian Government contributing around 35 per cent and the industry levy contributing the remainder (chapter 9).

The Agreement is currently administered by the Department of Communications and the Arts (DoCA).^a Telstra's performance under the TUSOP Agreement is assessed annually against performance requirements set out in legislation and the Agreement, which includes the Customer Service Guarantee that relates to *standard telephone services*. The Agreement currently provides for a mandatory 10 year independent review of the technologies and systems used by Telstra to provide the current USO services.

The TUSOP Agreement is one of a series of separate, yet interrelated, agreements signed by the Australian Government, Telstra and NBN Co Limited (nbn) to enable the NBN infrastructure to be built and operated.

^a The agreement was administered by the Telecommunications Universal Service Management Agency (TUSMA) until 1 July 2015 when the Agency was abolished and its functions transferred to DoCA.

Sources: Telstra (2011); TUSMA (2015).

Telstra also has obligations regarding timeframes for connection and repairing *standard telephone services*. These are covered by the *Telecommunications (Customer Service Guarantee) Standard 2011*. If there is an extended delay and these timeframes are not met, Telstra is obliged to offer an interim service and/or financial compensation to customers under certain circumstances. Telstra also has a number of responsibilities, that are separate, but related, to the TUSO, imposed through its carrier licence conditions (box 3.4).

The *standard telephone service* has traditionally been provided as a fixed-line telephone service, however the obligation under the TUSOP Agreement is 'technology neutral,' and some remote areas have been provided with a standard telephone service over radio technologies and satellite (Telstra, sub. 30). However, this technological neutrality is partly restricted by the Copper Continuity Obligation, as existing customers outside of the nbn's fixed-line footprint are currently guaranteed continued access to copper on request.

Box 3.4 Telstra's carrier licence conditions and the TUSO

Owners of network infrastructure used to supply carriage services (telephony or internet) to the public are required to hold a carrier licence^a. Carrier licences are granted by the ACMA, and impose various conditions, including obligations under the *Telecommunications Act 1997* (such as contributing to the Telecommunications Industry Levy) and the telecommunications access regime^b and communications facilities, powers and immunities (such as some exemptions from local planning laws).

The Minister for Communications can impose further licence conditions on particular carriers. Telstra has a number of unique responsibilities, separate to its TUSO obligations, borne from its legacy role as a government-owned, dominant telecommunications provider. The majority of these are imposed as licence conditions, mandated by the *Carrier Licence Conditions (Telstra Corporation Limited) Declaration 1997*. They include:

- providing operator services and directory assistance services for *standard telephone service* users
- providing a free annual alphabetical public number directory to all customers and maintaining an integrated public number database
- priority assistance arrangements (chapter 4)
- maintaining the Low Income Measures Assessment Committee (LIMAC) and offering products to low- income customers, endorsed by low- income consumer advocacy groups
- providing mobile phone services to towns with populations of over 500, in selected population centres and on selected highways
- maintaining a local presence in regional, rural and remote parts of Australia where this is compatible with overall commercial interests of Telstra, is not unduly prescriptive, and does not impose undue financial and administrative burdens
- the Network Reliability Framework (chapter 4)
- an obligation to offer the Customer Service Guarantee (CSG) (chapter 4). Unlike other providers, Telstra cannot allow its customers to waive their CSG rights
- monitoring and reporting at the Field Service Area, Cable Run and CSG service levels.

^a Unless a nominated carrier declaration is in force in relation to the network unit or an exemption applies, according to the *Telecommunications Act 1997*. ^b Under Part XIC of the *Competition and Consumer Act 2010*.

Sources: ACMA (2016c, 2016j); *Carrier Licence Conditions (Telstra Corporation Limited) Declaration 1997*; *Telecommunications Act 1997*.

Copper Continuity Obligation

Within the context of the NBN infrastructure rollout (appendix B), Telstra is responsible for operating and maintaining its existing copper network in areas outside of nbn's fixed-line footprint, and providing fixed voice services over that network. Telstra also has an obligation to not disconnect any copper connections (regardless of location) except in accordance with the Subscriber Agreement (between nbn and Telstra) or as agreed with the Department of Communications and the Arts (DoCA). This is defined as the 'Copper Continuity Obligation' under the TUSOP Agreement, and is Telstra's responsibility until

the specified cessation date in 2032. Telstra is also required to act as the ‘retailer of last resort,’ and is obliged to provide *standard telephone services* on request over the NBN fixed-line network.³⁰

Payphone obligation

The obligation of the universal service provider extends to the supply, installation and maintenance of public payphones. This aims to ensure that payphones are reasonably accessible to all people in Australia, on an equitable basis, regardless of location.

Telstra operates various types of payphone terminals. These are required to provide:

- local, national and international calls for a fee
- 24 hour access to emergency service numbers, free of charge
- operator assisted services (such as directory assistance).

The obligation to facilitate equitable access to the *standard telephone service* for individuals with disability extends to payphones. A proportion of Telstra’s payphones are ‘Smart Payphones,’ which provide various features to meet this obligation. These payphones accept payment via both coins and phonecards, and provide features such as adjustable volume control, built-in acoustic hearing aid couplers, and a tactile orientation mark on the number ‘5’ on the keypad (ACMA 2016g). In addition, Telstra provides payphones with built-in TTY machines to enhance access and usage for people with impairments relating to hearing or speech. About 150 payphones have been modified to include a TTY facility (Telstra 2016i), with the majority of these located in shopping centres, airports and other high usage sites (ACMA 2016g).

Telstra is also responsible for conducting public consultation and resolving any complaints regarding the location of payphones. When determining where to install a payphone, Telstra applies an assessment framework (ACMA 2016g), and considers factors such as:

- the size of the community and the location of the nearest payphone
- accessibility of the site and the availability of appropriate infrastructure
- the risk of damage from vandalism
- environmental impacts
- the anticipated demand and commercial viability of the payphone.

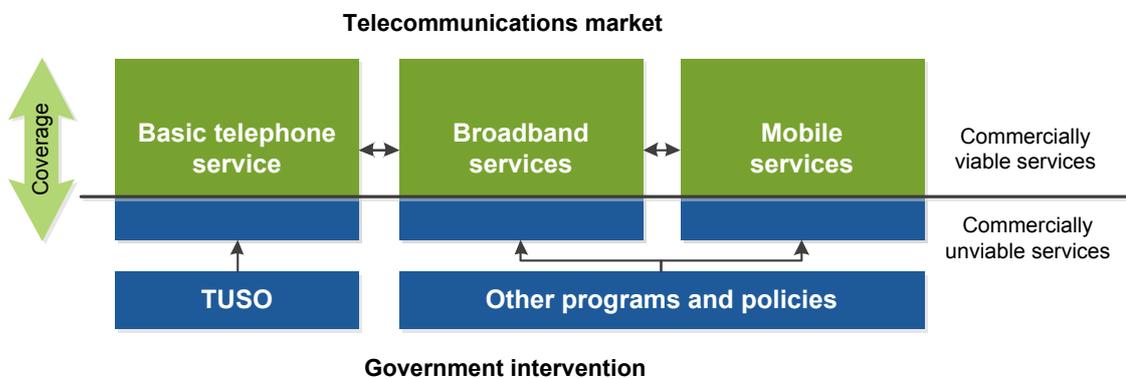
³⁰ Earlier Australian Government policy (DBCDE 2012) referred to Telstra’s responsibility to deliver the *standard telephone service* USO with respect to nbn’s ‘optic fibre footprint.’ However, a subsequent change in policy in 2014 (Turnbull and Cormann 2014) to allow nbn to use a mix of fixed-line technologies, not just optical fibre to the premises, has meant the appropriate reference is the fixed-line footprint.

When considering the removal or relocation of a payphone, Telstra is required to consult with the local community, site owner and local government. Any individual or group can apply to Telstra for the installation, relocation or removal of a payphone. Telstra’s performance regarding the supply of the *standard telephone service* through payphones is monitored by the ACMA, with results publicly available on the ACMA website (ACMA 2016m).

The TUSO is intended to focus on non-commercial areas

As the TUSO generally targets universal service availability, the current TUSO requires Telstra to provide voice telephony coverage in those areas that would be commercially unviable in the absence of government intervention (figure 3.2). While telecommunications service providers will connect premises when it is profitable to do so, the revenue from some connections may be insufficient to cover service provider costs let alone meet a minimum rate of return on their investment. These services are considered ‘commercially unviable’ or ‘non-commercial’ and can be difficult to determine (box 3.5).

Figure 3.2 **The TUSO aims to expand coverage to non-commercial areas**
Policies to address telecommunications availability



Source: Adapted from DoCA (2007).

Box 3.5 Determining non-commercial services

In the absence of government intervention, a profit-maximising service provider would only connect premises where the expected revenues are sufficient to cover costs.

The direct costs of a telecommunications service can include the fixed and variable costs of providing network infrastructure and its maintenance, and the retail and support costs required to service the connection. The provider also has indirect costs of raising capital and opportunity costs, as a provider's resources can instead be used for other services (Paterson 2011). Substitution costs may also exist for a designated universal service provider. In supplying a telephone service, a provider could forego revenue that it might receive by selling other types of services to the customer (for example, a mobile or wireless internet service) (Paterson 2011).

Revenues include the direct revenue from customers, as well as any wholesale revenue received from line rentals and other carriage and call origination services for these connections (Paterson 2011). Additional (secondary) revenues can come from selling, or 'bundling,' other services to a customer. There may be other less tangible benefits in extending network services to non-commercial areas, for example the ability to charge a higher price to other customers. Economies of scale and network effects can add value to a universal service provider, and can lower the costs of adding users to the network. By providing more connections, the universal service provider can increase market share, improve brand recognition and enjoy other benefits from market ubiquity (DCITA 2004).

Many uncertainties exist in the long-term viability of telecommunications services. Uncertainties include the expected future costs and revenues of the service, the productive life of the telecommunications infrastructure and whether this infrastructure can adapt to changing consumer expectations, market competition and technology. Government intervention, or the risk of future intervention, can also affect the size of non-commercial service losses. The various methodologies for calculating and appropriating the costs of non-commercial services are described in chapter 8.

How is the TUSO funded?

Telstra currently receives gross funding of around \$300 million annually for the provision of USO services — consisting of \$253 million for *standard telephone services* and \$44 million for payphones (including GST) (DoCA 2016n; TUSMA 2015).

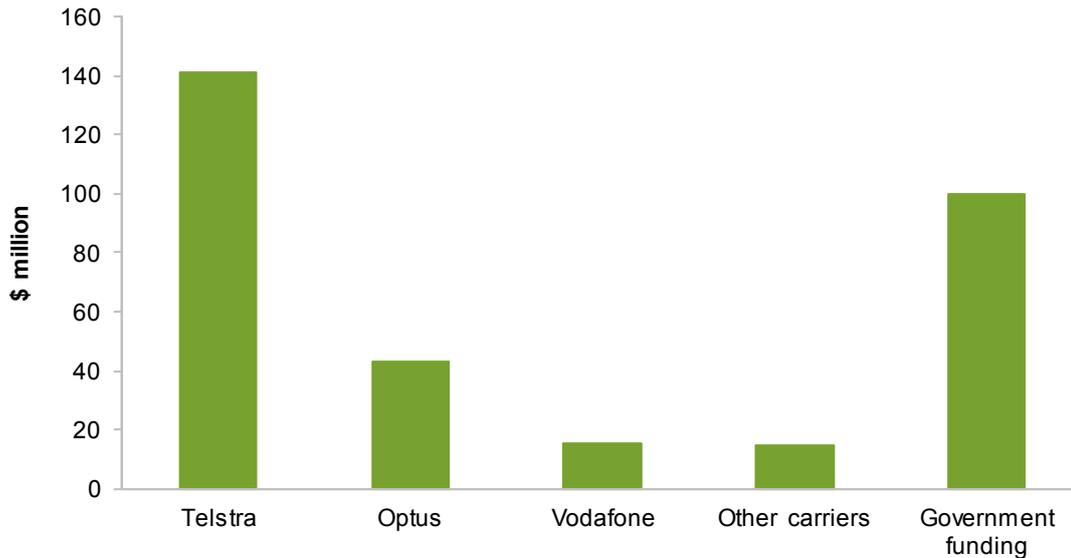
Funding for the provision of TUSO services (as well as other 'public interest' telecommunications services) is met through an Australian Government (non-indexed) contribution of \$100 million per year³¹ (TUSMA 2015) and through the Telecommunications Industry Levy (TIL). The TIL is collected by the ACMA from telecommunications carriers with gross annual telecommunications sales revenue of \$25 million or more.³² Eligible carriers pay a proportion of the TIL based on their share of

³¹ Excluding the 2012-13 and 2013-14 financial years, where Australian Government funding was \$50 million.

³² The *Telecommunications Act 1997* established methodologies to determine the cost of the USO, and the basis on which such cost should be divided among relevant carriers and carriage service providers (Raiche 2010). The current process for assessing and collecting the TIL is outlined in the TCPSS Act.

total industry revenue. In 2014-15, the industry levy raised around \$215 million,³³ with Telstra contributing around 65 per cent (\$142 million) of the total (figure 3.3). These percentages are expected to change over time as NBN infrastructure is rolled out.

Figure 3.3 Contribution to funding of the TUSO
2014-15



Source: Productivity Commission estimates based on the ACMA (2015d).

The TIL funding model effectively allows carriers to share the TUSO cost burden. That is, by partially funding the supply of telephone connections in non-commercial areas. Telstra's national pricing means that all customers pay the same rates for a standard telephone service despite the higher supply costs in regional areas. Urban users therefore cross-subsidise regional users, although competition in urban areas limits the extent to which this cross-subsidisation is possible. Ultimately, telecommunications consumers and taxpayers pay for the TUSO.

The TUSOP Agreement granted Telstra an extra \$125 million per year (GST exclusive) for the provision of TUSO services relative to the subsidy that Telstra was receiving immediately prior to the TUSOP Agreement (table 3.1). The funding increase was mostly met by the Australian Government contribution (DBCDE 2011).

³³ The TIL is used to fund the TUSO, as well as the National Relay Service, and the delivery of emergency call services and other public policy telecommunications outcomes (ACMA 2016k).

Table 3.1 Annual payments to Telstra for TUSO services^a

	2011 ^b	2012 – 2032 ^c
Standard telephone service	\$131.2 million	\$230 million
Payphones	\$13.8 million	\$40 million
Total	\$145 million	\$270 million

^a GST exclusive. ^b Pre-TUSOP Agreement. ^c As per TUSOP Agreement.

Source: DBCDE (2011).

Performance and reviews of the TUSO

In order to receive funding for the TUSO, Telstra is required to meet various performance requirements. There are no regulations that specifically relate to performance of the *standard telephone service* USO (ACMA, sub. 49), however performance requirements and protections are set out in legislative instruments made under the TCPSS Act and secondary instruments — in particular the Customer Service Guarantee (CSG). The ACMA uses the CSG as a ‘proxy’ to assess Telstra’s compliance and performance of *standard telephone service* delivery, with results published on its website (ACMA 2016m).

The CSG sets standards and benchmarks relating to installation, fault repair and appointment keeping timeframes. If a provider fails to meet these minimum standards, compensation may be payable to the customer. As noted earlier, Telstra’s Carrier Licence Conditions also contain the Network Reliability Framework, which requires Telstra to identify and remediate its copper network to ensure reliability of fixed telephone services. As highlighted above, the ACMA is also responsible for monitoring Telstra’s compliance with the TUSO Payphone obligation.³⁴ The ACMA encourages and monitors compliance to these various consumer safeguards through environmental scanning, submitting enquiries to providers and investigating possible non-compliance (ACMA, sub. 49).

The TUSO and related matters have been subject to several reviews in recent years (box 3.6). There are also various reviews scheduled for a future date or on an ad hoc basis as detailed within the TUSOP Agreement. The scope for changes to the TUSO arrangements is considered further in chapter 9.

³⁴ Assisted by the *Telecommunications Universal Service Obligation (Payphone Performance Benchmarks) Instrument (No. 1) 2011 (Payphone Benchmarks)*.

Box 3.6 **Reviews of the TUSO**

- In 2004, DoCA (previously the Department of Communications, Information Technology and the Arts) conducted a review of the operation of the USO and the CSG. Overall, DoCA found that the existing regulatory arrangements for the USO were broadly meeting the objects of the TCPSS Act, although there was room for improvement in some areas (DCITA 2004).
- In 2004, the ACMA conducted the *Payphone Policy Review*. They found that the TUSO was operating effectively with some exceptions, and recommended that the payphones USO should continue (ACMA 2004).
- In 2007, a comprehensive review of the TUSO was announced by the Minister for Communications (and an issues paper was released), but not completed due to a change in government (Corner 2012).
- In 2010, the Government held public consultations regarding 'Implementation of Universal Service Policy for the transition to the National Broadband Network environment'. These were followed by another round of public consultation and the release of an issues paper in 2011: *Universal Service Obligation Legislative Reform for the Transition to the National Broadband Network* (Corner 2012).
- DoCA aims to commission an independent review of telecommunications services in regional, rural and remote parts of Australia every three years.^a Previous reviews include the 2000 'Besley Review', the 2002 'Estens Review', the 2008 'Glasson Review', the 2012 'Sinclair Review' and the 2015 'Shiff Review'. The 2015 Review found that the *standard telephone service* is declining in relevance and questioned the cost-effectiveness of the TUSO (RTIRC 2015b).
- While not a formal review, ACCAN (the Australian Communications Consumer Action Network) held a conference in 2015 themed 'Rethinking the USO' (ACCAN 2015).
- DoCA is currently conducting a review of the ACMA, to determine whether its objectives, functions, performance, governance and resource base are fit-for-purpose for the contemporary and future communications regulatory environment (DoCA 2015a). The draft report was released in May 2016.

^a As described by section 4 of the *Telecommunications Legislation Amendment (Future Proofing and Other Measures) Act 2005*.

Beneficiaries of the TUSO

There is limited evidence on TUSO customers in Australia as Telstra's obligation to provide a service does not require it to distinguish between TUSO and non-TUSO customers (Telstra, sub. 30). Users of the TUSO would include customers who have a fixed voice service connection from Telstra and live in a non-commercial area (generally in regional and remote Australia), and do not have an alternative service available (for example, a mobile service). In theory, a TUSO customer would be a premises that has a *standard telephone service* with Telstra — a service that other providers would not have connected on a commercial basis. In practice, there appears to be no recent data on this.³⁵

³⁵ The cost of Telstra's TUSO commitments were estimated in a 2011 report prepared for the Department of Broadband, Communications and the Digital Economy (Paterson 2011). Using 2009-10 data, Paterson

Aside from Telstra's performance against the CSG performance standard and benchmarks relating to installation, fault repair and appointment-keeping timeframes, Telstra is not required to record any performance data specifically for the *standard telephone service* USO. Oddly, Telstra is not required to report on the number of non-commercial services or on the costs of any telephone service it supplies. Even though slightly less opacity applies to Telstra's payphones, Telstra is also not required to specify which payphones are non-commercial — that is, those that would, in theory, require a subsidy to service.

This apparent lack of transparency and accountability makes the continuation of current arrangements difficult to justify to those parties required to contribute to the annual TIL. It also makes any assessment of the value of the TUSO to the Australian community challenging.

Indicators of non-commercial areas

In the absence of information on the commercial viability of providing telecommunications services to particular areas, non-commercial TUSO areas can be gauged by a number of indicators related to population density and service coverage. In figure 3.4:

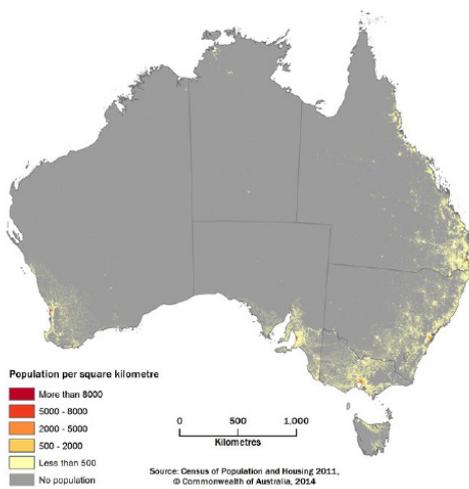
- panel a shows Australia's population density. While most people live along Australia's eastern seaboard and in the south-west corner of Western Australia, about 29 per cent live outside of Australia's major cities (ABS 2016g). Much of this population is dispersed over a large geographic area that could be uneconomic to service. In model documentation by Analysys Mason (and also used by the Australian Competition and Consumer Commission and Paterson), Australia's remote area network costs were estimated to be 2.7 times higher than the national average (Paterson 2011).
- panel b shows the planned rollout map for the NBN using fixed-line, fixed wireless and satellite technologies. The Bureau of Communications Research (BCR) identified the areas outside of the NBN's long-term fixed-line footprint as non-commercial (2015). These areas cover most of Australia's landmass and represent about 1 million premises (or around 8 per cent of Australian premises) (nbn 2016a). The BCR noted that these areas were considered non-commercial largely because of the high costs of delivering broadband through fixed wireless and satellite technologies (2015).
- panel c shows Telstra's mobile coverage in 2016. Telstra's mobile coverage is the most extensive of Australia's three mobile carriers. It now covers 99.3 per cent of the Australian population based on where people live. However, little more than 30 per cent of Australia's landmass is covered by a mobile service (RTIRC 2015b). Areas without mobile coverage can indicate where services are, at present, commercially unviable.

estimated that Telstra operated about 810 000 copper-based fixed voice services in commercially unviable areas. In the same year, Telstra had about 20 000 payphones in operation. Paterson's overall USO net cost estimates for 2009-10 were \$215-\$262 million for the *standard telephone service* and \$35-\$48 million for USO payphones. Paterson stated that a limitation to his analysis was obtaining reliable cost data.

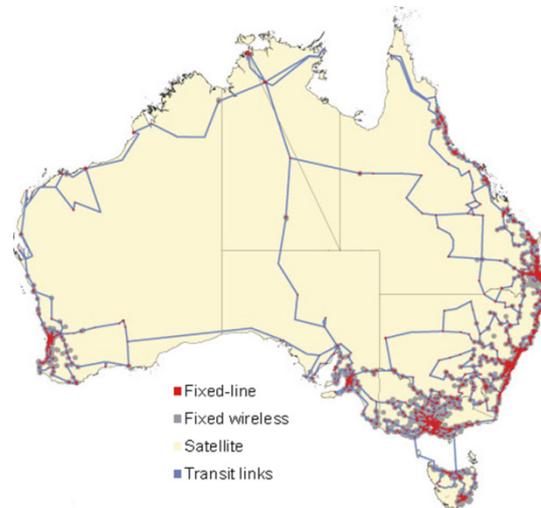
- panel d shows the geographic spread of fixed-line broadband availability in 2013, according to the Australian Government’s *Broadband Availability and Quality Report* (DoC 2013). According to that report, about 6 per cent of Australian premises were identified as unable to access fixed broadband, with availability lowest in remote parts of Australia. Broadband availability in some remote parts of Australia primarily reflects the recent rollout of NBN infrastructure, which has prioritised connections in regional and remote Australia.

Figure 3.4 Possible extent of non-commercial services

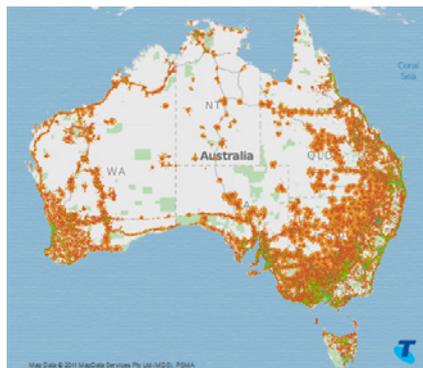
a. Australia’s population density, 2011



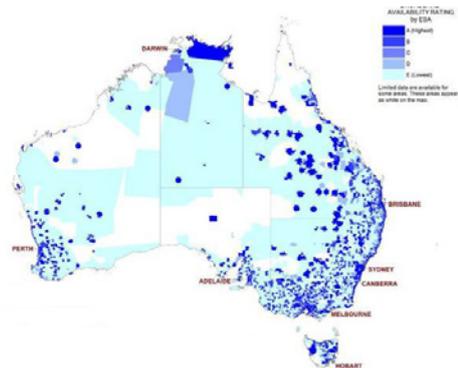
b. NBN planned rollout map in 2020



c. Telstra mobile coverage, 2016



d. Fixed-line broadband availability, 2013



Sources: Productivity Commission based on ABS (2014); Australian Government (2011); Telstra (2016g); DoC (2013).

The lack of data on the number of ‘TUSO’ services provided by Telstra has led the Commission to develop preliminary estimates on the basis of several proxies for non-commerciality (table 3.2). These estimates suggest that the current TUSO could imply a subsidy ranging anywhere between \$248 and \$2811 per ‘TUSO’ service per year. The Commission has also drawn on published estimates that also display a wide range: \$312 to

\$2530 per year. In table 3.2, the ‘2011 Paterson Report estimate’ reflects the number of net-cost TUSO premises assumed at the time by the Department of Broadband, Communications and the Digital Economy (Paterson 2011), while the ‘Optus submission estimate’ shows the results of calculations made by Optus (sub. 4) in their submission to this inquiry, based on a range of assumptions.

Table 3.2 Estimated annual STS USO subsidy per premises
Assuming a total annual STS USO subsidy of \$253 million^a

<i>Assumption</i>	Premises outside of the NBN fixed-line footprint rely on the TUSO	Premises within the NBN satellite footprint rely on the TUSO	Premises in areas with no mobile coverage rely on the TUSO	2011 Paterson Report estimate	Optus submission estimate
Number of premises	1 020 000	412 000 ^b	90 000 ^c	810 000	100 00 – 150 000
Percentage of total Australian premises	8 ^d	3	0.8	9 ^e	1-1.5
Subsidy per premises	\$248	\$614	\$2 811	\$312	\$2 530 – \$1 687

^a Based on GST-inclusive figure for 2014-15. ^b Assumes NBN has been fully rolled out (nbn 2015a). ^c As calculated in chapter 6. ^d Represents 8% of premises by 2021 (nbn 2014b). ^e Assumes 9.27 million premises in 2011.

Sources: Productivity Commission estimates based on ABS 2015, Household and Family Projections, Australia, 2011 to 2036, Cat. no. 3236.0; nbn (2014b, 2015a); Optus (sub. 4); Paterson (2011); RTIRC (2015b).

TUSO-funded services are primarily delivered over copper

Outside of the NBN fixed-line footprint, Telstra delivers the current TUSO almost exclusively over copper. According to the 2010 NBN Implementation Study:

Today, 99.75 percent of all premises are capable of receiving voice over Telstra’s copper access network, with low latency and high availability providing a high quality of service. In addition, Telstra implements a number of copper-based solutions to serve remote premises, including pair-gain systems that enable service for long loops and serve multiple customers over a single copper line. (McKinsey & Company and KPMG 2010, p. 319)

Telstra delivers the remainder of its TUSO services using a mix of alternative technologies, including through its own fibre, satellite and point-to-point radio infrastructure, and via the NBN fixed-line network. Telstra provided around 6 million fixed voice services to consumers across Australia in the last year (Telstra, pers. comm., 4 November 2016). Of Telstra’s 5067 Exchange Service Areas, only 543 will sit wholly within nbn’s fixed-line footprint.³⁶ In more remote areas, such as Australia’s islands and parts of the outback,

³⁶ Telstra estimate based on information published by nbn and subject to any changes to nbn’s corporate plan.

Telstra uses radio infrastructure to deliver fixed voice services. While in the most isolated parts of Australia, Telstra delivers fixed voice services over satellite.

Payphones are another part of Telstra’s TUSO commitments. As at June 2015, Telstra had about 17 500 payphones in operation (ACMA 2015b). About 68 per cent of payphones were in urban areas, 27 per cent in rural areas, and 5 per cent in remote areas (including 579 payphones located in remote Indigenous communities). In the absence of data regarding the number of non-commercial payphones funded by the TUSO, the Commission has developed preliminary estimates based on a number of assumptions (table 3.3). These estimates point to an average subsidy per payphone ranging from \$2514 to \$49 718 per payphone per year.

Table 3.3 Estimated annual TUSO subsidy per payphone
Assuming a total annual TUSO payphone subsidy of \$44 million^a

<i>Assumption</i>	All Telstra payphones are non-commercial	Telstra payphones in rural and remote areas are non-commercial	Telstra payphones in areas with no mobile coverage are non-commercial
Number of payphones	17 511	5 582	885
Subsidy per payphone	\$2 513	\$7 882	\$49 718

^a Total annual USO payphone subsidy is based on GST-inclusive figure for 2014-15.

Sources: Productivity Commission estimates based on DoCA (2016n); Telstra (pers. comm., 31 August 2016).

DRAFT FINDING 3.1

There is a dearth of data on the number of premises covered by the telecommunications universal service obligation (TUSO). Telstra (the universal service provider) is not required to, and has advised that it does not collect information on the number of non-commercial telephone services, or on the costs of any telephone service it supplies under the TUSO. As such, the evidence base for assessing whether the TUSO is providing value for money is inadequate.

Commission estimates suggest that the TUSO could imply a *standard telephone service* annual subsidy ranging anywhere between \$250 to \$2800 per ‘TUSO’ service, and an annual average payphone subsidy of between \$2500 to \$50 000.

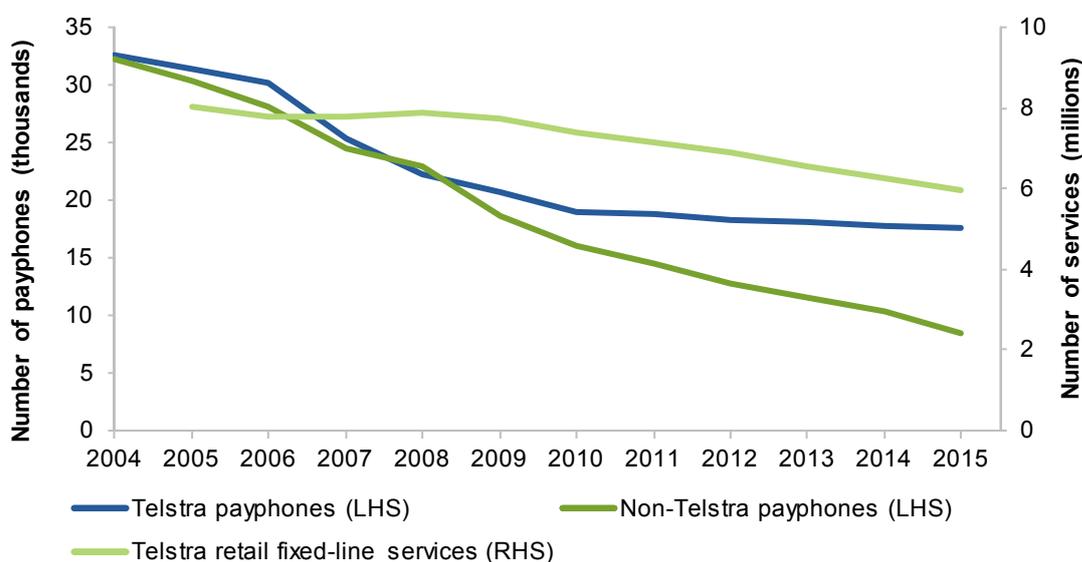
Demand for TUSO-funded services is decreasing

Even though there is limited information on TUSO customers, it is clear that consumer demand for TUSO-funded services is decreasing. Overall, Telstra’s active retail fixed-line services have declined by about one-quarter in the last decade, from over 8 million to just under 6 million services (figure 3.5). In the same period, Telstra payphones have almost

halved in number (from over 31 000 to about 17 500), while non-Telstra operated payphones have decreased by an even greater amount (figure 3.5).

In terms of usage, about 68 per cent of adult Australians made a phone call from a fixed service in the six months to May 2015 (ACMA 2015b), while only 6 per cent had used a payphone in the same period. The number of voice call minutes originating from a fixed service contracted by 79 per cent over the decade to June 2015 (chapter 2, figure 2.2), while the total number of calls made from payphones decreased by approximately 71 per cent from 2010-11 to 2015-16 (from around 54 million to around 16 million) (Telstra, pers. comm., 31 August 2016).

Figure 3.5 Trends in payphones and Telstra’s retail fixed-line services



Sources: Productivity Commission estimates based on ACMA (2007, 2009, 2010a, 2012, 2015b).

Decreased demand for TUSO-funded services reflects changes in telecommunications technology and in consumer preferences (chapter 2), as well as the increasing number of customers being serviced by the NBN. As already noted, a growing number of Australians are using mobile services, while there has been a slight decrease in the number of fixed voice services. Mobile-only communication is becoming increasingly common. In 2015, 29 per cent of adults used only a mobile service and did not have a fixed service (ACMA 2015b). This trend toward mobile-only services was slightly more common in regional areas (30 per cent) than in capital cities (28 per cent). It was also more common among young people and those who rented a home.

These trends imply that the average subsidy for the TUSO is increasing, with fewer TUSO services but static TUSO funding.

DRAFT FINDING 3.2

Evidence of the declining relevance of services covered by the telecommunications universal service obligation — the *standard telephone service* and payphones — is unequivocal. Over the past decade, Telstra’s active retail fixed-line services have declined by about one quarter (from over 8 million to just under 6 million services), while the number of Telstra payphones has almost halved (from over 31 000 to around 17 500). One third of Australian adults now rely solely on mobile phones for voice services.

Is the TUSO really universal?

A *standard telephone service* is available to all households and businesses under the TUSO. However, this excludes Australians with no fixed address, such as those who are homeless or itinerant. The Australian Bureau of Statistics estimates that there were about 105 000 people homeless on Census night in 2011 (2012c). The TUSO may also be less available to disadvantaged Australians living in shared or low-cost housing.

For a premises to be covered by the TUSO it must be habitable and secure. The TUSO provider also requires access to power for the installation of the *standard telephone service*. These changes were made in 2011 to formalise what was a ‘reasonable’ request for a TUSO service to be provided to premises (Fletcher 2015). Excluded premises from a TUSO service can include non-permanent structures, such as portable homes and non-permanently moored boats, among other exclusions.³⁷

These restrictions can exclude *standard telephone service* availability for some of the most remote and disadvantaged Australians, including some remote Indigenous communities. The payphones component of the TUSO aims to provide reasonable access to a telephone service, including for people without a fixed address. But this does not include some of the most remote and isolated communities. According to the ACMA:

Significantly for remote Indigenous communities, the [TUSO] stipulates that a payphone should be provided to communities with a permanent population of more than 20 adult residents or 50 people in total, unless there are extenuating circumstances such as low site accessibility.³⁸ In the latter case, a viable alternative service is provided, such as mobile or satellite coverage. (2008, p. 8)

In these instances, other government policies and programs are often used to provide universal access to telecommunications infrastructure. For example, in 2015 the

³⁷ *Telecommunications Universal Service Obligation (Standard Telephone Service—Requirements and Circumstances) Determination (No. 1) 2011.*

³⁸ As outlined by the *Telecommunications Universal Service Obligation (Location of Payphones) Determination 2011.*

Government tendered for the supply of 301 WiFi telephones and 245 community payphones to deliver services to remote Indigenous communities (Connolly 2015).

3.2 Assessing the current TUSO

Throughout the twentieth century the TUSO was regarded as an important policy to ensure telecommunications access in the bush. In more recent times, however, it has been criticised for being outdated and overdue for reform. Each of the past four Regional Telecommunications Reviews have commented on the declining relevance of the TUSO in the context of an evolving telecommunications market (RTI 2002; RTIRC 2008, 2012, 2015b). In 2011, the ACMA referred to the USO as a ‘broken concept’ (2011a).

Almost all stakeholders to this inquiry view the current TUSO as no longer fit-for-purpose (box 3.7). Some stakeholders see the TUSO as an inefficient policy instrument. Many users, however, want the TUSO extended to other services such as broadband and mobile. Some groups also want the TUSO to better address accessibility and affordability. Critics of the TUSO rightly argue that it duplicates other government programs. Other concerns relate to the current TUSO contract, which is seen to lack transparency or justification for many of its changes.

The Commission has developed a set of guiding principles related to the development of a universal service objective and policy (chapter 1). In addition to the concerns raised by stakeholders, these principles provide a basis for an assessment of the current TUSO and assist in the development of future objectives and policy mechanisms for universal service.

The TUSO is a blunt and inefficient policy instrument

It is untargeted

In Australia, and in other countries, a USO is viewed as a one-size-fits-all policy to ensure universal availability to a *baseline* level of telecommunications services (Coutts 2015; Lateral Economics 2001; OECD 2006). The TUSO in Australia is not means-tested and is not restricted to low-income households. The policy also covers high-income households that could potentially access these services without the need for a subsidy.

Further, Lateral Economics (2001), a consultancy firm that reviewed the TUSO, concluded that USOs were wasteful because people have different preferences. Not everyone will necessarily want or value access to a telephone service. This idea was raised by inquiry participants, who emphasised the importance of choice and flexibility in developing an effective USO regime (RDANT, sub.10), particularly given the heterogeneous telecommunications needs and demands of different individuals and communities (Broadband for the Bush Alliance, sub. 6). This factor has become more important as

consumer preferences for a fixed voice service have diverged with the growing availability of substitute communications technologies (chapter 2).

Box 3.7 Selected stakeholder views on the TUSO

ACCAN supports the continuation of guaranteed access to voice services for all premises. This should ensure a high quality, reliable voice service with enforceable connection and fault repair timeframes for all premises. Where this can be delivered over other technologies, it should be. (ACCAN, sub. 48, p. 8)

... a universal service regime of some kind will continue to be important to ensure that essential communications services are available, accessible and affordable for all Australian consumers no matter their circumstances ... However, we consider that current arrangements relating to the provision of universal voice services could be improved, and that additional measures to address affordability and accessibility issues for some end-users may be required. (ACCC, sub. 40, p. 1)

The ongoing transformation from a relatively stable telecommunications sector to the dynamic characteristics inherent in today's telecommunications sector poses a challenge to the effectiveness and relevance of a static USO regime ... Given past and continuing shifts in the communications sector, the existing USO mechanism — and many of the related interventions intended to achieve the objectives of availability, affordability and accessibility — are no longer fit-for-purpose. (ACMA, sub. 49, pp. 17–18)

The current [TUSO] was introduced at a time when industry conditions justified addressing existing market failures. Significant changes over the past two decades in technology, government policy, industry structure, and consumer behavior mean that these market failures have been, or soon will be, addressed. (nbn, sub. 47, p. 1)

The [TUSO] remains rooted in principles more applicable to the analogue era of telecommunications. It is predominantly focused on the delivery of fixed voice handsets and voice calls over fixed line copper connections. The widespread deployment and use of mobile, data and broadband services now render it increasingly inappropriate. (Optus, sub. 4, p. 3)

At this time, the [*standard telephone service*] obligation should remain in place as delivered under the [TUSOP Agreement] ... consumers, communities and businesses nation-wide value the voice telephone service and would suffer personal, social and economic detriment if their basic right was revoked, no matter what other changes may be made to the obligation. (Telstra, sub. 30, p. 4)

We recommend retaining the current universal service obligation for standard telephone services and improving benchmarks for connections and fault rectifications, so that each person in Australia, no matter where they carry out business or reside, has reasonable and reliable access to a standard telephone or equivalent service ... (Telecommunications Industry Ombudsman, sub. 52, p. 3)

The concept of taxing fledgling companies trying to make a profit in an environment where they are competing against a powerful and wealthy incumbent seems to be antithetical to sensible competition policy, particularly when that money is then handed to the powerful and wealthy incumbent to support it in supplying its core business of telecommunications services. (TPG Telecom, sub. 38, p. 1)

The [TUSO] is an opaque, inefficient, inflexible and outdated model which delivers poor outcomes for consumers at the cost of substantial distortions to competition. A scheme which guarantees \$6 billion over 20 years to Telstra, for legacy copper and payphone infrastructure without any serious scrutiny of cost, let alone a cost-benefit analysis, is clearly not the solution in an evolving telecommunications market. (Vodafone Australia, sub. 46, p. 3)

It distorts market signals and is anticompetitive

There are no indicators to suggest that the TUSO promotes competition. In fact, the current universal service provider (Telstra) noted that the TUSO was not designed as an instrument to deliver competition (sub. 30).

The current TUSO has indeed been criticised by some participants as being anticompetitive (for example, Coutts Communications, sub. 5; Vocus, sub. 33; TPG Telecom, sub. 38 and others). Opponents of the TUSO claimed that it distorts the telecommunications market by diverting productive resources and suppressing market signals. Without market signals there are limited incentives for telecommunications service providers to reduce costs or to determine the most efficient way to deliver a service, especially in remote and regional Australia. There are also limited incentives to invest in better technologies.

The subsidy may also place an unnecessary burden on taxpayers and industry. In addition, the current levy does not attract funding from the large multinational companies (such as Google, Facebook and Microsoft) that supply many of the substitute Over-the-Top (OTT) communications services. Telstra (sub. 30) suggested that, should the current TUSO funding arrangements continue, extending levy liability to OTT providers who also benefit from network infrastructure funded by the TUSO should be considered (chapter 8).

Many competing carriers advocated for a more contestable TUSO. The carriers claimed that the TUSO should not be specific to a single operator. Despite the growing presence of competing carriers in regional Australia, these carriers are not able to bid for the current TUSO but they are required to help fund it.

Telstra's competitors also claimed that the TUSO is effectively a tax on competition, and is not consistent with 'a level playing field' (Fletcher 2015). Under the current TUSO, the most profitable operator receives 100 per cent of the benefit, which results in significant market distortion (Coutts 2015). Some participants to this inquiry have suggested that the TUSO subsidy has allowed Telstra to entrench its competitive position and protect itself from competitors (Vocus, sub. 33). Telstra is the only available provider for 46 per cent of fixed-line services in regional areas (CIE 2015). This has resulted in households with only Telstra services, such as those in regional areas, paying a premium of between \$450 and \$650 for fixed-line services per year (CIE 2015). Vodafone (2015) contended that the TUSO is another reason why Australia has less investment, less innovation and higher prices in telecommunications.

Many industry participants (for example, Optus, sub. 4; Vodafone Australia; sub. 46) conjectured that Telstra's funding level was far in excess of the likely cost of the TUSO. If true, Telstra is over-compensated, and the TUSO is not competitively neutral. As the methodology used in calculating the universal service subsidy under the current TUSO is not transparent, its effect on competitive neutrality also lacks transparency. The importance of minimising distortions to competition through efficient funding model design is discussed in chapter 8.

The TUSO is outmoded

Voice over copper is outdated and new technologies should be encouraged

Other evidence adds further weight to concerns surrounding the continued viability of the TUSO. For example, some technologies supporting the TUSO are out of date. While public safety was originally a key motivator for the TUSO (ACMA, sub. 49) (and remains important today), technological progress has created an increasing reliance on digital technologies to enable markets to function efficiently and for social inclusion.

Many stakeholders viewed the current TUSO as outdated and diminishing in relevance (box 3.7). As noted earlier, the current TUSO policy is theoretically technology-neutral, as any technology can be used to provide the *standard telephone service*. However, Telstra is contractually required to fulfil its copper continuity obligation in areas outside of the NBN fixed-line footprint. This policy effectively maintains copper services in these areas for the life of the twenty-year TUSOP Agreement. In addition, the provision of payphones is guaranteed by the TUSO, despite being considered an outdated technology by many (TPG Telecom, sub. 38 and Vodafone Australia, sub. 46) and consistently declining demand for these services.

The ACMA also commented on the significant changes occurring in Australia's communications and media markets over recent years. It observed that consumer expectations, network structure and industry structure in the telecommunications sector have been relatively stable historically, and this is assumed in the current regime (sub. 49).

Rather than relying on a functional (outcomes-based) definition of the desired service quality levels, the TUSO's objective and accompanying standard hinges largely on a particular technology for voice telephony (as do many of the associated consumer safeguards and codes). The current governance arrangements also do not require a regular review of these standards. As the TUSO requires Telstra to provide a particular quality of voice service on demand (irrespective of location), it does not efficiently harness market-based solutions that could adequately meet users' needs in different circumstances. While Telstra may use a range of technologies (for example, copper, radio and satellite) to meet its obligation, it is unable to use other technologies that might be more cost-effective (for example, nbn's fixed wireless). Hence, the TUSO is not strictly technologically neutral.

Most stakeholders considered copper to be an outdated technology. The TUSO, they noted, has historically been provided over copper because that was once the only technology available. In light of the superior technologies now available, they questioned why copper would continue to be required outside of nbn's fixed-line footprint. Other technologies considered outdated, such as the Digital Radio Concentrator System (DRCS), also continue to be used to fulfil the TUSO in some remote areas of Australia (Crouch and Davies 2013). Telstra's fixed radio network³⁹ has been described as unreliable and near the end of its life (RTIRC 2015b), and repairs can take a long time and require 'cannibalising' other

³⁹ The DRCS and the high capacity radio concentrator (HCRC)

services, since the required parts are no longer manufactured (Great Northern Telecommunications, sub. 2). Despite the theoretically technology-neutral nature of the TUSO, the choice of physical technology deployed will impact upon the quality and capability of services that can be provided to customers (Great Northern Telecommunications, sub. 2).

Most stakeholders advocated that the TUSO should take a technology-neutral approach in practice, as it is required to in theory. That is, the TUSO should be focused on the objectives and the services that it aims to provide, not on the technology. Participants did not favour entrenching a specific type of technology for the TUSO as technology will continue to evolve. They also argued that any future USO policy should be agile enough to incorporate these changes.

Consumers want the USO to cover mobile and broadband services

As already noted, access to a fixed telephone service is becoming increasingly redundant as more people forego this service in favour of mobile and broadband (chapter 2). Basic communication needs can now be met by a range of technologies, including Voice over Internet Protocol and other OTT communications services. These services are more flexible and cheaper than the *standard telephone service* provided for by the TUSO (Rennie et al. 2016).

Fixed voice services are no longer considered an essential service for some stakeholders. But for others, a fixed voice service alone is no longer considered enough. Pavlidis and Hawkins stated that the TUSO is:

... a 20th century legislative instrument operating in a very different 21st century digital environment — an environment in which access to a fixed line home phone cannot provide the connectivity necessary for full economic, social and community participation. (2015, p. 31)

This divide between consumer expectations and the *standard telephone service* has grown as substitute communication services have multiplied. According to Goggin (2015, p. 12), there is now a ‘yawning gulf’ between the basket of communications services that people expect and the voice service safety net provided by the TUSO, which has been unresponsive. Yet consumers are demanding more from their telecommunications services, in terms of mobile coverage and data, and now expect a choice of providers.

Many participants were of the view that the TUSO should include better mobile coverage as this service is becoming increasingly vital. A number of stakeholders (including ACCAN, VFF and AgForce) have proposed that the TUSO, or TUSO-funding, should be used to expand mobile coverage, notwithstanding that full mobile coverage of Australia’s landmass would be uneconomic and prohibitively expensive (with current technology).

The ACMA (2011a), as part of their *Broken Concepts* report, asserted that the communications standard had changed. The new standard is ‘connectivity’ to the digital economy, and access to a fixed voice service alone may not meet this new standard.

Some stakeholders advocated that the TUSO should change its focus to ‘people, places and things,’ and not just to the place of residence. Connecting people highlights the increasing dependence that people have on mobile communications, especially smartphones. Mobile connectivity, stakeholders claimed, promotes productivity and safety. Mobile services also enable some of the most vulnerable Australians to communicate. As already noted, people with no fixed address do not directly benefit from the current premises-based TUSO or NBN policies (although many use mobile devices connected to free WiFi services).

An emerging use of mobile services is the ‘Internet of Things’. The growth of autonomous vehicles and other machine-to-machine communication are areas of growing demand, particularly for ‘smart-farming’ techniques in the agricultural sector. Internet of Things communications often rely on mobile connectivity to operate.

The TUSO does not currently include any provision for internet services. According to Thomas (2015), broadband services are increasingly thought of as essential as they enable consumers to carry out many work, home and lifestyle activities. For many people, internet access is more important than a voice service. In particular, young Australians and people with disability often rely on internet communications. Many stakeholders advocated for the inclusion of some form of access to a minimum amount of data as part of a future policy (for example, Gregory, sub. 9; ACCC, sub. 40; de Ridder, sub. 56).

Broadband internet is viewed as a key driver of productivity and economic development. The agricultural sector regards a fast and reliable internet service as critical to managing a modern farm (National Farmers’ Federation, sub. 31). Many stakeholders (including Gregory, sub. 9) claimed that data services are becoming even more important with the Australian Government’s Digital Transformation Agency developing an online platform for government services. Some have advocated for access to this platform to be provided free of charge (CAYLUS, sub. 25; de Ridder, sub. 56).

It should address other aspects of universality

Another concern about the current TUSO is that it does not do enough to support other objectives of universal services — such as accessibility and affordability. ACCAN stated that ‘[w]hatever form a future USO takes it’s clear that [it] must provide accessible and affordable telecommunications for all Australians’ (2015, p. 2).

As already noted, the current TUSO does not directly aim to address telecommunications access and affordability. In practice, however, ensuring affordability for customers has been an implicit objective of the TUSO. For example, Telstra (sub. 30) noted:

... we must price [*standard telephone service*] access at a level our customers can reasonably afford. We have delivered this through national pricing of our fixed voice product suite which has ensured that the price paid by customers in regional and remote areas is the same as that paid by customers in metro areas. (p. 10)

Despite this, consumer advocacy groups considered that more should be done to improve telecommunications affordability (ACCAN 2016a; Thomas 2015). Some participants suggested that free public open access WiFi be considered as part of a USO (Coutts Communications, sub. 5; Barcoo Shire Council, sub. 41; Swinburne Institute for Social Research, sub. 45). ACCAN proposed that eligibility for the Telephone Allowance be broadened to include all people who are on the lowest payments of income support, such as Newstart and Youth Allowance recipients (ACCAN 2016a; Musolino and Ogle 2016). Indeed, as ACCAN (sub. 48) noted:

Affordability of telecommunication[s] services is currently addressed in Australia in two ways; through the carrier licence conditions on Telstra that requires it to ‘offer products and arrangements to low-income customers (the low income package)’ and the Commonwealth Telephone Allowance. (p. 20)

The TUSO does not address the specific needs of some users. For example, the policy does not tailor services to remote Indigenous communities, or provide fixed voice services for pre-paid customers. Pre-paid services are seen by some as a solution to reducing the risk of very large telephone bills that sometimes occur in remote Indigenous communities because of service sharing, and some advocated for pre-paid services to be included as part of a future TUSO (Broadband for the Bush Alliance, sub. 6; Ninti One, sub. 16). On the other hand, pre-paid mobile services can be significantly more expensive than contract services, sometimes referred to as the ‘poverty premium’.

Digital empowerment is also a barrier to the take-up of telecommunications services. Some people lack the confidence and ability to utilise these services and require additional training and support. While digital literacy supports are not available under the TUSO, they are offered in the broader policy landscape supporting universal services (chapter 4).

At present, the consumer safeguards available through the CSG only apply to the *standard telephone service*. Consumers do not have the same guarantees for mobile or internet services, or for OTT communications services that can substitute for a standard telephone service. Some users (for example, Regional Development Australia Wheatbelt Inc, sub. 55) regarded service reliability of mobile and broadband as vital, particularly in regional and remote areas where it is necessary for personal safety and to operate a business. Without guaranteed reliability, these users said they were hesitant to adopt new technologies or to have confidence in telecommunications services. Carrier groups, however, expressed concern about increasing regulation on services other than the standard telephone service. Additional regulation, they argued, would hamper investment in these services and lead to market inefficiencies.

The TUSO runs in parallel with other government programs

The current TUSO runs in parallel with other government programs — in particular, the NBN and the Mobile Black Spot Programme. However, many stakeholders regarded these other programs as delivering more important telecommunications services to regional and

remote Australia (for example, Victorian Farmers Federation, sub. 32; Regional Australia Institute, sub. 50; Northern Territory Government, sub. 59).

Macquarie Telecom (sub. 27) argued that since there is no shared underlying policy reasoning between current telecommunications policies, various regulatory tools existed to achieve overlapping outcomes, resulting in inefficient spending. The ‘ad hoc’ and ‘lagging’ nature of spending in this area was also highlighted by the Regional Australia Institute (sub. 50). The Remote Area Planning and Development Board (sub 12) proposed the development of a ‘national strategy’ to deliver a dynamic digital network as an alternative to the ‘patchwork collection’ of current telecommunications policies.

The NBN can also deliver voice services

As noted in chapter 2, the NBN will provide the infrastructure for broadband services to all premises across Australia. Once rolled out, broadband will effectively be universally available (at least at a wholesale level). Retail service providers will have open access to this infrastructure to deliver retail services over the NBN, including voice services at a capped wholesale price.

Arguably, the TUSO may no longer be needed once Australia fully transitions to NBN infrastructure. Consequently, many stakeholders viewed the need for the TUSO as transient. OptiComm (sub. 13, p. 4) suggested that nbn should fulfil the role of ‘universal wholesale only infrastructure provider of last resort’ and be compensated through TUSO funding.

Better mobile coverage also lessens the need for a USO

The TUSO does not deliver the *standard telephone service* over mobile technologies (except in very limited circumstances⁴⁰). However, mobile coverage is now extensive in terms of population coverage. This in turn also makes the TUSO less relevant. Other taxpayer-funded initiatives, such as the Mobile Black Spot Programme, aim to improve mobile coverage in regional areas. But these programs are funded separately from the TUSO. Infrastructure Australia (2016b) recommended that the Government consider phasing out the TUSO and instead divert the funding to further improve mobile coverage.

In addition to the perceived duplication of measures to promote universal availability of telecommunications, a further concern is that these programs appear to be largely viewed in isolation. Some participants argued that there was not enough consultation on where coverage of these services intersect and where gaps remain (Remote Area Planning and Development Board, sub. 12; Macquarie Telecom, sub. 27).

⁴⁰ For example, Telstra may provide customers with mobile handsets to deliver the *standard telephone service* on an interim basis. This typically occurs in circumstances where nbn has accepted responsibility for delivering infrastructure to a new estate but there is a delay in its delivery (Telstra, sub. 30).

The TUSO lacks transparency and accountability

A long-term and opaque contract

The TUSO is also commonly criticised for its lack of transparency and accountability. As already noted, there is no information on the scope of Telstra's TUSO services or the associated costs. Some stakeholders rightly argued that this hinders debate, and with it, the necessary scrutiny to evaluate the effective use of public funds. De Percy commented:

[It's] fairly obvious that it needs to be more transparent ... If you wanted to make sure this was actually a transparent solution to the problem of providing service to everyone, then you would expect to be able to know exactly who couldn't get service and who was being funded through the USO ... Part of the problem is this [has] rarely, if ever, been the case. (De Percy, cited in Whigham 2016)

Some participants also questioned why, given the rapid change in technology, the Government has locked in a twenty-year contract (the TUSOP Agreement) to provide TUSO services. The ACMA highlighted how the dynamic nature of today's telecommunications sector poses a challenge to the effectiveness of a static TUSO regime (sub. 49), while the Barcoo Shire Council emphasised the need for universal service policies and related definitions to be able to change over time (sub. 41). This Agreement extends well beyond the NBN infrastructure rollout period, and the fixed annual funding does not appear to align with the decreasing demand for fixed-line and payphone services. According to Raiche:

The outcome looks to be a nonsense. The Government owned NBN Co is charged with implementing Government policy of providing broadband transmission capacity that is accessible to all Australians within a few years. Yet Telstra is charged with maintaining its copper network for twenty years. (2015, p. 133)

As already noted, funding for the current TUSO contract increased significantly from the previous TUSO agreement (table 3.1). For some, this increase occurred without justification and it now includes an additional \$100 million per annum in taxpayer funding.

A twenty-year Agreement looks anachronistic in the context of such a dynamic service sector. While there are review points embedded, the scope for substantially changing the nature of the obligation appears to be limited (chapter 9).

The benefits of the TUSO are not factored into its costs

Some competing carriers suspected that Telstra's TUSO is effectively narrow in scope. These carriers also contended that it does not account for the benefits that Telstra gains in providing these services, and therefore does not reflect the real net cost.

This criticism is often applied to payphones. The TUSO subsidises Telstra's provision of payphones, but every year Telstra reduces the total number of payphones that it operates. Competing carriers stated that the payphones provide Telstra with revenue-generating

advertising opportunities (Opticomm, sub. 13; Vodafone, sub. 46). In addition, Telstra uses some of its payphones to deliver WiFi hotspots ('Telstra Air') made available only to its customers (with other customers having to pay for the service). These hotspots are said to further increase Telstra's competitive advantage by enabling its customers to use additional bandwidth and hence avoid some of the spectrum limitations of Telstra's mobile network. Critics also stated that Telstra's WiFi services reduce competition (Macquarie Telecom, sub. 27) and give Telstra a competitive advantage for state and local government tenders that seek to provide public WiFi hotspots.

As already noted, there are likely to be other less tangible benefits to being the designated TUSO provider, including increased brand awareness and market ubiquity. OptiComm (sub. 13) highlighted how the TUSO has assisted Telstra in gaining a competitive advantage in regional and remote markets, due partly to the visible presence of its logo on payphones, vans and business premises in these areas. Vodafone Australia (sub. 46) identified the benefits regarding economies of scale and scope in regional telecommunications investment enabled by the TUSO, which have been valued and considered as part of universal service policies internationally but ignored in Australia.

Are there any positives about the TUSO?

Despite the criticisms outlined above, a number of stakeholders highlighted the benefits of the TUSO. Historically, the TUSO has enabled those living in rural and remote areas to maintain social and economic connections, and has helped to overcome the 'tyranny of distance' (Infrastructure Australia, sub. 51, p. 2). Other participants highlighted the particular importance of the TUSO for remote Indigenous communities (CAYLUS, sub. 25), farmers (National Farmers' Federation, sub. 31), and small business owners (Australian Small Business and Family Enterprise Ombudsman, sub. 39).

Participants also highlighted the importance of the TUSO in ensuring the provision of payphones. Despite falling usage, payphones may be important in areas with no mobile coverage and where residents are unable or unlikely to take up satellite-based internet services due to affordability issues (RDANT, sub. 10). Payphones can also serve as a 'last resort' for access to telecommunications (National Farmers' Federation, sub. 31), and may be important in emergency situations (ACCAN, sub. 48) and for certain groups of users who are vulnerable and have limited access to other telecommunications services (Telecommunications Industry Ombudsman, sub. 52).

The TUSO has ensured access to the National Relay Service and assisted those living with disability or an impairment to access telecommunications services on an equitable basis. Furthermore, others suggested that the TUSO remains important in areas where no 'viable alternative' technology exists (ICPAQ, sub. 14). The need for a 'guarantee' or 'safety net' may therefore be essential for people in certain remote areas (McLaren, sub. 18).

Notwithstanding these benefits, the TUSO also entails costs, both direct and indirect. Even though universal access to a minimum level of telecommunications services remains

important, the weight of evidence suggests that the costs are likely to be greater than the benefits, and that the TUSO is no longer fit-for-purpose. While Telstra may have acted with goodwill in fulfilling its contractual obligations, the Commission considers that these arrangements are no longer serving the best interests of the Australian community.

DRAFT FINDING 3.3

In addition to its declining relevance, the telecommunications universal service obligation (TUSO) has a number of deficiencies. It is a blunt instrument with a one-size-fits-all approach to universal service provision. Telstra's contractual obligations under the TUSO lack transparency and accountability. The basis for TUSO funding (a total of around \$3 billion in net present value terms over 20 years to 2032) is unclear and disputed.

While recognising that the current TUSO is subject to a contract (the TUSOP Agreement) between the Australian Government and Telstra until 2032, and considering the concerns outlined above, the Commission proposes that the TUSO be phased out as soon as practicable. Relevant transitional considerations are discussed in chapter 9.

DRAFT RECOMMENDATION 3.1

The Australian Government should phase out the existing telecommunications universal service obligation as soon as practicable.

4 Other policies and programs

Key points

- Australia has a number of policies and programs outside of the telecommunications universal service obligation that are broadly designed to support universal service objectives. Fundamentally, these measures are aimed at ensuring that telecommunications services are available, accessible and affordable to geographical areas or cohorts of users that may otherwise be uneconomic to serve.
- The Commission's conservative estimate is that the Australian Government allocates at least \$1 billion per annum to universal telecommunications services. Not included in this estimate is the Australian Government's sizable investment in National Broadband Network (NBN) infrastructure (with a commitment of \$29.5 billion to date) or the expected ongoing costs of supplying non-commercial services over NBN infrastructure.
 - Preliminary analysis undertaken by the Bureau of Communications Research estimated that the net losses involved in servicing the NBN's fixed wireless and satellite premises to 2040 were \$9 billion in net present value terms. This is equivalent to a subsidy of \$1200 per fixed wireless premises per year and of \$1440 per satellite premises per year.
- A number of consumer safeguards and services are in place to support telecommunications availability, accessibility and affordability. These safeguards do not apply consistently across all providers and all telecommunications services. Safeguards mainly cover the *standard telephone service*. The declining reliance on this service means that these safeguards are becoming less relevant to consumers.
- The numerous policies and programs across all of these different areas of government intervention appear to lack integration. Potential overlap in programs suggests that there is scope for rationalisation of telecommunications policy in Australia. Efficiency gains and better outcomes could be achieved by taking a more coordinated and whole-of-sector perspective when allocating funding and developing policies regarding universal telecommunications services.
- The Australian Government, in consultation with state and territory governments, should conduct a stocktake of all telecommunications programs that share universal service objectives to improve their efficacy and cost-effectiveness. The Government should also provide a forum for agencies and jurisdictions to promote program evaluation and share best practice.

In addition to the telecommunications universal service obligation (TUSO), Australia has a wide range of policies and programs broadly designed to support universal service objectives. These include infrastructure-related programs and services to expand telecommunications availability and a variety of consumer safeguard provisions and services to support service quality, accessibility and affordability.

These programs, while distinct from the *standard telephone service* and payphone components of the TUSO, are interrelated. Collectively they aim to provide affordable access to telecommunications services. These programs tend to target regional and remote areas that may be high cost and uneconomic to serve. Some programs also aim to meet specific needs of disadvantaged segments of the Australian community, such as people on low incomes, older Australians, people with disability and remote Indigenous communities.

Programs are delivered through a variety of means, including direct funding of consumer subsidies, funding of providers to supply a particular service, and contractual obligations and regulation through carrier licencing requirements and legislation. Most programs are delivered by the Australian Government, although state, territory and local governments also provide additional telecommunications services within their jurisdictions. Co-contribution and industry funding are a feature of some of these programs (and are sometimes the major source of funding).

The Commission's conservative estimate is that the Australian Government allocates at least \$1 billion per year to telecommunications programs broadly associated with supporting universal service objectives (table 4.1). Not included in this estimate is the Government's equity funding in National Broadband Network (NBN) infrastructure (with a commitment of \$29.5 billion to date),⁴¹ or the expected costs of supplying fixed wireless and satellite services over NBN infrastructure in non-commercial areas.

This chapter describes the main policies and programs outside of the *standard telephone service* and payphone components of the TUSO that support universal service objectives. It does not attempt to include all such initiatives or assess the merits of each program. Section 4.1 of this chapter describes the main programs that relate to telecommunications infrastructure and service availability. Section 4.2 discusses consumer safeguards and services to address service quality, accessibility measures for customers with specific needs and measures to improve telecommunications affordability. Section 4.3 identifies initiatives that aim to improve access to government services through telecommunications. Section 4.4 concludes with the Commission's views on how, collectively, these policies and programs could be better organised to support universal service objectives.

⁴¹ The Australian Government announced in November 2016 that it will loan \$19.5 billion to nbn, with the expectation that this loan will be re-financed on external markets in 2020-21 (Fifield and Cormann 2016a).

Table 4.1 Public transfers related to telecommunications universal service objectives

Preliminary estimates, including GST ^{a,b}

<i>Program</i>	<i>Indicative annual funding</i>
Telephone Allowance	\$611 m ^c
Standard telephone service USO	\$253 m^d
Mobile Black Spot Programme	\$48 m ^e
Payphones USO	\$44 m^d
Programs to support digital inclusion	\$29 m ^f
Emergency Call Service	\$22 m ^d
National Relay Service	\$22 m ^d
Voice only Customer Migration	\$17 m ^g
Remote Indigenous telecommunications programs	\$5 m ^h
Untimed local calls in extended zones	\$2 m ⁱ
Total	\$ 1 053 m

^a Excludes equity funding of NBN infrastructure and non-commercial services in fixed wireless and satellite areas. Also excludes funding by state, territory and local governments. ^b Figures in this table are subject to rounding to the nearest million. ^c \$45 m for the Telephone Allowance plus \$566 m for the telephone component of the Pension Supplement. ^d Includes the Telecommunications Industry Levy contribution. ^e Assumes Australian Government contribution of \$242 m over 5 years. ^f \$112.2 m over 4 years for the 'Inspiring all Australians in digital literacy and STEM' measure plus \$1.03 m for 'Broadband for Seniors'. ^g \$165 m over 10 years. ^h \$14.7 m over 3 years from 2015-16 for telecommunications-related parts of the Remote Australia Strategies Programme. ⁱ \$1.785 m allocated for 2015-16.

Sources: Department of Communications and the Arts (2016k, 2016n); Department of Education and Training (2016); Department of the Prime Minister and Cabinet (pers. comm., 30 June 2016); Department of Social Services (pers. comm., 13 July 2016); Liberal Party of Australia (2016); Productivity Commission estimates based on unpublished data from Department of Social Services.

4.1 Telecommunications infrastructure and service availability

Government intervention in telecommunications is largely targeted at improving the availability and quality of telecommunications infrastructure, particularly in regional and remote Australia. This includes universal wholesale broadband infrastructure through the NBN, expanding mobile phone coverage through the Mobile Black Spot Programme, and local initiatives, such as community WiFi. It also covers the availability of public safety services, such as the Emergency Call Service.

The National Broadband Network

In April 2009, the Australian Government established nbn (NBN Co Limited), a government business enterprise, to build and manage NBN infrastructure. The NBN will provide a broadband service to all premises across Australia at a capped wholesale price, regardless of location. According to Department of Communications and the Arts (DoCA, sub. 58):

The Government has made a commitment to ensuring that, to meet Australia's economic and social needs, all Australians have access to very fast broadband as soon as possible, at affordable prices, and at the least cost to taxpayers. This commitment is being delivered by the rollout of the National Broadband Network. (p. 2)

The NBN includes three types of broadband infrastructure: 'fixed-line' (that will become available to about 92 per cent of Australian premises), 'fixed wireless' to about 5 per cent of premises, and satellite to the remaining 3 per cent of premises — generally in the more remote parts of Australia. As of November 2016, nearly 3.5 million premises had been connected to the NBN, with around 1.5 million active users (nbn 2016o).

The NBN provides a universal broadband service

When completed (currently scheduled for 2020), the NBN will be Australia's national data network and will be able to provide broadband services to all Australian households and businesses. Broadband includes both data and voice over internet protocol (VoIP) services. However, NBN infrastructure has been designed to supply a 'high quality' voice service only within its fixed-line footprint — where it is migrating existing 'voice over copper' users to an equivalent NBN service (nbn, sub. 47). In its submission, nbn stated:

As nbn has not designed or deployed its Fixed Wireless or Satellite networks with a view of supporting voice services, further detailed analysis would be required to understand the technological, operational and service quality implications of having to do so. (sub. 47, p. 16)

That said, after consultation with stakeholders, the Commission considers that the NBN fixed-line and fixed wireless infrastructure offers a high quality voice service which can be either managed or Over-the-Top (chapter 6). However, in respect of the NBN satellite services, the voice quality will be affected by latency and be of a lower perceived quality and reliability to users (chapter 6).

The NBN contains a number of quality performance objectives. According to nbn's latest Service Level Schedule,⁴² the network availability objective is 99.9 per cent for its fixed-line and fixed wireless infrastructure, and 99.7 per cent availability for its satellite infrastructure (nbn 2016l; chapter 6). nbn's network reliability standards are therefore similar to Telstra's own standards for its copper network (described later). As noted by McLaren:

⁴² Performance objectives are set out in nbn's contractual agreements with retail service providers.

For the non-satellite networks this means downtimes of less than 45 minutes per month on average which is significantly better than the recent results report by the [Australian Communications and Media Authority] for Telstra’s network (but in line with previous reported average downtime figures). (sub. 18, p. 4)

Wholesale provision, retail competition

The NBN operates as a wholesale-only network that delivers broadband to retail service providers who purchase access to this network through nbn’s 121 points of interconnection. Retail service providers can acquire access to any or all of these points of interconnection to deliver broadband services to their customers. Providers are able to configure these services in a number of ways to enable them to differentiate and compete — such as price, download speeds, data limits and customer service (nbn, sub. 47).

nbn provides capped wholesale prices to access its network, regardless of the location or infrastructure type. Capped pricing is designed to encourage retailers to provide a nationwide broadband service as nbn subsidises the much higher cost to deploy, connect and maintain fixed wireless and satellite broadband infrastructure (nbn, sub. 47). Preliminary analysis undertaken by the Bureau of Communications Research (BCR 2015) estimated the net losses involved in servicing fixed wireless and satellite premises to 2040 were around \$9 billion in net present value terms. This is equivalent to a subsidy of \$1200 per fixed wireless premises per year and \$1440 per satellite premises per year.

The Australian Government has also directly funded the supply of fibre-optic transmission network infrastructure in regional locations to enhance the competitive supply of these networks and to support NBN infrastructure (box 4.1).

Box 4.1 Regional Backbone Blackspots Program

In April 2009, the Australian Government announced the Regional Backbone Blackspots Program. This program allocated \$250 million to fund the construction of fibre-optic transmission links (or ‘backbone’) across Australia. The Government selected six priority locations in regional Australia where supply of existing transmission network infrastructure was deemed uncompetitive. Locations included Geraldton, Victor Harbor, South West Gippsland, Broken Hill, Emerald and Longreach, and Darwin.

The program provided over 6000 kilometres of government-owned, open-access transmission network infrastructure across mainland Australia. Program objectives were to enhance the competitive supply of transmission links to provide better service outcomes for consumers in regional areas. It also aimed to deliver economic stimulus and to contribute infrastructure for the National Broadband Network.

The transmission network routes were completed by January 2012, with the contractor Nextgen Networks responsible for operating and managing the network until 2017.

Sources: ANAO (2012); Nextgen Group (2016).

nbn has non-discrimination obligations to ensure equitable access to its network and to encourage competition among retailers. Competition is further supported by Telstra's structural separation undertaking that migrates ownership of Telstra's fixed-line networks to nbn within the NBN fixed-line footprint (nbn, sub. 47). nbn considered that these legislative settings and the design of the NBN will ensure that there are no barriers to a competitive retail market for broadband and that services will be available Australia-wide (nbn, sub. 47). Retail competition over NBN infrastructure in regional and remote Australia is discussed further in chapter 6.

The NBN supports accessibility and affordability objectives

The NBN also provides support to the accessibility and affordability objectives of universal services. According to the Council of Australian Governments' 2010–2020 National Disability Strategy:

The National Broadband Network will provide Australians with disability and their carers access to a range of benefits including e-health services, remote monitoring for assisted living, interactive learning opportunities, employment opportunities, increased connectedness within the community, and improved access to communication services. (COAG 2011, p. 27)

The Australian Government is working with nbn to improve the accessibility of public interest services in NBN satellite areas (Fifield 2015). Satellite broadband is limited in capacity and this can constrain access to public services that are delivered by broadband in these areas.⁴³ An additional data allowance is available to eligible students in these areas who study via distance education. The 'Sky Muster Educational Service' enables access to a dedicated broadband capacity of 50 gigabytes per month per eligible student that is outside of their home broadband quota (nbn 2016m).⁴⁴ Prices and subsidy arrangements differ by jurisdiction and are set by retail service providers in consultation with nbn and state and territory governments (BIRRR 2016). The Australian Government has also directed nbn to develop similar products to improve access to assist remote health delivery and other community services (Fifield 2015).

The design of the NBN also aims to address affordability objectives for some of its customers. nbn's provision of non-commercial broadband infrastructure and its nationwide wholesale price caps seek to ensure affordable access to broadband services for regional and remote Australia. Without these provisions, most customers in these areas could not access broadband at an 'affordable' price. However, in the (largely urban) fixed-line footprint, heavy users of the NBN who demand high broadband speeds are charged prices that can be well in excess of their connection and service costs. These higher tariffs aim to deliver a commercial return to nbn and cross-subsidise services for its regional and remote

⁴³ Satellite users currently have their broadband data allowance capped during both peak and off-peak periods. Internet service speeds slow once customers reach their monthly data allowance.

⁴⁴ Available for up to three eligible students per household.

customers, as well as for customers who want only a basic level of NBN services (Potter and Mason 2016; chapter 5).

The Australian Government initially intended to retain full ownership of nbn during the rollout, with funding coming from Government equity (Dalzell 2011). The total value of Government's investment in the NBN is currently capped at \$29.5 billion which is expected to be fully utilised in 2016-17 (Fifield and Cormann 2016a; nbn 2016a). The Government announced in November 2016 that it will loan a further \$19.5 billion to nbn on commercial terms. The Government expects that this loan will be re-financed on external markets in 2020-21, once nbn has sufficient cash flows to support private sector debt (Fifield and Cormann 2016a). The NBN is covered in more detail in appendix B.

The Mobile Black Spot Programme

Programs expanding mobile phone coverage may be also seen as promoting universal services. One such example is the Mobile Black Spot Programme which seeks to extend mobile phone coverage and competition in regional and remote Australia.

The Mobile Black Spot Programme is an Australian Government initiative that consists of telecommunications companies bidding for funding to provide a base station in 'black spots' — areas with inadequate mobile coverage. The program was announced following the 2013 federal election in response to the mobile coverage issues in regional and remote Australia raised in regional telecommunications reviews (RTIRC 2008, 2012). The program also sought to improve mobile coverage along major transport routes, small communities and areas prone to natural disasters (Liberal Party of Australia and The Nationals 2013).

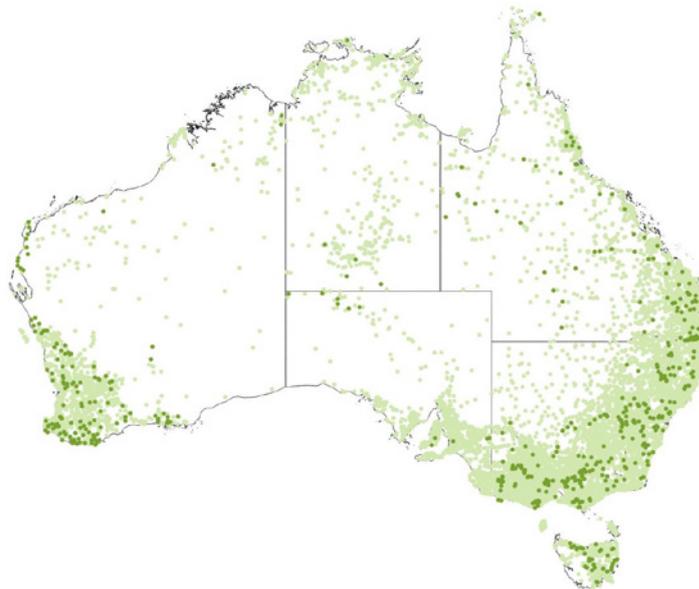
The first round of the program was finalised in June 2015. It featured \$100 million of funding from the Australian Government, \$87.35 million from state and territory governments, and \$1.7 million from local governments, businesses and community organisations. Telstra was selected to build 429 base stations with a co-contribution of \$165 million, and Vodafone was selected to provide the remaining 70 base stations with a co-contribution of \$20 million (figure 4.1). The rollout will occur over a three-year period and will provide new handheld coverage to 68 600 square kilometres, new external antenna coverage to over 150 000 square kilometres, and new handheld or external antenna coverage to over 5700 kilometres of major transport routes (DoCA 2016e).

The second round of the program, to which a further \$60 million of Australian Government funding has been committed, is currently underway with the locations to be announced in the second half of 2016. As part of the 2016 federal election campaign, the Government announced a further \$60 million to a third round of the program, which brings the Australian Government's total funding commitment to \$220 million (Liberal Party of Australia 2016).

Proposed base stations were selected according to the new coverage they would provide, the benefit of that coverage and whether it was in a ‘priority location’. Also important was the value of the co-contribution they attracted from applicants, state governments and third parties, as well as the cost of provision, and commitments by other mobile network operators to use the new base station.

Under program rules, the company selected to build each station must provide competitors with the opportunity to co-locate and provide input into the station’s design to facilitate the potential sharing of new infrastructure. However, the extent of infrastructure sharing may, in practice, be limited by ownership of transmission networks and site location (Vodafone Australia, sub. 46). A lack of commercial incentives is also apparent for non-dominant operators to expand network coverage in remote areas that are near mobile black spots. Stakeholder views of the Mobile Black Spot Programme and the program’s merits are assessed in chapter 7.

Figure 4.1 Mobile Black Spot Program
Funded base stations (round 1)^a and reported black spot areas^b



- ^a Dark green areas show the 499 base stations funded in round 1 of the Mobile Black Spot Programme.
^b Light green areas show locations with poor or no mobile coverage as nominated by members of the public. Non-coloured areas are therefore more likely to indicate unpopulated parts of Australia rather than areas of good mobile coverage.

Source: Productivity Commission estimates based on DoCA (2015b).

Community WiFi initiatives

In addition to the national telecommunications infrastructure programs described above, there are some state, territory and local government initiatives that aim to improve telecommunications access. In particular, large-scale free public WiFi has become an increasingly popular service to encourage public internet access and to support tourism and urban renewal across central locations of towns and cities (ACMA 2014d). Some examples include:

- AdelaideFree — this WiFi network is a jointly-funded initiative by Adelaide City Council and the South Australian Government. It provides free wireless coverage in outdoor areas across the central business district and North Adelaide (Adelaide City Council 2016).
- CBRfree — is currently being rolled out across the Australian Capital Territory. It provides users free public WiFi across town centres with the aim of establishing Canberra as a digital city (ACT Government 2016).
- Tasmanian Government Free Wi-Fi — a free WiFi service provided in various towns, cities and key tourism locations in Tasmania (Tasmanian Government, sub. 57).
- Victorian free public Wi-Fi pilot — free WiFi is available in train stations and other public locations in the Melbourne central business district and in central parts of Ballarat and Bendigo (Victorian Government 2016).

Specific programs that include community WiFi facilities for Indigenous people living in remote settlements are described later in the chapter.

Emergency services

Public safety is a key rationale underpinning universal availability of telecommunications services. The provision of telecommunications to access emergency services can be critical, especially to regional and remote communities most at risk of natural disasters (chapter 5).

Emergency services are often time critical, and communications technology is important to enable the rapid and efficient exchange of information (PC 2015b). To enable effective two-way interaction with the community, emergency service organisations require communications services that are widely available, secure and interoperable. They rely on their own radio networks for most of their communications; however, there is a trend towards information being increasingly digitised and carried over data services.

Free calls to emergency services is another feature of universal access programs and policies. The *Telecommunications (Emergency Call Service) Determination 2009* requires carriage service providers to provide free calls to emergency services from standard telephone and mobile services. It also requires carriers to provide the most precise

information on the emergency caller's location. This capability has recently been expanded to identify the location of emergency callers that use payphones.

The Emergency Call Service is an operator-assisted service that connects callers to an emergency service organisation (ambulance, fire and police). The service can be called free of charge from any fixed, mobile or conventional 'handheld' satellite phone, as well as certain VoIP services (ACMA 2015c). The service is operated under government contract to 'Emergency Call Persons'. This currently includes Telstra for Triple Zero and 112 calls, and Australian Communication Exchange (the National Relay Service provider) for calls made to the 106 text service for people who have a hearing or speech impairment. The service is funded by a combination of government funding and the Telecommunications Industry Levy, up to \$22 million per annum (DoCA 2016n).

The Australian Government has recently reviewed the Emergency Call Service to explore ways the service can improve and adapt to new technologies (DoC 2015a). That review recommended enhancements to improve caller identification capabilities and to transition services to an internet protocol-based environment (DoCA 2016m). Currently, the Government is seeking expressions of interest from providers for the future provision of the Triple Zero Emergency Call Service. In a separate process, it is also seeking technology solutions to provide accurate location-based data for emergency calls made from mobile phones (Fifield 2016).

In 2014-15 there were around 8.4 million calls to Triple Zero and 112 emergency service numbers (TUSMA 2015). The majority of these calls originated from mobile phones (67 per cent), and less frequently from fixed-line services (31 per cent) and public payphones (2 per cent) (ACMA 2015b). There were 123 genuine calls to the 106 text emergency service in 2014-15, although more than 500 genuine emergency calls were also transferred by the National Relay Service to emergency service organisations via the Triple Zero emergency service number (ACMA 2015b).

Infrastructure audit

Australian telecommunications infrastructure is owned by a number of agencies across all levels of government, and by the private sector. Owners include public safety agencies, the Department of Defence, nbn, electricity and transport service providers, mobile network operators, access infrastructure and transmission infrastructure owners, and other businesses such as mining companies.

There is a lack of publicly accessible information about existing telecommunications infrastructure held by the public and private sector. This has limited the scope for infrastructure sharing and led to a degree of duplication and higher costs, the extent of which is difficult to assess in the absence of a comprehensive telecommunications infrastructure audit.

The Commission endorses the Regional Telecommunications Independent Review Committee's (RTIRC's) recommendation (2015b, p. 40) that public data and information about any infrastructure that might be of assistance to investors in telecommunications be collected and published. This might include 'dark fibre' or towers with a power source in other sectors such as gas and electricity. It might be undertaken by Infrastructure Australia (as recommended by RTIRC) or another government agency with capability and expertise.

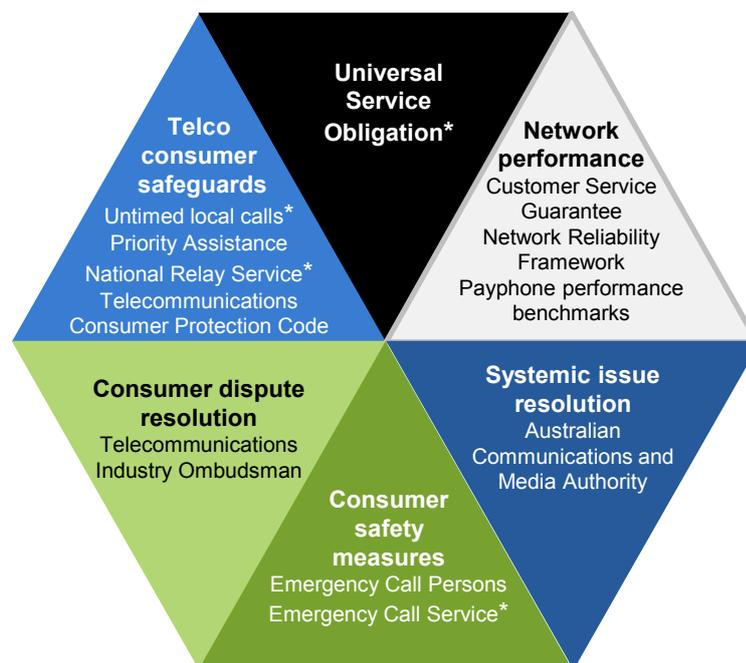
4.2 Consumer safeguards and special needs services

Consumer safeguards are in place in a number of areas of the telecommunications sector (figure 4.2). These include the following.

- *Availability* safeguards — designed to assist consumers by setting quality standards for service provision, ensuring timely maintenance of the infrastructure required to provide these services, and facilitating the independent resolution of disputes between consumers and service providers. Such safeguards largely affect the quality of telecommunications services provided and promote the provision of universal services.
- *Accessibility* safeguards — include measures to address telecommunications access for customers with special needs, such as people with disability. Governments and community organisations also deliver services that have accessibility objectives, including training programs to improve digital literacy, and facilities to improve telecommunications access for remote Indigenous communities.
- *Affordability* safeguards — include untimed local calls, discounts and subsidies to improve telecommunications affordability for low-income groups.

These safeguards apply with respect to the delivery of telecommunications services, and are provided through a variety of means, including legislation, contractual obligations, carrier licence conditions and direct subsidies. Coverage of consumer safeguards varies by carrier service provider and by the services they deliver. In particular, Telstra has a number of specific carrier licence conditions in addition to its legislative and contractual obligations under the TUSO. Most safeguards relate to the delivery of the current *standard telephone service* (and can also apply to other carriage service providers). Other examples include calling line identification, Priority Assistance (for those with a life threatening medical condition) and service performance standards and benchmarks under the Customer Service Guarantee (CSG) safeguard.

Figure 4.2 **Telecommunications safeguards**



* Initiatives that have an asterisk are funded through the Telecommunications Industry Levy.

Source: ACMA (sub. 49, p. 4).

Other safeguards and forms of consumer protection include:

- funding the Australian Communications Consumer Action Network (ACCAN) — Australia’s peak body for consumer representation in communications
- government regulators of telecommunications services and consumer and competition law, including the Australian Communications and Media Authority (ACMA), and the Australian Competition and Consumer Commission (ACCC)
- Commonwealth legislation ensuring competition in telecommunications markets and general Australian Consumer Law protections when buying goods and services — including the *Competition and Consumer Act 2010* (Cth), the *Telecommunications Act 1997* (Cth) and the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth)
- the Telecommunications Industry Ombudsman (TIO) — an independent body providing dispute resolution services free of charge for consumers and small business who have complaints regarding their telecommunications service
- the Telecommunications Consumer Protections Code — an industry code developed by the Communications Alliance that sets out rules regarding telecommunications advertising, billing, payment methods, complaint handling and the changing of service providers.

The *Regional Telecommunications Review 2015* (RTIRC 2015b, p. 52) identified that the consumer safeguards relating to the *standard telephone service* (in particular, the CSG) are increasingly irrelevant given the evolution of the telecommunications markets. RTIRC's view is also supported by a number of participants (box 4.2). The Commission also agrees with this assessment.

Box 4.2 Participants' views on performance standards

TPG believes the mandated Customer Service Guarantee (CSG) arrangements are unworkable and unnecessary, at least insofar as they affect carriers other than Telstra. Competitive carriers who control their own infrastructure into the customer premises will be able to control service delivery and fault rectification. Customer service will be a competitive point of differentiation for such carriers and, as such, mandating a particular [CSG] has the disappointing effect of removing that area as a competitive differentiator. (TPG Telecom, sub. 38, p. 2)

... [T]he ACCC considers that essential telecommunications services should be subject to minimum performance standards relating to connections, fault repairs and network reliability. We consider that some form of CSG scheme should continue to apply. It is important that consumers continue to be protected by clear performance standards and reducing or removing such protections may disproportionately impact vulnerable consumers and those in regional, rural and remote areas. (ACCC, sub. 40, p. 9)

There is an existing technical standard for the provision of a standard telephone service. That standard is, however, increasingly irrelevant for three reasons:

- The Standard was not set for the use of [internet protocol] technology
- It applies only to the provision of a standard telephone service — not to the many other ways Australians are communicating, including [voice over internet protocol] services.
- It does not reflect the existing split between infrastructure providers and retail service providers. (Internet Australia, sub. 43, p. 3)

The current CSG only protects the [*standard telephone service*]. This is out of step with changes in consumer usage patterns, which are now overwhelmingly towards mobile and broadband based communication. The NBN will significantly address the lack of access to infrastructure, but guaranteed service connection, fault repair and reliability remains an issue. (ACCAN, sub. 48, p. 16)

DRAFT FINDING 4.1

A number of consumer safeguards apply to the provision of the *standard telephone service*. These safeguards do not apply consistently across all providers and all telecommunications services. The declining reliance on the *standard telephone service* and the increasing proportion of consumers agreeing to waive these safeguards (in particular, the Customer Service Guarantee) make the relevance of these safeguards questionable.

In response to the *Regional Telecommunications Review 2015*, the Government has proposed to conduct a review of Australia's telecommunications consumer safeguards (Australian Government 2016b). According to DoCA (sub. 58):

The Government is proposing that reform of telecommunications consumer safeguards is undertaken in parallel with the Productivity Commission's inquiry. That reform will focus on,

amongst other consumer protections, affordability and accessibility as important safeguards. We therefore do not consider that broader consumer safeguards should be addressed by this Productivity Commission inquiry. (p. 5)

Consumer safeguards, as they relate to a potential transition from the current TUSO, are discussed further in chapter 9.

Telecommunications performance standards

As noted in chapter 3, performance requirements and protections are set out in legislative instruments under the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth) and secondary instruments, such as the CSG.

Customer Service Guarantee

The *Telecommunications (Customer Service Guarantee) Standard 2011* aims to protect residential and small business customers from a poor telephone service (ACMA 2016b). It sets out performance requirements for carriage service providers for connections, fault repair and appointment keeping for the *standard telephone service*. Customers can be financially compensated by the provider if these minimum performance standards are not met. Compensation payments under the CSG totalled \$5.85 million for 2014-15 (ACMA 2015b).

The CSG Standard applies only where the provider offers a CSG service to a customer's location. This Standard covers the supply of *standard telephone services* (including where retail service providers offer a voice service over the NBN fixed-line footprint)⁴⁵ but it does not cover mobile phone or internet services (ACMA 2016e). Providers are required to inform customers of their obligations and the customer's entitlements under the CSG Standard. Part 5 of the CSG Standard enables customers to waive their rights under the CSG (either in writing or orally), perhaps in exchange for cheaper prices for their phone service. Unlike other providers, Telstra, as the TUSO provider, is prohibited from having its customers waive their CSG rights.⁴⁶

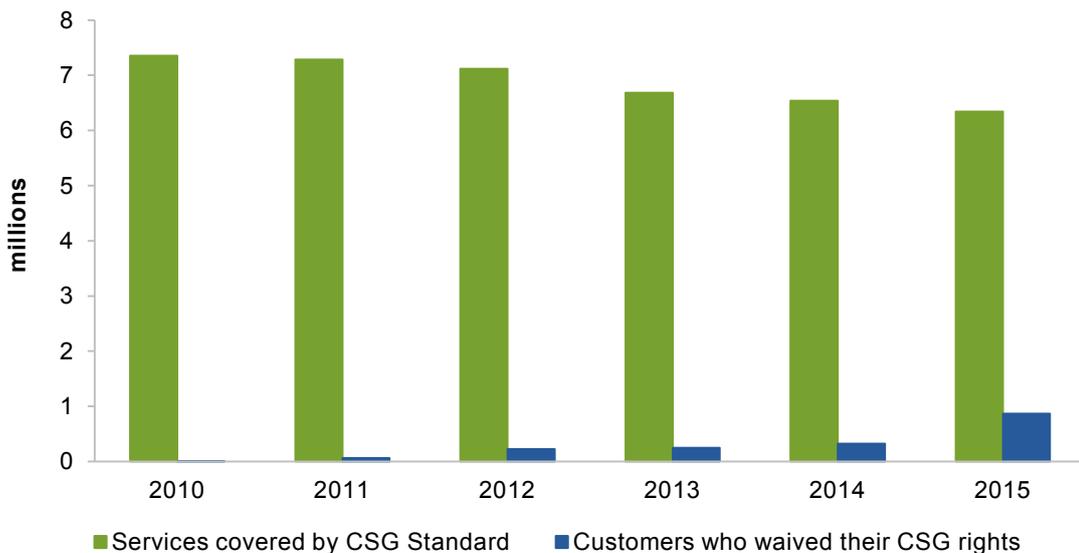
Consistent with the decrease in fixed-line telephone services in operation, the number of services subject to the CSG Standard has decreased from 7.36 million services in June 2010 to 6.34 million services five years later (figure 4.3). In contrast, the number of people who waived their rights under the CSG Standard increased significantly during the same period. The increase in CSG waivers reflects the growth in VoIP customers (who generally elect to waive their rights), and the increased market share of companies that

⁴⁵ Under section 10.3 of nbn's Wholesale Broadband Agreement, the CSG Standard does not apply to retail service providers using NBN fixed wireless and satellite services (nbn 2016k; chapter 9).

⁴⁶ Under section 120, part 7(A) of the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth).

request waivers. For instance, TPG (and its recently acquired companies) routinely requests CSG waivers for its services. TPG/iiNet accounted for 93 per cent of CSG waivers in 2014-15 (ACMA 2015b).

Figure 4.3 Fewer services are covered by the Customer Service Guarantee (CSG) Standard
2010 – 2015



Sources: Productivity Commission estimates based on ACMA (2010a, 2011b, 2012, 2013b, 2014a, 2015b).

Under the Standard, guaranteed timeframes for connection and fault repair can differ depending on customer location and whether infrastructure is readily available. New connections that are close to infrastructure must be made within five working days in urban centres, but within 15 working days in minor rural and remote areas (table 4.2).

The *Telecommunications (Customer Service Guarantee — Retail Performance Benchmarks) Instrument 2011* also applies to qualifying carriage service providers. These providers are required to meet performance standards of at least 90 per cent on measures of connections, fault rectifications and appointment keeping across urban, rural and remote areas.⁴⁷ Each of the four qualifying carriage service providers exceeded these performance standards in 2014-15 (ACMA 2015b).

⁴⁷ Qualifying providers had 100 000 or more CSG services at the last day of the preceding financial year. Telstra is required to meet equivalent payphone fault repair benchmarks under the *Telecommunications Universal Service Obligation (Payphone Performance Benchmarks) Instrument 2011*.

Table 4.2 Customer Service Guarantee Standard timeframes

Number of working days

	<i>In-place connection</i>	<i>New connection close to infrastructure</i>	<i>New connection not close to infrastructure</i>	<i>Fault repair</i>
Urban	2	5	20	1
Major rural	2	10	20	2
Minor rural	2	15	20	2
Remote	2	15	20	3

^a 'Urban' is communities with 10 000 or more people, 'major rural' is communities with between 2500 and 10 000 people, 'minor rural' is communities with between 200 and 2500 people, 'remote' is communities with up to 200 people.

Source: ACMA (2015b).

National Reliability Framework

A complementary performance safeguard to the CSG is the Network Reliability Framework. This framework applies only to Telstra's fixed-line network and is contained in Telstra's Carrier Licence Conditions (ACMA, sub. 49). The framework has three levels of operation. The first requires Telstra to report to the ACMA at a national level on its network availability and the percentage of services that do not experience a fault. The other two levels require Telstra to identify and act to prevent areas of the copper network that are prone to multiple faults at a local area and individual service level.

At a national level, there has been a slight decrease in the performance of Telstra's (mainly copper) fixed-line network. The percentage of CSG services with no faults in a given month fell from 99.05 per cent in June 2006 to 98.35 per cent a decade later (figure 4.4). Network availability (measured as the percentage of CSG services not awaiting repair) was also down slightly from a national monthly average of 99.94 per cent in June 2006 to 99.82 per cent a decade later (ACMA 2015b), and availability is worse on average in non-urban areas than in urban areas (chapter 6). The average time taken for Telstra to restore fault-affected services was 86 hours in 2014-15 (76 hours in urban areas and 94 hours in non-urban areas) (ACMA 2015b).

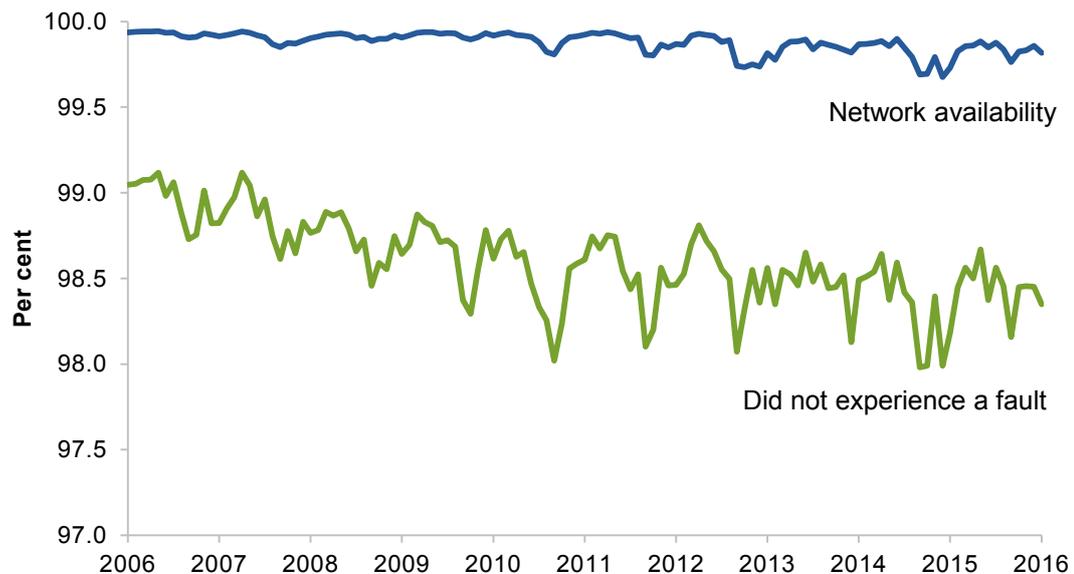
Priority Assistance

Priority Assistance is a customer status that entitles those with life-threatening medical conditions to have priority connection and fault repair for their telephone service. The ACMA has special rules telephone companies must meet for these customers. Customers identified as requiring Priority Assistance are entitled to connection to, or fault repair of, a fixed-line telephone service within 24 hours in urban and rural areas and 48 hours in remote areas (ACMA 2016h). nbn, in its fixed-line footprint, also aims to provide these

same connection and fault rectification times for customers with diagnosed life-threatening medical conditions (nbn 2016j).⁴⁸

Figure 4.4 **Increased faults on Telstra's fixed-line network**

Telstra's fixed-line services, network availability and services with no faults in a given month, 2006 – 2016^a



^a Annual tick marks shown at June each year. 'Network availability' refers to the average percentage of time in a month that services are available and not awaiting repair. 'Did not experience a fault' refers to the percentage of Customer Service Guarantee services that did not experience a fault during the month.

Sources: Productivity Commission estimates based on ACMA (2015b) and ACMA unpublished data from Telstra's monthly reports.

Telstra offers Priority Assistance as part of its carrier licence conditions.⁴⁹ Other carriers can also provide these services in line with the code developed by the Communications Alliance, but are not obliged by regulation to do so.⁵⁰ There were almost 187 000 priority assistance customers in 2014-15 (ACMA 2015b, p. 114).

⁴⁸ Under section 10.3 of nbn's Wholesale Broadband Agreement, Priority Assistance does not apply to retail service providers using NBN fixed wireless and satellite services (nbn 2016k; chapter 9).

⁴⁹ Outlined in the *Carrier Licence Conditions (Telstra Corporation Limited) Declaration 1997* (s.19). Priority Assistance also applies to satellite and VoIP phone services that are supplied by Telstra in fulfilment of the TUSO (Telstra 2014a).

⁵⁰ In 2014-15, Primus was the only provider to voluntarily offer Priority Assistance in line with industry code ACIF C609:2007 *Priority Assistance for Life Threatening Medical Conditions* (ACMA 2015b).

Programs to improve telecommunications accessibility

People with specific needs can have barriers to accessing telecommunications services. Programs to improve accessibility include telecommunications solutions for people who are hearing or speech impaired, or who have other forms of disability that require additional equipment or support. Participants to this inquiry were generally in support of the programs that make telecommunications more accessible for people with disability (box 4.3).

The Australian Government is currently reviewing accessibility issues relating to telecommunications services. This includes future service options and technologies available for people with disability (DoCA 2016a).

Box 4.3 Participants' views on accessibility programs

Not all users will be able to use increasingly sophisticated and new devices (eg. handsets, computers, tablets) for the purpose of making telephone calls. Traditional or specialised devices and services for these users will need to continue to be provided. (McLaren, sub. 18, p. 6)

The National Relay Service (NRS) provides a unique service to the community and, as such, deserves stand-alone consideration within this review of the [TUSO]. There is no other program or policy alternative and the function and offerings of the NRS are not well understood outside the deaf and hearing/speech impaired communities, increasing the risk that its value and importance could be underplayed or considered only in terms of raw expenditure. (Australian Communication Exchange, sub. 22, pp. 2–3)

Telstra delivers this special equipment via the Telstra Disability Equipment Program (DEP). We consider that this program, in combination with the National Relay Service (which is delivered under contract separate to the USO), has done a good job in delivering reasonable [*standard telephone service*] access to Australians with a disability. (Telstra, sub. 30, p. 11)

TPG considers that a cost benefit analysis of the National Relay Service is warranted to ascertain whether it should still be a mandated service and whether there might be a better way to meet the special needs of the group. For example, it may be simpler for the Government to mandate that business of a certain size have an online interaction tool under which specific questions can be asked and answered. (TPG Telecom, sub. 38, p. 2)

Such [accessibility] programs will continue to be needed to ensure that these services are provided and funded. The nature of such programs may change over time as new technology solutions emerge, and is important that whatever regulatory intervention is put in place to support these programs is flexible enough to respond to evolving technology options and consumer needs. While the introduction of nbn-based broadband may introduce additional options to meet these needs, a specifically targeted program will ensure that appropriate services continue to be provided and funded. (nbn, sub. 47, p. 18)

There is a clear need for greater intervention to ensure that all Australians with disability can access and benefit from our increasingly ubiquitous connected society. The current range of ad-hoc programs and services are not providing the necessary safety net. ... In 2011 ACCAN recommended the development of a national Disability Telecommunications Service (DTS). We envision a DTS as a one-stop agency for communications information, equipment provision, training and support. This would alleviate many of the barriers to accessing communications for those consumers with disability who are unable to receive funding packages from the [National Disability Insurance Scheme]. (ACCAN, sub. 48, p. 23)

National Relay Service

The National Relay Service is an Australia-wide telephone service for people who are deaf or have a hearing or speech impairment. Established in 1995, the Australian Government contracts this service to provide consumers with an alternative means of communication equivalent to voice telephony, such as a teletypewriter service (National Relay Service 2016).

The service is available 24 hours a day, every day of the year at no extra cost to the user. Recent additions have been made to the service, including video and text message relay and captioned telephony (Australian Communication Exchange, sub. 22; DoCA 2016a).⁵¹ Approximately 821 000 successful inbound calls were made using the National Relay Service in 2015-2016 (DoCA 2016g, 2016h, 2016i, 2016j). However, the number of individual users of this service is unclear. DoCA noted that the number of individual users was previously estimated at around 5000 to 10 000 but it had experienced increased demand due to recent innovations in the service (DoCA 2016a). Connelly (2015) stated that these innovations, particularly since captioned telephone headsets were introduced in 2011, have dramatically increased the number of unique users to the service and call minutes relayed, and have correspondingly increased its costs.

While demand for the National Relay Service has increased, Telstra noted that the traditional consumer segment for the service is increasingly choosing to use mainstream digital communications technologies to meet their needs (Telstra 2016h). Optus also stated that it is not clear how many National Relay Service users rely solely on these services or what barriers prevent them from accessing mainstream communications (Optus 2016b).

The annual funding allocation for the National Relay Service is currently \$22 million (including delivery of an outreach service), with funding sourced from the Telecommunications Industry Levy (DoCA 2016n).

Disability Equipment Program

The Disability Equipment Program provides affordable access to specialised equipment for people with disability to communicate by telephone (DoCA 2016a). Telstra provides this program to meet its obligations as the universal service provider under the *Telecommunications (Equipment for the Disabled) Regulations 1998*. This program interacts with the National Relay Service and serves a similar purpose to the TUSO, by ensuring that all Australians have equitable access to a basic voice service or equivalent.

The program is available to Telstra retail customers, or associates of Telstra customers, who have a disability or impairment and cannot use a standard telephone handset.

⁵¹ ACCAN (sub. 48) notes that the video relay service is currently only provided on a limited basis. The National Relay Service also does not provide services specific to deafblind consumers or relay languages other than English (chapter 7).

Equipment can include large button telephones, extension ringers, visual alerts and teletypewriters. The products are charged at the same annual rental fee as a standard rental telephone handset, currently at \$36 per annum (Telstra 2016e).⁵²

Telstra noted that there is a decreasing reliance on the Disability Equipment Program as customers move away from fixed-line telephone services in favour of mobile and internet-based communications (Telstra 2016h). In particular, they observed a drop in new users of teletypewriters under this program and attrition of existing users. Telstra stated that it had provided less than 2500 teletypewriters since 1997 and about 100 of these units were being returned every year (Telstra 2016h).

National Disability Insurance Scheme

The National Disability Insurance Scheme is a government-funded program that supports people who have a permanent or significant disability. The scheme is being rolled out nationally from 2016 and is available to Australians who access it before the age of 65.

Support options include organising appropriate equipment and services for disabled people to meet their goals in education, employment, health, and wellbeing (DSS 2016b). Communication devices may be available to participants under this scheme, but it does not include funding for the ongoing costs of internet or telephone services (DoCA 2016a). The National Disability Insurance Scheme will not provide disability equipment to people who do not qualify for funding, such as those with episodic disability or who are over the age of 65 (ACCAN, sub. 48).

Digital literacy programs

Universal access to telecommunications services also depends upon the community's capacity to use them. For instance, older Australians and low-income groups can face particular barriers to the take up of new technologies. Governments and community groups deliver a range of programs to improve digital literacy to avoid the risk of exclusion from these technologies.

National Innovation and Science Agenda

In recognition of the importance of digital literacy, the Australian Government's National Innovation and Science Agenda contains the 'Inspiring all Australians in digital literacy and STEM' measure. A key focus of the program is students identified as being at risk of 'falling behind in the digital age' (Department of Education and Training 2016). The program includes (amongst other initiatives):

⁵² Optus provides a similar program for its customers with disability in Optus-cabled areas of Sydney, Melbourne and Brisbane (DoCA 2016a).

-
- an updated school curriculum focusing on digital technologies, assisted by a free online course for primary and early secondary teachers
 - national computing and coding challenges for students
 - support for partnerships between science, technology, engineering and mathematics (STEM) professionals in industry and schools.

Total funding for the program is \$112 million over four years, commencing from July 2016. The providers of certain aspects of the program, such as the ‘Early Learning STEM Australia’ pilot, will be determined through a competitive tender process.

Broadband for Seniors

The Australian Government funds the ‘Broadband for Seniors’ program to improve older Australians’ access to the internet so that they can participate and share the benefits of the digital economy. Broadband for Seniors was established in 2008 and provides people aged 50 years and over with free access to computers, the internet, and basic training to gain skills and confidence to use these technologies. Training is delivered by volunteer tutors in a friendly, face-to-face environment in small groups or individually. It includes topics such as how to email and use social media and the internet, and how to stay safe online. Broadband for Seniors kiosks are provided in around 1500 kiosks across Australia, including community centres, libraries, retirement villages and aged care facilities (DSS 2016a).

Administered funding for Broadband for Seniors was \$1.03 million in 2015-16, down from \$5 million per annum in the initial years of the program. Additional funding in 2013 was used to provide touchscreen computers and a one-off training grant of \$2000 per kiosk to assist with the delivery of cyber security training. No further funding has been allocated beyond 2016-17 (DSS, pers. comm., 13 July 2016).

Other digital literacy programs for older Australians

Other digital literacy programs for older Australians include the following.

- Improving the digital confidence and skills of senior Australians — during the 2016 federal election campaign, the Australian Government announced that it would invest \$50 million to improve the digital literacy of older Australians and improve their safety online (Turnbull, Fifield and Porter 2016). A digital inclusion and online safety strategy will be developed and will complement existing programs. The package will also include training and small technology grants (DSS, pers. comm., 13 July 2016).
- Digital Literacy for Older Victorians Program — a Victorian Government program providing four grants of up to \$40 000 for the delivery of digital literacy training programs tailored to the needs of ‘older learners’ in the community (Victorian Department of Education and Training 2014).

-
- Tech Savvy Seniors — Telstra has partnered with the state governments of New South Wales, Victoria and Queensland to provide free online training sessions, reference guides and face-to-face training to older Australians through public libraries and community colleges (Telstra 2016a; Telstra, pers. comm., 31 August 2016).

Digital literacy for all Australians

Recognising that digital literacy is important for all Australians, there is a number of government and community organisations across Australia that offer free or affordable internet training and services. Some examples including the following.

- Internet facilities and training are available in public libraries, Australian Neighbourhood Houses and Centres, computer clubs and other community organisations across Australia. For example, LINC Tasmania is a Tasmanian Government initiative to provide public access internet and computer facilities and adult literacy support (Tasmanian Government, sub. 57).
- Go Digi is a program designed to help individuals and communities improve their digital skills and confidence, funded by Infoxchange and Australia Post. The program partners with local governments and community organisations to provide online digital training and mentoring and aims to support more than 300 000 Australians. The program will target older Australians, Indigenous and Culturally and Linguistically Diverse communities as well as small business and regional and remote Australians (Go Digi 2014).
- Forward IT is a South Australian Government website designed to help individuals and businesses learn how to use the internet safely (South Australian Department of State Development 2013).

Remote Indigenous telecommunications programs

Remote Indigenous communities are often identified as a group with ‘unmet needs’ in relation to universal telecommunications services (Broadband for the Bush Alliance, sub. 6, p. 3). Participants to this inquiry state that these communities often face unique challenges and different needs that require tailored government intervention (box 4.4). Indigenous Remote Communications Association (IRCA) noted in its submission to the *Regional Telecommunications Review 2015*:

In general, Remote Indigenous communities have different needs, household make-up, socioeconomic conditions, environmental challenges, and usage patterns to other households in Australia. More community-wide and regional solutions are needed such as WiFi sharing to enable pre-paid services using mobile devices and shared models of access across a region. Very mobile populations are less likely to be house or office-based. (IRCA 2015, p. 5)

Box 4.4 **Participants' views on programs for remote Indigenous communities**

Various government programs, including *Networking the Nation* and [*Remote Indigenous Public Internet Access*] were designed to address the infrastructure void in remote Australia, with varying degrees of success. The result of these programs is an uneven patchwork of infrastructure and programs across remote Australia, resulting pockets of digital exclusion and inclusion. One positive consequence of these various experiments is that there is a great deal of knowledge amongst Indigenous organisations as to how to better meet the needs of remote-living Indigenous Australians, yet the [TUSO] provides no assistance for these organisations to do so in a sustainable manner. (Swinburne Institute for Social Research, sub. 45, p. 3)

nbn has, within its overall policy mandate, implemented a number of initiatives which provide the means for RSPs [retail service providers] to address the needs of specific groups. For example, nbn allows RSPs to relax the general rules for [nbn's Ethernet Bitstream Service] — in which one connection may be used by one household only — to permit certain locations to set up local Wi-Fi networks from a single nbn™ network termination device. This arrangement can be valuable in some remote Indigenous communities, where the model of one nbn™ connection per premises may not meet the needs of people living there. RSPs can then choose how to offer and bill the retail services they deliver in these situations. In addition, nbn is currently developing, in consultation with the Government, specialised Satellite services to meet the distance education needs of remote communities. (nbn, sub. 47, p. 18)

In ensuring that we have connected consumers it is important when addressing market failures that the solutions presented are appropriate to meet consumers' needs and give them control and choice. For example, Indigenous consumers have specific preferences for services which limit the take up of services that are made available but do not meet these preferences. (ACCAN, sub. 48, p. 10)

In recognition that telecommunications services may not be available, accessible or affordable in many remote Indigenous communities, governments — often in partnership with community organisations and businesses — have provided a range of projects that aim to support universal service objectives in these areas. Some examples include the following.

- Indigenous Advancement Strategy — the Department of the Prime Minister and Cabinet (PM&C) funds telecommunications infrastructure, training and support services in remote Indigenous communities under the Remote Australia Strategies Programme (PM&C, pers. comm., 30 June 2016). Initiatives include:
 - Remote Indigenous Community Telecommunications — the Australian Government is providing more than \$8 million over three years from 2015-16 to maintain about 245 community payphones and 301 WiFi telephones in remote Indigenous communities. The phones are generally in areas with less than 50 permanent residents that are not covered by the TUSO (chapter 3). Telstra provides free line rental for most community payphones. Australian Private Networks Pty Ltd, trading as Activ8me, is contracted to maintain and monitor both community payphones and WiFi telephones.
 - ... Community payphones have pre-paid card facilities.
 - ... WiFi telephones are solar powered and provide VoIP. Calls to any fixed-line number are free and pre-paid phone cards can be used for calls to mobile,

international and 13 numbers (Activ8me 2016). The Australian Government provides up to 20 gigabytes of free data per month per WiFi telephone.

- Remote Indigenous Internet Training activity — the Australian Government is providing \$6.7 million over three years from 2015-16 to provide remote Indigenous communities with internet access, training and/or essential internet infrastructure to address barriers to access. This includes trialling a community access WiFi model in five locations in 2016 in conjunction with nbn.
- Other related Indigenous community projects in telecommunications include:
 - inDigiMOB — this project establishes a network of Indigenous mentors living in remote Northern Territory communities to provide on-the-ground training and support in digital literacy, cyber safety and internet access for local community members. The project is funded by Telstra and coordinated by IRCA (IRCA 2016).
 - Central Australian Youth Link Up Service (CAYLUS) computer rooms — provides access to internet facilities in remote Indigenous communities (CAYLUS 2015).

Affordability measures

Australia has a number of measures to address telecommunications affordability and support universal service objectives. These are achieved through welfare payments for particular groups of telecommunications consumers, price discounts, tax concessions and other subsidies to help targeted consumers afford telecommunications services. Participant views of current affordability measures are shown in box 4.5.

Box 4.5 Participants' views on affordability programs

... the current Low Income Measures Assessment Committee (LIMAC) has provided a good model to take into account the needs of low income customers when designing our products. Given the benefits that competition has delivered and diversity in service offerings in the marketplace, the government could consider extending the LIMAC model to other major carriers on an opt-in basis. (Telstra, sub. 30, p. 11)

While such [affordability] measures help to address important social objectives, they can also have implications for competition. For example, requiring a single RSP [retail service provider] to provide basic services for low income consumers can create market distortion. In contrast, demand side interventions which enable low-income consumers to choose a plan from any RSP based on their needs and preferences may be less distortionary. (ACCC, sub. 40, p. 8)

The remaining mechanism to assist people on low incomes is the 'Low Income Measures' licence condition on Telstra to develop products and arrangements to 'address the needs of low income customers' by Telstra's Low Income Measures Assessment Committee (LIMAC), and report annually to the Minister on their work. LIMAC has been very successful in developing programs and products such as HomeLine, InContact, Bill Assistance and PhoneCard Assistance. (Internet Australia, sub. 43, p. 4)

ACCAN does not believe the current arrangements adequately address affordability barriers and need to be re-examined. Affordability measures going forward should be retail service provider independent to give consumers choice in their provider. (ACCAN, sub. 48, p. 21)

Telephone Allowance

The Telephone Allowance is designed to help people on income support with the costs of maintaining a telephone and a home internet service. The allowance is available to older Australians, people with disability and carers on income support. It is paid in addition to the recipients' main income support payment. The Telephone Allowance has been available since 1992, where it replaced a similar telephone rental concession voucher scheme available to eligible pensioners (Daprè 2006).

Funding is available in two tiers depending on a person's circumstances.

- A basic telephone service rate of \$28.20 per quarter is available to some welfare recipients with parental responsibilities, partial work capacities, or who are aged over 60 but are not receiving a pension. It is not available to most people on unemployment-related payments unless they meet these age, dependent children or partial work capacity criteria.
- A higher rate of \$42.00 per quarter is available to recipients of the Disability Support Pension who are under 21 years of age, without children and who have a home internet service connected (DHS 2016b). Other pensioners (and recipients of the Bereavement Allowance and Carer Payment) automatically receive this higher rate as part of their Pension Supplement. The Pension Supplement also includes the Pharmaceutical Allowance, Utilities Allowance, and Goods and Services Tax Supplement (DHS 2016a).

Eligibility for the allowance is assessed when a person makes a claim for certain income support payments. Around 400 000 people received the basic telephone service rate in September 2016, and a further 3.4 million received the higher rate as part of their Pension Supplement (unpublished data from DSS).

While there is no separate funding appropriation for the Telephone Allowance, the Commission estimates that it cost around \$611 million in 2016. This includes \$45 million for the basic rate and \$566 million for the (higher rate) Telephone Allowance component of the Pension Supplement (Productivity Commission estimates based on unpublished data from DSS). The Telephone Allowance is non-taxable and is indexed annually in line with the consumer price index.

The Telephone Allowance, together with the Utilities and Pharmaceutical Allowances, was identified as a potential area for reform in the 2015 McClure Review and the 2009 Pension Review (DSS, pers. comm., 13 July 2016).

- The 2015 McClure review (DSS 2015) identified that the Telephone Allowance contributes to covering general costs of living. The review recommended 'moving to a simpler and more coherent system' (p. 92) where general costs of living should be covered by the main payments.
- The 2009 Pension Review (Harmer 2009) also recommended that the structure of pensions could be simplified by integrating supplementary payments into the base rate

of pensions (p. 92). From September 2009, the value of Telephone Allowance was rolled into the Pension Supplement.

User discounts

Telstra's carrier licence conditions include the maintenance and resourcing of a Low Income Measures Assessment Committee (LIMAC) that represents consumer advocacy groups that work on behalf of low-income Australians. As part of this condition, Telstra introduced the 'Access for Everyone' program in 2002.

In 2015-16, the Access for Everyone program provided fixed-line home telephone service discounts to around 885 000 pensioners (Telstra, pers. comm., 31 August 2016). The program also includes other fee exemptions, low-cost telephone service plans, and bill assistance for low-income customers and those in financial hardship (Telstra 2016b). According to Telstra, the Access for Everyone program has delivered \$107 million in benefits in 2015-16, and around \$2 billion in total value to low-income customers since 2002 (Telstra, pers. comm., 31 August 2016). In its 2013 report to the Minister for Communications, the LIMAC noted that the assistance provided under the Access for Everyone program had declined. While this was attributed to pensioners opting for bundled services offering better value, it was unclear whether it was also influenced by the growing customer preference for mobile over traditional fixed-line telephones (Pavlidis and Hawkins 2015).

Untimed local calls in Extended Zones agreement

Under the Extended Zones agreement, Telstra is contracted by the Australian Government to provide untimed local calls to 'extended zones' — areas outside of its standard local charging zones. There are 98 active extended zones with a total of about 40 000 services, mostly in remote Australia. These zones cover close to 80 per cent of Australia's landmass (ACMA 2015e).

The agreement provides for untimed local calls for users within extended zones and to an adjacent extended zone. It also provides for untimed local calls to that extended zone's designated community service town (DoCA 2016a). The agreement includes calls made from a *standard telephone service* (including dial-up internet) and from payphones. Prior to this agreement, for the same calls described above, customers in extended zones would have been charged national rates instead of an untimed local call (Telstra, pers. comm., 31 August 2016).

The contract value for the Extended Zones agreement was \$1.785 million in 2015-16 (DoCA 2016n). Telstra is continuing to apply untimed local call rates to extended zone calls while negotiations on future arrangements continue with the Australian Government (Telstra, pers. comm., 31 August 2016).

Tax breaks

Under income tax legislation, primary producers are able to claim a deduction over 10 years for capital expenditure incurred in installing a telephone line on, or extending to, land on which a primary production business is undertaken. Persons who have lived or worked in a remote or isolated area of Australia may be entitled to a zone tax offset (ATO 2015a, 2015b).

Community initiatives to support affordability

A number of not-for-profit organisations have measures to provide affordable telecommunications products and services to low-income groups. Initiatives mostly target internet access and include the following.

- Infoxchange technology support programs (Infoxchange 2016), such as:
 - GreenPC — which provides computers to low-income families and community organisations
 - Wired project — which provides affordable internet and skills training in social housing around Melbourne
 - iPads in Aged Care program — funded by Gandel Philanthropy to connect aged care residents with technology.
- The Smith Family’s Tech Packs — which provides disadvantaged families with affordable, refurbished computers and internet access. The Smith Family partners with corporate organisations to fund the program and computer refurbishing organisations that provide hardware and technical support for the families (The Smith Family 2016).

4.3 Telecommunications for government service delivery

Telecommunications plays an important role in the Australian Government’s delivery of public services throughout Australia. It affects the way consumers source information and access services such as health, education and social security. Government’s delivery of these services continues to adapt to new technologies, and has evolved from radio and telephone-based communications to digital platforms. There is also a growing demand and expectation for government to deliver public services online (DTO 2015). This demand will likely intensify with increased consumer adoption of internet-based technologies and the rollout of the NBN.

Online government services

Digital Transformation Agency

The Digital Transformation Agency (formerly the Digital Transformation Office) was established in 2015 as an executive agency of the Australian Government. The agency is tasked with bringing all government services to a single online platform to ‘create public services that are simpler, clearer and faster’ (DTA 2016). It works with government agencies to help transform services and aims to drive the digital delivery of these services from start to finish. The objective of the agency is to improve the government service experience of Australians by making government webpages easier to find and use. Webpages will be streamlined so that people can access them with low bandwidth broadband connections.

To expand its digital agenda for improved government services online, the Australian Government recently announced a broader remit for the agency. In addition to changes to its name and organisational structure, the agency will now be responsible for information and communications technology policy and procurement functions that have been managed by the Department of Finance (Dennett 2016). The agency is also in charge of the technical operation of the myGov portal.

myGov

A range of Australian Government services can be accessed online via myGov. Introduced in 2013, myGov provides a secure web portal for users to link government services to a centralised account. Features include receiving service messages and enabling users to update their details in one place, rather than for each service. Participating member services are growing, and currently include services relating to health and aged care, taxation, social security, public housing and job search (Australian Government 2016a; chapter 5).

Public service delivery to regional and remote Australia

Regional and remote Australia is characterised by its isolated and sparse populations. It is often not viable for governments to supply these regions with physical public service infrastructure, such as schools and hospitals. Instead, many public services are delivered via telecommunications.

Telehealth

Telehealth is the use of telecommunications technology to provide health services over a distance (Department of Health 2015). This includes using telecommunications to transmit

health information to diagnose and treat health conditions. It also allows for medical training and educational support to remote health workers.

Video-conferencing is becoming a common means of delivering telehealth in regional and remote Australia (and also for urban patients who have limited mobility). It reduces the need for patients to travel to major cities to receive medical advice (Department of Health 2015). Users of telehealth include the following.

- The Royal Flying Doctor Service (RFDS) — a not-for-profit aeromedical health organisation that delivers primary health care and 24-hour emergency services to regional and remote Australia. The service conducts 44 regular fly-in fly-out clinics per week (RFDS 2016). In 2015-16, it conducted around 62 700 remote telehealth consultations (RFDS, pers. comm., 26 October 2016). The majority of its consultations are conducted over telephone using satellite and mobile technology (chapter 6), although the RFDS is trialling new technology (including video consultations) which could provide a better diagnosis and help it decide which calls require a personal visit by a doctor or nurse.
- Western Australian Emergency Telehealth Service — a telemedicine service to support clinicians in regional and remote sites by linking them via videoconferencing equipment to a specialist emergency workforce. The service aims to improve access to timely medical advice for emergency patients in regional areas and to improve the knowledge and skills of regional clinical staff (WACHS 2016).
- Northern Territory telehealth trial — a trial to provide telehealth services to clinics in the Katherine, Barkly and Central Australian regions from specialists in Alice Springs, Darwin and Katherine. An evaluation of the trial found that telehealth consultations increased from about 200 per year to more than 1000. The trial was also found to have delivered savings of over \$1.1 million over 18 months through reduced travel costs (Giles and Elferink 2016; Broadband for the Bush Alliance, sub. 6).

Distance education

Students in isolated parts of Australia often rely on telecommunications services for their education. State and territory governments provide distance education to students who cannot attend mainstream schooling. Eligible students include children in remote areas and those who cannot attend school for medical reasons or other commitments.

Educational services are provided through online resources as well as telephone and videoconferencing. However, while the internet is increasingly being used to deliver distance education, it depends on having broadband speeds capable of providing this service.⁵³ Some government initiatives for distance education include the following.

⁵³ The Isolated Children's Parents' Association of Australia stated that the minimum download speed required to effectively participate is 2 megabits per second download and more than 1 megabit per second upload (sub. 11).

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- School of the Air — a distance education service for children in remote communities that is delivered by all state and territory governments except Tasmania and the Australian Capital Territory. The service is available mostly for primary school students but can also include secondary school and adult education courses. It covers the same curriculum as other schools in the same jurisdiction and is delivered by high frequency radio transceivers and, increasingly, by videoconferencing via broadband (Australian Government 2016c).
 - School of Distance Education ICT Subsidy Scheme — a Queensland Government initiative which offsets the cost of computer equipment and internet for eligible students enrolled in a School of Distance Education. Annual subsidies include a \$250 Hardware subsidy to assist with computer equipment and a \$500 Broadband Internet subsidy to assist with the ongoing costs of broadband services (Queensland Government 2016).

4.4 Supporting universal service objectives

There is currently a patchwork of initiatives that aim at some level to address universal service objectives. Despite the commonality of the issues being addressed, and the overlapping nature of some of these programs and policies, there does not appear to be an integrated and coherent approach to funding.

This issue was raised by Rennie et. al (2016) in relation to policies targeting telecommunications in remote areas:

The field of remote communications is characterized by an episodic sequence of programs and reviews, each with different emphases and developing in different ways ... [M]any of these have funded the establishment of facilities, but not their ongoing operation. (p. 40)

This lack of coherence, combined with the scope for duplication and the distortions created by various policy decisions over time, has inevitably led to relatively high public costs of service provision. Some of these programs may also reduce incentives to seek and adopt innovations that could benefit customers. Furthermore, many consumer safeguards in place to support these objectives do not cover telecommunications services outside of the *standard telephone service* and require further review (chapter 9).

DRAFT FINDING 4.2

In addition to the telecommunications universal service obligation, there is a plethora of policies and programs that subsidise the provision and use of telecommunications services across Australia and across different cohorts of users. Conservatively (and excluding the NBN), at least \$1 billion per year is allocated to telecommunications programs broadly associated with supporting universal service objectives. There would be benefits from removing duplication and moving towards a more integrated approach to meeting universal service objectives.

As noted in chapter 3, some participants to this inquiry stated that there is significant crossover between the TUSO and other policies and programs. Some suggested that these other programs can act as a substitute for the USO (Optus, sub. 4) and that there is a blurring of the role of the TUSO with programs that sit outside of it, such as Indigenous community phones in remote areas (Cape York Digital Network, sub. 17).

This potential overlap in programs suggests that there is scope for rationalisation of telecommunications policy in Australia, providing increased consistency while still targeting specific services, locations and customer groups. The Australian Government should identify all of these programs and consider what programs work best in different circumstances.

Efficiency gains could be achieved by taking a more coordinated and whole-of-sector perspective when allocating funding and developing policies regarding universal access to telecommunications. The Commission considers there is scope for greater information sharing between and within governments about these programs that could be facilitated through a low-key network of officials. Participating officials should either be involved in relevant government programs or be from government business enterprises and agencies that are engaged in telecommunications infrastructure such as nbn, the Department of the Prime Minister and Cabinet, and the Department of Defence. As well as offering scope for more efficient allocation of public funding, another benefit of an officials' network is the opportunity to share knowledge about the relative effectiveness of different types of programs.

DRAFT RECOMMENDATION 4.1

The Australian Government, in consultation with state and territory governments, should conduct a stocktake (by the end of 2017) of all telecommunications programs that share universal service objectives to rationalise and improve their efficacy and cost-effectiveness. The Australian Government should also provide a forum for agencies and jurisdictions to promote program evaluation and share best practice.

5 Universal service: objectives and scope

Key points

- There is a range of possible rationales (and potential community-wide benefits) in support of a universal telecommunications service objective. These include: enabling markets to function well (thereby facilitating economic growth and regional development); providing access to emergency services and associated spillovers for public safety; facilitating greater social inclusion; and enabling access to online government services while providing a platform for data collection.
 - The community-wide benefits from better data collection, access and use across a wide range of public and private sector functions reinforce the value of ubiquitous digital connectivity.
- In this context, the objective of a universal telecommunications service should be reframed to make a *baseline* broadband (including voice) service available to all premises in Australia, while having regard to its accessibility and affordability.
 - Stipulating the scope of a universal service objective as a *baseline* (or minimum) quality of service recognises that there are material costs to the Australian community in the provision of universal services.
 - Functionally, a *baseline* service is one that is reliable and intelligible.
- The proposed reframed objective for universal service should be implemented once National Broadband Network (NBN) infrastructure is fully rolled out.

The telecommunications sector has progressed from the 19th century invention of the telegraph — where messages were few and far between — to 21st century ubiquitous connectivity, that allows instantaneous long-distance voice conversations and large amounts of data to be sent around the other side of the world in just seconds.

Australia's current telecommunications universal service obligation (TUSO) was developed at a time when the *standard telephone service* was the dominant technology. However, as the TUSO has barely evolved relative to considerable changes in technology, consumer preferences and government policy, the Commission is recommending that it be phased out as soon as practicable (draft recommendation 3.1). Accordingly, this chapter focuses on what (if any) universal service objective and policies should replace the TUSO.

This chapter: opens with a brief discussion of some key definitions and issues of scope (section 5.1); identifies possible rationales for establishing universal service policy objectives (section 5.2); outlines some key principles to guide the development of any

future policy objective (section 5.3); and proposes a revitalised universal telecommunications service objective (section 5.4).

5.1 Some key definitions

As there is no single widely-accepted definition of ‘universal service’, the Commission has adopted the approach used by the International Telecommunication Union and the World Bank’s infoDev program (infoDev and ITU 2016) and the Organisation for Economic Cooperation and Development (Garcia Calvo 2012) to define these concepts.

Put simply:

- **universal access** occurs when everyone can obtain the service on a *shared* basis
- **universal service** occurs when everyone can obtain the service *privately*.

Notably, while universal service is typically a premises-based concept, universal access and universal service are not mutually exclusive.

The following three elements are commonly used to characterise the achievement of universality: *availability*, *accessibility* and *affordability*. The Commission’s definitions of these three elements are outlined in section 5.4.

In practice, a universal service also defines the *scope* of the services covered. The scope can include voice telephony or be expanded to include broadband and broadcasting services.

The scope of a universal service objective also depends on the quality of service provision (infoDev and ITU 2016). For example, in Australia, the quality of universal voice telephony services mainly rests on the technology associated with the *standard telephone service* and the Customer Service Guarantee, and other consumer safeguards (chapters 3 and 4). The quality of a broadband service is typically defined in terms of its data transmission (upload and download) speed, measured in kilobits per second (kbps) or megabits per second (Mbps) and reliability (or volatility) of that throughput. Further, complementing and supplementing consumer protections provided in Australian consumer law is the Telecommunications Consumer Protection Code — an industry code applying to all telecommunications service and product providers (chapter 4).

5.2 Possible rationales for a universal service policy

It is widely accepted that communication between people, government and business is central to a well-functioning economy and society. Indeed, ‘... communicating among people is the essence of what distinguishes an organization, community, or society from a

collection of individuals’ (Lucky and Eisenberg 2006, p. 7). As such, telecommunications is the technological foundation for communication. It:

- is a key enabler for all markets to function efficiently, thereby facilitating economic growth and regional development, including through increased international collaboration across basic and applied research
- provides access to emergency services
- facilitates greater social inclusion
- enables access to online government services and supports associated data collection.

As highlighted by Ockerby and Wongsosaputu in their analysis for NBN Co Limited (nbn, sub. 47, attachment), in the absence of market failures, a competitive market generally delivers the efficient quantity and quality of services at prices that reflect the least cost of production. However, governments may establish a universal service objective in an otherwise competitive market for social policy, equity or even for income and wealth redistribution reasons. These other rationales are canvassed below.

Nevertheless, while there is value in communication and some functions may be regarded as ‘essential’ to everyday life, there is also a cost involved in providing infrastructure to make telecommunications universally available. Fundamentally, determining the scope of a universal service policy objective becomes a question of how much can, and should, be required of providers beyond what they would provide on a commercial basis. In addition, given that governments often directly or indirectly subsidise the provision of universal service, the question is how much taxpayers are willing to pay to provide telecommunications services (beyond the level that people and businesses are able or willing to pay for themselves), especially in the context of alternative uses for scarce taxpayers’ resources.

Telecommunications enables markets to function well

There are a number of foundation conditions needed for a modern market to efficiently set prices, allocate resources and distribute goods and services. These include: a payment system (currency and an associated financial system); a legal system that defines property rights and enables participants to form and enforce contracts; regulatory oversight to ensure consumers have protection and choice; a transport infrastructure to enable the flow of inputs and outputs between suppliers and purchasers; and a telecommunications system to enable suppliers to connect with customers in real time and facilitate efficient transport logistics and payment systems.

One of the features of telecommunications networks is the presence of *positive network effects*: the more users, the more value is derived by those (new and existing) users. This is a feature of all infrastructure networks (such as electricity grids and transport highways) — where the more electricity grids or roads are connected, the more effective is the network. And the greater the use of roads and electricity grids, the more likely is congestion.

This type of positive network effect reflects increasing returns to scale. For example, the more people connected to a telephone system or a digital platform the more valuable is the telephone system or digital platform likely to be to each user. This gives rise to network providers introducing incentives for more users to adopt the device which gives access to their network through, for example, fee waivers and discounts to users for signing up other users to the network. The role for government in the presence of ‘network effects’ is generally focused on enabling competition to flourish and facilitating standards to ensure compatibility (inter-operability) between networks (Farrell and Klemperer 2007).

These positive network effects differ from a positive community-wide spillover arising from the use of telecommunications itself (see below). This is because network effects benefit users rather than the broader community of non-users (that is, non-related third parties) (Liebowitz and Margolis 1994).⁵⁴

This raises the question of whether the benefits to existing users (and so their willingness to pay) increases with the expansion of the network provided by a service provider. If the benefits to existing network users of providing access to the last 5 per cent of possible customers are high, then there will be an incentive for the market to provide this service to these possible customers, sharing the additional costs across all users. But if the benefits to existing network users are low, then providers will look to new customers to pay for the actual costs of providing them with a service. However, these costs may not be affordable for many of these potential customers. It is in these situations that governments often face calls to act to ensure this group of customers is provided with some level of service.

Telecommunications can support economic growth

Telecommunications networks, like transport and electricity networks, are important to support economic growth and, with this, growth in employment and incomes that benefit the broader community. Analysis using data from 21 OECD countries over the period 1970–1990 showed a significant positive link between telecommunications infrastructure and economic activity controlling for two-way causality and country ‘fixed effects’ (Roller and Waverman 2001). The relationship to growth was found to be stronger once a critical mass was reached.

In its study on *Digital Disruption*, the Commission (PC 2016b) pointed out that the benefits of technological innovation achieved through digital disruption rest on three types of enabling technologies — the internet and its supporting infrastructure, cloud computing, and sensor technologies — all of which rely on internet connectivity. The diffusion of digital technology through an economy is more rapid when the underlying infrastructure is in place, making diffusion over years rather than decades. Katz (2014) listed the requirements for widespread diffusion of digital technologies as:

⁵⁴ In markets where the full benefits and costs to society are not ‘internalised’ into the price of the good or service, the market may be inefficient, although the alternative (government intervention) may be even less efficient.

-
- affordable — so that it is scalable
 - ubiquitous — reaching most of the population
 - accessible — by both fixed and mobile technologies
 - reliable — able to deliver digital content at speed.

More recently, the Commission also observed that data derived from the ‘Internet of Things’ (and all its many applications) require ubiquitous availability of broadband services (PC 2016a).

However, availability alone, without effective skills to use it, does not deliver economic benefits (Evangalista, Guerrieri and Meliciani 2014). The importance of adequate digital literacy skills in attaining an accessible universal service is discussed in section 5.4.

Quantifying these benefits, however, is difficult. That said, the Regional Australia Institute (RAI, sub. 50) pointed to the PricewaterhouseCoopers’ (2009) modelling of the United Kingdom’s total potential economic benefit from ubiquitous online services, which were estimated to be in excess of £22 billion per year (approximately \$38.2 billion). In Australia, Dynamic Business (2016) reported that in a survey conducted by Telstra, 41 per cent of small and medium businesses stated that the National Broadband Network (NBN) boosted their productivity.

... and regional economic development

The universal availability of telecommunications services also enables regional development within a country. Without access to reliable communications, regional-based businesses struggle to flourish on both national and international markets (PC 2016a; South Burnett Regional Council, sub. 35; South Australian Government, sub. 60). Digital delivery of services offers a greater opportunity for regionally-based businesses to compete, but it also means that city-based and international businesses can have greater reach into the regions, which could compel less competitive regional business to either lift their game or close. Such pressures and opportunities can improve the allocative efficiency of the economy.

The RAI, for example, outlined the economic and social benefits for regions flowing from the universal availability of telecommunications:

Improving access to telecommunications in regional Australia ... is about the national interest in efficient provision of services and improving access for communities to health, education and economic opportunities that can reduce disparities in social and economic outcomes between the city and the bush. (sub. 50, p. 6)

Regional Development Australia: Wheatbelt WA (RDAW, sub. 55) also proposed there were productivity benefits, explaining that:

Increasingly agribusiness management and marketing Apps are becoming available and are decreasing time lags in crucial decision making processes in areas such as pest and disease management and/or achieving optimum commodity prices. As with the Internet, mobile phones are increasingly viewed as a critical component of productivity in agriculture. (p. 2)

Regional planning policy has recognised these potential benefits, not just to regional areas, but to cities that are struggling to manage congestion. For example:

Regional planning attempting to encourage a more harmonious distribution of residents away from large congested metropolitan areas. This rationale is based on the existence of externalities: noninternalized congestion externalities in large cities; social benefits from maintaining a rural habitat. (Laffont and Tirole 1999 cited in Ockerby and Wongsosaputru's analysis for nbn (sub. 47, attachment) pp. 8–9)

In a similar vein, the World Bank (2016) recently dedicated its annual flagship publication, the *World Development Report*, to highlight the importance of 'digital dividends'. According to the World Bank, these dividends include the economic benefits (like economic growth and job creation) that result from telecommunications investments. It argued that:

By reducing information costs, digital technologies greatly lower the cost of economic and social transactions for firms, individuals, and the public sector. They promote innovation when transaction costs fall to essentially zero. They boost efficiency as existing activities and services become cheaper, quicker, or more convenient. (p. 5)

The lower transactions costs from cheaper and superior telecommunications services also encourage innovative activity in the university sector by making international collaborations across basic and applied research easier and less costly. In the Australian Government's (2015a) *National Innovation and Science Agenda*, the NBN was listed as a key infrastructure supporting increased university and industry research collaborations, both in Australia and worldwide. Suitable intellectual property arrangements can also support these types of collaborations (DIIS and IP Australia 2015; PC 2016c).

This raises the question about the optimum level of public investment in telecommunications infrastructure to support broader economic growth, innovation and economic activity, especially in regional areas.

Telecommunications is important for personal and public safety

A range of participants submitted that reliable universal access to telecommunications was necessary on private and public safety grounds (box 5.1), especially in remote and regional areas of Australia. Indeed, the Australian Communications and Media Authority (ACMA, sub. 49) noted that public safety was a key rationale underpinning the policy to provide reasonable access to voice telephony services.

Box 5.1 Some participants' views on telecommunications and safety

Yaraka Isisford Branch Isolated Children's Parents' Association (sub. 19) said:

Reliable telecommunications comes back to three words: '**SAFETY OF LIFE.**' (p. 9)

Isaac Regional Council (sub. 26) stated:

The vulnerability of satellite based services to climatic conditions is further exacerbated in northern Australia with the tropics' distinct and often intense wet season. Monsoon trough events can disrupt services for significant periods of time. In areas with no mobile coverage this would significantly impact community safety if no 'landline' service was available. (p. 7)

The **National Farmers' Federation** (sub. 31) said:

Mobile access to internet and voice services is a basic expectation of most Australians, including those in regional areas. Such access has important safety implications for people on the land. Agriculture is statistically a high risk industry with regards to work health and safety. Often, farmers work alone in areas a long way from mobile coverage, which can limit access to emergency services and lead to preventable fatalities. (p. 22)

Northern Regional Development Australia Alliance (sub. 34) submitted:

... the USO, which was once all about basic service standards for human safety, should now additionally and equally be about basic service standards to underpin sustainable communities and economies. (p. 3)

Australian Communications Consumer Action Network (ACCAN), sub. 48) submitted:

The essentiality of communication services today can be seen by what they are used for; ***in life threatening situations for personal safety and security*** (8.5 million calls were made to Triple Zero in 2014, 67% of which were made from mobile phones) ... (p. 11)

The **Tasmanian Government** (sub. 57) stated:

The importance of reliable telecommunications was highlighted in Tasmania during the recent spate of natural disasters. The frequency and severity of extreme weather events is predicted to increase in Tasmania ... , which further emphasises the importance of universal telecommunication services for Tasmanians' safety and wellbeing. (p. 2)

While some of the benefits of ready access to emergency management services could be viewed as mostly 'private' in nature and the consequence of a person's 'lifestyle' choice, other benefits may provide spillover benefits for public safety. That is, the existence of communication links provides benefits to people beyond those involved in supplying or purchasing the service. In this way, telecommunications provides a positive externality (or spillover). For example, the availability of telecommunications services enhances the safety of the general public in cases where they may face significant danger from death, injury or property damage as a result of disasters (including floods and fires) and criminal behaviour (including child abuse, domestic violence, and terrorism and espionage activities). New technologies — such as the 406 Mhz band personal locator beacons and the larger emergency position indicating radio beacon used on ships — also provide a means of indicating distress and precisely guiding rescuers directly to the individual without embarking on expensive search and rescue operations. There are also alternatives such as the HF Royal Flying Doctor Service channel or HF/VHF maritime and aviation channels.

As the level of telecommunications services provided by the market is generally considered to be less than optimal from a public safety perspective, free (to the user) calls to emergency services and full roaming on mobile networks for emergency calls have been longstanding regulatory requirements and expectations across fixed and mobile telephony services in many countries (Attorney-Generals' Department 2012; chapter 2).

Telecommunications can help to facilitate social inclusion

Telecommunications can also reduce social isolation and facilitate social inclusion (Eardley, Bruce and Goggin 2009). Indeed, the explanatory memorandum to the *Telecommunications Bill 1996* (which introduced Australia's TUSO) explained that the fundamental purpose of the TUSO was:

... to safeguard access to a minimum level of essential telecommunications services for all persons in Australia. This recognises the fundamental importance of telecommunications in supporting effective participation in Australian society. (cited in nbn, sub. 47, p. 12).

Others (for example, Cremer et al. 2001) have argued that telecommunications is a necessity for a functioning democracy in order to achieve objectives such as social inclusion. The World Bank (2016) also contended that access to telecommunications services narrows the 'digital divide' (by lowering social exclusion and enhancing social inclusion) and enables participation in political affairs.

The twin notions that accessing internet services is essential for a flourishing modern economy and that such access narrows the 'digital divide', underpins the recent announcement by the United Kingdom Government (2015) of a legal right for its citizens to request a connection to broadband with speeds of 10 Mbps to premises, no matter where they live. For example, in its initial conclusions from their strategic review of digital communications, Ofcom (2016) stated:

Residential consumers and small businesses that participated in our consumer research reported that telecoms services are now essential to their home and work lives. When things go wrong, the inconvenience they experience is acute. The disruption that loss of service causes can be on a par with a power cut or loss of water supply. (p. 47)

There is a persistent digital divide between those who have access to the latest technologies, and those who do not. As the world goes increasingly online, those left behind risk social and economic exclusion. We have found that people who are left behind are usually less well-off or living in vulnerable circumstances. (p. 2)

The United Kingdom's House of Commons Culture, Media and Sport Committee also found a 'compelling' case to expand its current USO from telephony to broadband:

We believe that there is a compelling case for expanding the current USO for telephony and dial-up internet to cover broadband, given the vital role it plays in people's lives through facilitating interactions with friends and family, and commercial and public services. (cited in Rathbone 2016, p. 13)

Some participants also provided examples of how universal telecommunications services have facilitated social inclusion (box 5.2).

Box 5.2 Some views of participants on telecommunications and social inclusion

The **Isolated Children’s Parents’ Association of Australia Inc.** (ICPAA, sub. 11) submitted:

The dependence on reliable telecommunication services increases with geographic isolation. More than 70% of Australia’s landmass has no mobile coverage. Coupled with this, inhabitants of rural and remote areas often have no regular face-to-face access to services, and are becoming more reliant on telephone and data to facilitate access to a variety of services for health, education, business and social needs.

The need for a standard telephone service is particularly vital for students who have no reasonable daily access to face to face schooling due to geographic isolation and who therefore study via distance education. (p. 1)

Telstra (sub. 30) stated:

The ability to communicate using voice is the fundamental telecommunications service. It delivers social inclusion, public safety and productivity to the Australian community. (p. 10)

The **Australian Competition and Consumer Commission** (ACCC, sub. 40) said:

A universal service regime should ensure that consumers are able to access essential communications services in order to promote social inclusion ... by helping to ensure that all individuals are able to access services necessary for them to fully participate in social, economic and political life. (pp. 1–2)

De Ridder (sub. 56) suggested:

The three existing pillars of universal policy (universal availability, accessibility and affordability) should be extended to include social inclusion. (p. 1)

Further, without enabling employees in remote areas to be socially connected, employers may not be able to attract them (even if their economic value is high). For example, the Isolated Children’s Parents’ Association of Australia (sub. 11) said:

... a quality telecommunications service is a fundamental requirement, necessary to attract and retain young families and professionals to rural and remote communities. (p. 1)

In many remote parts of Australia, access to education — which is essential for social and geographic mobility (PC 2014a) — is primarily through interactive distance learning enabled by multicast and satellite technology employed by the School of the Air. It is also well known that social isolation affects suicide rates (Player et al. 2015 cited in Davey 2105) and health more generally (Yang et al. 2016 cited in Lewis 2016).

Visitors and tourists can also be deterred when telecommunications services are lacking. For example, the Flinders Ranges Council (sub. 29) submitted:

The lack of the ‘safety net’ of having the access people are used to and have come to rely on discourages visitation or foreshortens stays ... (p. 1)

In their analysis undertaken for nbn, Ockerby and Wongsosaputro (sub. 47, attachment), pointed out that accepting a social inclusion justification implies that the welfare cost of social exclusion is exceeded by the incremental cost of supplying the telecommunications network to non-commercial areas. Hence, targeting taxpayer assistance to supporting infrastructure in non-commercial areas⁵⁵ (or specific groups of users in commercial areas) is sensible from a cost–benefit and cost-effectiveness perspective.

... and enables access to online government services while supporting data collection

Another potential benefit of ubiquitous access to broadband services is through its effect on the cost of government service provision. For example, the United Kingdom House of Commons Culture, Media and Sports Committee (2016) inquiry report stated:

A core justification for establishing a USO lies in the social and economic benefits it could deliver, such as cheaper and more efficient Government and public services, and the likely consequent productivity and growth to follow. For example, by 2020 digital services such as ‘tele-medicine’ are likely to be more prevalent — where patients monitor their own conditions through home-based or wearable devices connected to the internet, which could reduce the need for referrals to acute centres. Clearly, broadband offers an opportunity to overcome geographical constraints by providing more services remotely. (p. 12)

As part of its Digital Transformation Agenda, the 2015-16 Australian Government Budget allocated \$95.4 million to establish the Digital Transformation Office (DTO). The DTO’s mandate is to ‘redesign services to be digital by default’ and ‘ensure that all new and redesigned government services are simpler and easier to use and can be completed from start to finish online’ (Turnbull 2015, p. 1). In addition, \$159.3 million was allocated to: implement a Digital Service Standard; design and deliver more online services for individuals; and implement a simpler and more efficient grants administration process across Government. Box 5.3 provides an example of the potential efficiencies from improved digital government services.

Australians’ take up of online Australian Government services — through the *myGov* portal (box 5.4) — has grown strongly in recent years. The Minister for Human Services stated that ‘very few other nations have had this level of digital take-up’ (Tudge and Taylor 2016b, p. 2). The number of logins almost doubled from 7.5 million to 14.2 million over 2015-16 and 130 million letters from Centrelink, Medicare, Child Support and the Australian Taxation Office were sent to users’ *myGov* inbox between 2014 and 2016, ‘saving both time and money’ (Tudge and Taylor 2016b, p. 2).

The Australian Government’s recent elevation of the DTO to an agency with additional responsibilities including the *myGov* portal (chapter 4), reinforces this trend to making access to government services more user-friendly and digital by default.

⁵⁵ A non-commercial area is where the market is absent (chapter 3).

Box 5.3 **The potential efficiencies from online services: an example**

A recently concluded digital trial between the Australian Government and the Queensland Department of Health at Gold Coast University Hospital allowed automatic enrolment of a newborn into Medicare, the Medicare Safety Net and the Australian Childhood Immunisation Register. As part of the trial, 786 newborns were enrolled after their parents consented to allow existing hospital data to be sent to the Department of Human Services (DHS), bypassing the usual requirement that parents complete a six page Medicare enrolment form (a Newborn Child Declaration), have it signed by the Doctor or midwife and then lodge it at a Government Centrelink or Medicare office.

In an Australian first, the trial linked basic data between the state hospital system and the federal Medicare system to enrol the child for Medicare in a more streamlined way.

The results of the trial showed that 97 per cent of those parents indicated that the streamlined process was convenient, the average time to enrol a baby fell from 35 days to six, and cut government processing time in half.

Source: Tudge and Taylor (2016a).

Box 5.4 **Australian Government online services: an overview**

As at July 2016, the Australian Government's online portal *myGov* had 10 million registrations on its website making it the largest digital service in Australia, with the number of users per day averaging 160 000 with a peak of over 660 000 users in the July tax time peak.

These customers undertake their business online and via smartphones with a wide range of Government agencies including Medicare, Centrelink, Child Support and the Australian Tax Office (ATO). In 2015-16, over 1.2 million people updated their details via *myGov*, resulting in updates across their Centrelink, Medicare and ATO online accounts.

Recent improvements in *myGov* services have included:

- users being given the option to login with their username or email address, reducing incorrect logins by 37 per cent
- the length of time users are locked out of their account for entering the wrong password has been reduced from 12 to 2 hours, reducing the frustration for people who want to complete their business in the same day
- the 'tell us once' feature has been expanded to include the Department of Employment's job search service
- the introduction of a two part authentication process (via a text message to a mobile phone) to improve security.

As part of its 2016 election commitment, the Australian Government recently committed \$50 million to *myGov* for ongoing improvements. Planned improvements include:

- Improved usability of *myGov* across devices, particularly on mobile
- Reducing the number of people who are unnecessarily locked out of *myGov*
- Enabling a smoother user experience when dealing with multiple agencies
- A further improved sign-in experience
- Improved tools for staff to support users with their *myGov* enquiries (Tudge and Taylor 2016b, p. 1).

Source: Tudge and Taylor (2016b).

The RAI (sub. 50) outlined some fiscal and other benefits from increased efficiency in public services from universal access to internet services.

Improving internet and mobile in regional areas creates new opportunities for Government and businesses to provide essential services in more efficient ways (i.e. tele-health and distance education) and for globally competitive businesses to access national and international markets from a variety of locations. A recent report by Deloitte Access Economics identified that 40 per cent of an estimated 811 million transactions at federal and state levels, are still completed using traditional measures (face-to-face, post and over the phone). If the proportion of transactions that were completed using traditional methods was reduced from 40 per cent to 20 per cent over a period of ten years, Government would save around \$17.9 billion in real terms (lifetime present value terms). A further \$8.7 billion would be saved by the public in time, convenience and out-of-pocket costs. (p. 9)

Other participants also pointed to the importance of universal services in accessing online government services (box 5.5). In addition to cost savings to the Government from delivering its services online, there are also benefits to users in terms of time, travel cost, and convenience.

The Commission's ongoing inquiry into *Data Availability and Use* (PC 2016a) also highlights some of the major community-wide gains from unlocking data availability and use could generate across a wide range of public and private sector functions. The draft report argued that Australia's health sector exemplified the types of foregone opportunities due to impediments and distrust around data availability and use. For example, opening up health data can help:

- governments and researchers to anticipate and prepare for community and individual health needs
- governments to improve the provision of health services
- empower individuals in managing their own health records.

In turn, the potential gains from digital data availability and use relies on widespread and reliable internet connectivity.

What about on equity grounds?

Historically, the principle of equity in the availability and accessibility of a quality telecommunications service for all Australians has been an enduring cornerstone of policy. However, Middleton and Park (2014) suggested that the other long-standing policy of equity in pricing across all Australians (that is, uniform pricing for all achieved via the cross subsidisation of revenues) may no longer be considered as high a policy priority as equity in availability:

The competition regulator [ACCC] recently allowed competition to the NBN in urban centres, meaning that the ability to generate revenues in urban centres to support the cross-subsidization that allows for uniform pricing may be under threat. (Middleton and Park 2014, p. 10)

Box 5.5 **Some participants' views on telecommunications and access to online government services**

The **ICPAA** (sub. 11) said:

A mandated right to a fixed telephone service and a reliability guarantee is essential for those that reside in rural and remote areas, allowing for the delivery of education, accessing government services and for enabling enterprises to conduct their business. (p. 1)

The **Central Australian Youth Link Up Service** (CAYLUS, sub. 25) submitted:

The Federal government's plans to further reduce direct service delivery and make access to government services primarily via internet (Digital Transformation Office) makes it imperative that there is good quality, affordable access to internet services across remote regions. (p. 3)

The **National Farmers' Federation** (NFF, sub. 31) noted:

Recent years have seen a concerted effort to shift the delivery of Government services online. The issues associated with regional connectivity ... have limited the ability of regional Australians to participate in modern day delivery of Government services. For example, the *etax* section of *mygov* requires continuous connection to lodge returns. (p. 15)

The **South Burnett Regional Council** (sub. 35) stated:

Our Council is in a position where if we do not continue to partner in the development of basic telecommunication infrastructure we will be unable to develop to take advantage of the trend for businesses to require a global connection. Not having connectivity represents us as a region difficult to do business with or do business from. Here we also highlight future difficulty for our agricultural producers to hold up in the market where streamlining expenses in digital innovation can be the difference between profit and loss.

The issues highlighted above don't even touch on consumers 'outside of business' who use telecommunication to connect to their loved ones, connect to the internet for study, teleconference to a support network or access government services. (p. 2)

The **Northern Territory Government** (sub. 59) said:

It is also vital that the needs of distance education students in very remote areas are considered. Many are reliant on connection to the internet and are disadvantaged by inadequate telecommunications infrastructure and are subject to high consumption costs owing to data plans that are much more costly than those available in urban areas.

Many government services to the community are now almost exclusively provided online and governments are moving to 'digital by default' positions. This has enabled ease of access for members of the public who need these services, but makes it more difficult for people in remote areas to access necessary services where there is no online infrastructure no traditional government to client interfaces, eg customer service centres. (pp. 2–3)

A range of participants also argued that there were strong equity grounds to provide a universal service of the *same quality* to all who reside in Australia, irrespective of where they choose to live (for example, Great Northern Telecommunications, sub. 2; Tennant Creek Regional Economic Development Committee, sub. 3; Northern Territory Government, sub. 59; South Australian Government, sub. 60).

However, whether these universal services of an equivalent quality for all should be provided at the *same price* to all was a less frequently expressed view. For example, the RAI (sub. 50) contended that 'regional Australians need guarantees that their level of

access will remain comparable to the urban areas’ (p. 4) at an affordable price, where that price is not necessarily the same price as urban areas would pay.

In contrast, the Broadband for the Bush Alliance (sub. 6) suggested that, as a lack of competition in many regional areas caused higher prices, lower quality and less choice than in metropolitan areas:

... in these circumstances we believe it is neither fair nor reasonable to expect these consumers to pay more for their telecommunications. (p. 8)

Other participants considered that an equity-based rationale (based on the equivalence of quality and price for all) was ‘unreasonable’ as adopting this would require city-based users to cross-subsidise those users who voluntarily chose to live in rural and remote areas of Australia (presumably because it is in their interest to do so). For example, Coutts Communications (sub. 5) stated:

In my view, it is unreasonable for users in regional and remote locations to expect exactly the same service quality and price (including usage) as those living in cities irrespective of the cost of provision. (p. 8)

From an economic viewpoint, when a uniform price is used as a single policy instrument to meet the dual objectives of ubiquitous availability *and* affordability, distortions are almost inevitable. These distortions were summarised by the Vertigan Panel in the context of its discussion of uniform pricing of the NBN (box 5.6). Effectively, uniform prices benefit wealthy households in high-cost regional areas (who would obtain the service at below cost), while imposing a disguised tax on low-income households in low-cost metropolitan areas (who would pay charges at above cost). These considerations led the Vertigan Panel to recommend a move away from uniform pricing towards a cost-based wholesale pricing approach, with subsidies targeted directly to those consumers who may find nbn’s service unaffordable.

The decision of where to live is largely (but not always) a matter of personal choice, with a range of underlying factors influencing this decision (PC 2014a). Various factors — such as proximity to family and friends, property prices, wages, career prospects, commuting times, climate, quality and availability of infrastructure and lifestyle — all influence people’s location (and mobility) decisions. People choosing to live in (or move to) regional or remote areas typically place a different value on each of these factors than a person choosing to live in (or move to) a metropolitan area. Hence, a person is likely to stay put if there are net benefits from doing so and vice versa. As with any such decisions, tradeoffs are inherent. That said, for some people there may be no — or no practical — choice (see below).

Box 5.6 Distortions arising from uniform pricing of NBN infrastructure

Affordability is intended to ensure all Australians can access high-speed broadband services, should they choose to do so, without undue financial sacrifice. Traditionally, this goal has combined vertical equity (that is, the objective of ensuring that irrespective of income level, all households can afford the service) and the geographical dimension of horizontal equity (the objective of ensuring households can access a given service on similar terms, regardless of where they are located). With both objectives being pursued by a single instrument (the uniform national price), substantial distortions are likely to result.

Thus, the uniform price could benefit wealthy households in high cost regional areas (who would obtain service at less than cost), while imposing a large, but disguised, tax on low income households in low cost metropolitan areas (who pay charges well above costs). Rather than advancing social equity, this would undermine it. Indeed, the uniform national pricing of access to telephony in Australia had exactly this effect for most of the 20th century, providing a large transfer to owners of agricultural land at the expense of poorer consumers in the urban areas.

At the same time, since demand for telecommunications usage (though less so basic access) is relatively price elastic, the uniform price can lead to allocative inefficiency (that is, some consumers who value the service at less than the attributable cost of its provision consume it, while some who value it at more than attributable cost do not). The distortions are then magnified if the fact that prices do not properly signal costs blunts the incentives for efficiency, as neither consumers nor regulators are necessarily aware of underlying costs and hence may have difficulty in observing the potential to secure productivity gains.

Last but not least, price distortions both provide a policy rationale for impeding competition (so as to protect cross-subsidies) and by encouraging ‘cherry picking’ can distort whatever competition emerges. This readily translates into a form of taxation by regulation that lacks transparency, weakens accountability, and achieves its objectives at unnecessarily high cost. (Vertigan Panel 2014, p. 98)

While access to telecommunications services means that some workers are able to undertake long-distance commuting or telecommuting (instead of permanently relocating for employment), to the extent that this benefit is private means there is no case for taxpayer subsidies to support this choice. However, the presence of spillovers may change this conclusion. Even so, for government intervention to be justified, the costs to the community need to be outweighed by any community-wide benefits.

On the other hand, most children often do not have a choice about where they live and hence their forebears’ decisions have spillover consequences for them, especially if they are raised in locations with limited access to education (and health) services. As education is a key enabler of mobility, improving the accessibility of education and training — for example, through the School of the Air (and telehealth services) — particularly in disadvantaged regions, supports geographic labour mobility and has broader efficiency and wellbeing benefits (PC 2014a).

Further, for Indigenous people living in remote communities, choosing not to move away from their communities may involve significant opportunity costs such as loss of cultural connections and access to native title. To prove a continuous connection to their traditional land, native title claimants need to:

... prove continuity in the acknowledgment and observance of traditional laws and customs and the continued existence of the rights and interests which derived from those laws and customs from sovereignty through until the present day. This imposes a significant forensic burden on native title claimants. (ALRC 2014, p. 29)

The Commission's view is that while a ubiquitous availability policy objective has the outcome of equity in availability for all Australians on a geographic basis, it does not necessarily imply that service levels (beyond a minimum) and prices (beyond that which is affordable) should be equal between commercial and non-commercial service areas for all Australians. Accordingly, the Commission separates its proposed policy response to a geographic availability objective from affordability considerations (chapter 7). This approach (which is consistent with Tinbergen 1956) aims to minimise potential distortions by ensuring that for each and every policy objective there should be at least one policy tool.

The case for government intervention

A competitive telecommunications market is likely to deliver universal services and hence enable most users to enjoy the above-mentioned community-wide benefits. However, other benefits (notably spillovers) may be under-provided by the market. In addition, Australia's population density patterns mean that in some geographic locations a retail market may be absent (because of non-commerciality).

Moreover, while there are potential community-wide benefits from universal services, they do not necessarily provide a case for government involvement. These community-wide benefits need to be juxtaposed against the community-wide costs of achieving them.

These costs are direct and indirect. For example, the direct cost of the current TUSO is around \$300 million per year, with an implicit subsidy per premises of potentially over \$2800 per year (chapter 3).

In addition, there are indirect costs arising from the distortions that any government intervention in a market inevitably creates. For example, taxes imposed on service providers — like the Telecommunications Industry Levy (TIL) — or a subsidy funded from general government revenue, distorts the allocation of resources from the perspective of both service providers and consumers (chapter 8).

Leaving that issue aside, to the extent that the current TIL over-compensates Telstra for the cost of providing the TUSO, further economic distortions are created in the form of competitive non-neutrality. This occurs when one entity operating in an economic market is given undue competitive advantages or disadvantage over other entities (OECD 2014). The distortion of competitive relations within an industry can create inefficiency, introduce entry barriers, reduce innovation, and lower the intensity of competitive pressure in the market (OECD 2016).

Further, to the extent that the TUSO encourages the continued provision of, and investment in, voice-only services, it can reduce the investment in data services (which include voice).

It is only following a comparison of all the costs and benefits and a finding that there are net community-wide benefits, that a policy should be implemented. Further, the policy that maximises net benefits to the Australian community is generally the most economically efficient option.

Generally, if an option is deemed to be economically efficient, it must also be cost-effective (where cost-effectiveness means that for proposals with the same or similar benefits, the least cost proposal is the most cost-effective). But the converse is not always true. This is because:

... a cost effectiveness study cannot by itself demonstrate a conclusive case (on grounds of economic efficiency) for or against the appropriateness of a proposal, because it is concerned only with possible alternative unit costs, and not concerned with whether the total costs exceed or are exceeded by the total of prospective benefits. The beneficial effect, although achieved as cheaply as possible, may not be worth the cost — that is, it may not contribute to economic efficiency. (PC 2013d, p. 9)

DRAFT FINDING 5.1

There are several possible rationales for the provision of universal telecommunications services. These revolve around: enabling markets to function well; providing access to emergency services; facilitating greater social inclusion; and enabling access to online government services.

Some of these benefits involve a public good and are likely to be underprovided by the market. Further, Australia's extended areas of low population density mean that a market presence may not exist because of high costs of service provision and limited revenue opportunities.

5.3 Some guiding principles

In developing new universal service objective(s) and policies, the Commission has established some key principles to guide its assessments. It has also drawn on approaches adopted by other countries (appendix C) and the perspectives expressed by participants to this inquiry.

International approaches to universal service policies

There are some guiding principles commonly used internationally to establish objectives and formulate policies for universal services (boxes 5.7 and 5.8, respectively).

Box 5.7 **Setting the objectives — principles used in the European Union, Canada and the United States**

Universal service objectives in most countries share at least three guiding principles (appendix C). Those objectives are:

- based on economic and social rationales
- clearly defined and encompass the three elements of universality (availability, accessibility and affordability)
- subject to regular review.

Universal service objectives in most Organisation for Economic Cooperation and Development (OECD) countries are based on economic and social rationales (appendix C). For example, in the European Union (EU), Directive 2009/140/EC stated that:

... the Internet is essential for education and for the practical exercise of freedom of expression and access to information. (s.4)

Another example is Canada, where the stated objective is:

... to facilitate the orderly development throughout Canada of a telecommunications system that serves to safeguard, enrich and strengthen the social and economic fabric of Canada and its regions. (Telecommunications Act 1993, s. 7)

Universal service objectives in most OECD countries are also clearly defined in terms of availability, accessibility and affordability (appendix C). For example, in the EU, the universal service is defined as:

... a minimum set of services of specified quality which is available to all users regardless of their geographical location and, in the light of specific national conditions, at an affordable price. (Article 2.1.g of Directive 97/33/EC)

The scope of services delivered through a universal service policy tends to be subject to regular review (appendix C). For example, in the EU, the European Commission is required to review the scope of universal services every three years in the light of social, economic and technological developments (Garcia Calvo 2012).

Box 5.8 Formulating policies — principles used internationally

According to EU law, the 28 member countries in the EU are required to adhere to the following seven principles when formulating their own national universal service policies:

- **minimisation of market distortions:** universal service shall to a great extent be provided by the market and any regulatory actions should have least market distortions
- **avoidance of competition distortions:** any regulatory actions shall not distort competition between companies active in the same relevant market
- **proportionality:** any regulatory actions taken by member governments shall not exceed what is necessary to achieve the objectives
- **objectivity:** methods and procedures used within the universal service policies should be developed in an objective manner
- **transparency:** the number of legal instruments used for regulations shall be minimal, interested parties should be consulted prior to taking regulatory measures by regulators, and access to important market and regulatory information should be ensured for outsiders
- **non-discrimination:** both service providers and users who are in similar situations shall receive similar treatment
- **technological neutrality:** there shall be no constraints on the technological means by which the telecommunications services can be provided (Batura 2016).

The universal service policies in the non-EU OECD countries, in general, also reflect these principles. For example, in Canada and the United States, governments rely on market forces to the maximum extent feasible for the provision of a universal service (appendix C).

What have participants said?

Several participants expressed their views on potential guiding principles for developing universal service objectives and policies. Their views collectively reflect most of the guiding principles used internationally.

Views on the guiding principles for developing an objective

The importance of considering economic and social rationales when developing a universal service objective was highlighted by several participants. For example Telstra (sub. 30) stated:

The provision of reasonable access to a [*standard telephone service*], on an equitable basis, to a residence or place of business, provides social inclusion, economic benefits and public safety to the Australian community. This should form the basis of any USO. (p. 23)

A number of participants supported the formulation of universal service objectives based on the three elements of universality — *availability*, *accessibility*, and *affordability*.

For example, Coutts Communications (sub. 5) stated:

In my view the policy objectives of universal availability, affordability and accessibility are still appropriate. (p. 7)

Participants also highlighted the importance of reviewing the services delivered through universal service policy. For example, the Australian Competition and Consumer Commission (ACCC, sub. 40) stated:

... in order for a universal service regime to remain relevant, any framework should include a process for periodically reviewing the quality of service requirements. (p. 9)

Views on the guiding principles for formulating a universal service policy

The ACMA proposed the following set of guiding principles for formulating any new universal service framework. (These are largely consistent with the guiding principles used internationally.)

- A new universal service framework should be clear regarding its objectives.
- As far as possible, market solutions should be harnessed.
- Interventions should be appropriately targeted to participants that have the best capacity to achieve them.
- There should be a clear connection between any intervention and how it will deliver, or contribute to delivering, a particular outcome.
- Funding mechanism should be established in a way that is equitable across all relevant industry participants and minimises as far as possible competitive distortions.
- Any new universal service framework should also embed the capacity for an evolution of service standards.
- Interventions of a regulatory nature should adhere to best practice principles. (sub 49, pp. 19–20)

Views from other participants also reflect the guiding principles used internationally (box 5.9).

These considerations have led the Commission to adopt a set of guiding principles in establishing a universal service objective (chapter 1). That is, a universal telecommunications service objective should be:

- founded on clearly-specified and **evidence-based** economic and/or social policy **rationales**
- based on **clear definitions** of universal access and service and their **scope**
- specified in the form of measurable user **outcomes**
- subject to **review**.

Box 5.9 Participants' views on principles for developing a new universal service policy — some examples

A universal service should minimise market and competition distortions

Optus (sub. 4) submitted:

... there is a strong argument in favour of removing the USO in its entirety and letting the market deliver services; backed-up as it is by an effective regulatory regime. (p. 3)

Vocus Communications (sub. 33) stated:

Vocus, as a significant investor in the telecommunications market is very conscious that any market distorting influences will have impact on investment decisions. (p. 3)

The ACCC (sub. 40) said:

... we consider that, where possible, consideration should be given to minimising any distortionary impact that a universal service regime may have on competition and economic efficiency within a market. (p. 3)

Universal service objectives should be set objectively, be transparent, and be non-discriminatory

The ACCC (sub. 40) submitted:

... to promote transparency and accountability, record keeping requirements, which require details about universal services in various areas to be provided to the regulator, should be introduced ... the allocation of the cost of providing universal services between taxpayers and industry should be underpinned by principles of transparency, economic efficiency, contestability, sustainability and equity. (p. 8)

Universal service objectives should be set in a technological neutrality way

Optus (sub. 4) stated:

... the current [*standard telephone service*] should be reviewed to ensure that it is technology neutral and does not preclude delivery of voice services by means of broadband or mobile infrastructure. (p. 29)

5.4 What should be Australia's policy objective?

A common goal of a universal service policy in many countries is to guarantee every resident, at a minimum, basic telecommunications services at an affordable price (appendix C). Most participants suggested objectives of a similar nature (box 5.10).

The ITU and InfoDev (2016) specified some desirable characteristics of a universal service broken down into the three elements of a universal service (table 5.1).

Many participants considered that the scope of a universal telecommunications service should not be limited to voice telephony but be expanded to broadband, especially given the Australian Government's commitment to NBN infrastructure (box 5.10).

Box 5.10 A sample of participants' views on objectives and scope

Greater Northern Telecommunications (sub. 2) said:

The objective [of a universal service policy] should be as follows:

- Provision of voice telecommunications service either switched or VoIP conforming to international standards.
- Provision of universal data service with minimum 25Mbps download / 5Mbps upload, with a future capability to download at 100Mbps or greater.
- Emergency calling and location identification. (p. 3)

Internet Australia (sub. 43) submitted:

Traditional telephony technologies are increasingly redundant in the Australian market place, and it is clear that the existing universal service obligations are failing to deliver an adequate safety net for citizens in accessing modern communications technologies. It is for this reason that Internet Australia considers that governments should broaden the concept of universal service to encompass access to the Internet via a suitable fast and reliable broadband connection. (p. 2)

nbn (sub. 47) stated that as its network will provide ubiquitous broadband availability, a broadband USO is not required (p. 3). However, in relation to voice services, it proposed that:

... the definition of the [standard telephone service] supplied under the [TUSO] be stripped back to its essential features, allowing it to be delivered in a technology agnostic manner that does not impose inefficient costs. If this is done, the locations where policy intervention is still required may be limited to only those areas outside the competitive mobile network footprint, somewhere between the most remote 0.7% and 1.5% of the population. (p. 12)

ACCAN (sub. 48) submitted:

ACCAN believes that availability, accessibility and affordability are still relevant; however, we believe further objectives of empowerment and appropriateness are needed. (p. 10)

ACCAN also submitted that the scope of a universal service should include voice services, payphones, data services, essential content (for education and government services) and service quality.

The **Australian Communications and Media Authority** (ACMA, sub. 49) stated:

Universal service is the principle that all citizens should have access to a given standard of communications services. (p. 1)

The **Regional Australia Institute** (sub. 50) said:

Ensuring equitable access to relevant telecommunications should be the core objective of Australia's [TUSO]. This includes providing and maintaining infrastructure that allows people to use reasonable levels of data at an affordable price. (p. 8)

Regional Development Australia: Wheatbelt WA (sub. 55) said:

... that the scope and objectives of the [TUSO] should be extended to include internet and mobile phone services. (p. 2)

Table 5.1 Some characteristics of a universal service

<i>Aspect</i>	<i>Universal service</i>
Availability	Blanket coverage Private service on demand Free emergency calls
Accessibility	Simple and speedy subscription Inclusively designed terminals and services (e.g. for blind or deaf people) Assistance through the terminal (e.g. by making calls or viewing help pages for the web) Reasonable quality of service (e.g. having few dropped calls)
Affordability	Cost of average monthly usage is a small percentage of monthly gross national income per capita Options of cash, card and electronic payment Flat rate, bundles of services or low monthly subscription fee

Source: Adapted from ITU and InfoDev (2016), p. 9.

A new universal service objective

Universal broadband (including voice) services should be available to all premises

Given the significance of access to data for economic and social participation, and the sizable investment into NBN infrastructure, the Commission considers that the scope of a new universal service policy objective should be defined to centre on the provision of broadband to all premises in Australia.

As universal service is typically a premises-based concept, mobile services are generally not included in the scope of universal service. Nonetheless, mobile services complement universal service availability and may be a suitable targeted policy response in some circumstances (chapter 7).

The Commission's focus on broadband in its proposed objective encapsulates access to the internet *and* to voice services, given that the internet will increasingly be the medium through which voice communication is delivered. By taking analogue audio signals and turning them into digital data that can be transmitted over the internet, Voice over Internet Protocol (VoIP) technology effectively provides an alternative way of making phone calls (typically at a much lower cost than traditional phone systems and with additional functionality). It is notable that 4G technology for mobile phones (and in a few years, 5G) provides voice services entirely through dedicated VoIP, also known as VoLTE. Skype services (via a VoIP App) can now be used on smart televisions.

As technologies continue to converge, it would be sensible to review the scope of universal telecommunications services in future.

... subject to a *baseline* (or minimum) quality

Some participants argued for quality standards that reflected consumer expectations rather than a minimum level deemed to be necessary. For example, Broadband for the Bush Alliance (sub. 6) said:

A new USO needs to address more than the simple provision voice services. In addition to availability it should include data and address accessibility, affordability, quality of service and equity, consistent with the holistic approach we advocate to addressing the digital divide. (p. 5)

Conversely, Infrastructure Australia (sub. 51) noted:

Governments should be mindful of the impact that minimum standards places on the costs of providing services. The standards set by government should strike an appropriate balance between service quality and service cost. (p. 2)

In the future, a contestable market is expected to provide a wide range of quality-price options in response to consumer preferences. However, to contain costs to the broader community, the Commission is proposing to specify the quality as a *baseline* (or minimum) level of service. This is consistent with approaches internationally. That said, any future technical standards that underpin the Commission's proposed functional *baseline* should be reviewed regularly (perhaps every five years) to ensure that standards evolve with technological changes and community-wide expectations surrounding the adequacy of *baseline* services. These prospective technical standards should be both practical and cost-effective.

This inquiry offers a timely opportunity to consider what might be a realistic minimum or *baseline* level of service quality, at least in functional terms.

How should a baseline quality of broadband (including voice) service be defined?

Currently, in relation to **voice** services, under the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth) a *standard telephone service* is defined along functional lines, as a:

... voice telephony carriage service that passes the 'connectivity test', or another form of communication for end-users with a disability. The 'connectivity test' is passed if an end-user is ordinarily able to communicate, via that service, with other end-users with the same service. (DoCA, sub. 58, p. 1)

This is similar to the proposal of McLaren (sub. 18) who suggested that a *baseline* voice service should be specified as a minimum for safety in stressful or emergency situations as 'successful' and 'intelligible'.

In the Commission’s view, any measure of a ‘successful’ end-to-end connection should also include the reliability of the service. Currently, aspects surrounding the reliability of the *standard telephone service* are set out in the Customer Service Guarantee and other consumer safeguards (chapters 3 and 4).

While there has been some discussion around moving towards a functional definition for **broadband** services (OECD 2008), to date most countries simply set targets for a minimum broadband speed (appendix C). This may be because the quality of broadband is largely affected by the speed of the flow (that is, Mbps) of downloads and uploads. That said, the quality of the broadband is also a function of the stock (the data cap) at any point in time.

The Australian Government expects nbn’s network to provide peak *wholesale* download data rates (and proportionate upload rates) of at least 25 Mbps to all premises, and at least 50 Mbps to 90 per cent of fixed-line premises, as soon as possible (Fifield and Cormann 2016b).

This minimum wholesale peak speed of 25 Mbps for all premises represents a relatively generous specification for a *baseline* service quality. For example, national broadband targets are lower in Canada and the United States, with targets to provide at least 5 Mbps broadband to all Canadians by 2015 and at least 4 Mbps broadband to all Americans by 2020 (appendix C).

The Commission understands that translating the current quality benchmark for standard voice services into a minimum broadband speed implies a speed of less than 1 Mbps (chapter 6). Hence, nbn’s expected minimum standard of 25 Mbps is more than adequate for a **voice** service over the internet. Further, the remaining balance of the 25 Mbps (wholesale) speed for a **broadband** service is also comparatively generous. The Commission also understands that data capacities are likely to be more than sufficient to access online Australian Government services given that the Government’s digital transformation agenda is designed to streamline government webpages to enable access with broadband speeds much lower than 25 Mbps (chapter 4).

However, the quality of a broadband service is more than just about upload and download speeds, and data caps. Similar to voice-only services, the quality of a broadband service also depends on how reliable its throughput is, how successful it is, and whether the content that is being communicated is intelligible.

The Commission favours an approach to defining the quality of a *baseline* service as one that is *reliable and intelligible*, especially in emergency situations — where:

- *reliable* means that users can consistently rely on their telecommunications service to provide a successful end-to-end communication. It encompasses measures including the proportion of time in which the service is available, and expected installation and fault repair times
- *intelligible* means that the content of the communication can be heard or read or viewed by the relevant parties.

This *baseline* functional standard should apply to all broadband (including voice) services, irrespective of the technology used or whether they are used privately or on a shared basis.

As NBN infrastructure becomes the primary channel for the delivery of universal broadband (including voice) services, the quality of its multi-technology mix services will matter relative to a *baseline* standard. While the Australian Government's expectations of the quality of nbn's services primarily cover broadband speed (Fifield and Cormann 2016b), nbn's wholesale broadband agreement with its retail service providers (nbn 2016l) includes another measure of quality: service repair timelines, which vary across its different technologies (chapter 6). However, as also noted in chapter 6, there appear to be no penalties to nbn (for example, by way of compensation payments to either retail service providers or end users) in the event that nbn does not meet these timelines. Chapter 9 discusses considerations for the Australian Government in establishing technical standards for both wholesale and retail services, which will be an important element of a reformed universal service regime.

Universal service should be accessible by all

In broad terms, accessibility refers to the ability of users to use telecommunications services irrespective of their personal characteristics (chapter 1). As such, accessibility is not just about physical accessibility, but also applies to users' cognitive and cultural characteristics, as well as their acquired skills, that impinge on their capacity to access standard *baseline* telecommunications services. For people with physical or intellectual disability, for example, an accessible telecommunications service that is tailored to their particular needs enables a level of engagement with education, information, friends and government that would not otherwise be possible. Further, cultural factors strongly influence the accessibility of telecommunications services among remote Indigenous communities (chapter 4). For some people (older people, for example), accessibility is also tied to their digital literacy skills (box 5.11).

Currently, various accessibility measures are largely required of Telstra in its role as the universal service provider (chapter 3). A range of other supports and services addressing accessibility are also outlined in chapter 4. These measures facilitate not only social but also economic inclusion and also assist people in accessing emergency services and online government services.

It should also be affordable

In addition to availability and accessibility, affordability is another key element of universality. While there are different measures of affordability, in essence affordability refers to the ability of someone to pay for a good or service relative to their income (box 5.12).

Box 5.11 What is digital literacy?

The **Australian Government Department of Education and Training's** website said:

Digital [literacy] involves knowing how to use a range of technologies to find information, solve problems or complete tasks. Digital literacy is also about knowing how to act safely and respectfully online. (Department of Education and Training 2016)

According to the **Victorian Department of Education and Training**, digital literacy is:

... the ability to effectively access, understand and use information using digital technologies, such as through computers, mobile phones, the internet, banking facilities, etc. (Victorian Department of Education and Training 2014, p. 3)

Go Digi's website suggests digital literacy involves:

... making sure everyone has the tools and knowledge they need to make the most out of technology in a way that's relevant and beneficial to them. (Go Digi 2016)

Thomas et al. (2016) stated:

Digital inclusion ... [is] based on the premise that all Australians should be able to make full use of digital technologies — to manage their health and wellbeing, access education and services, organise their finances, and connect with friends and family, and with the world beyond. (p. 6)

Box 5.12 What is affordability?

Ofcom said:

... a good or service is considered to be affordable for a consumer if the consumer is able to purchase it without suffering undue hardship. (2014, p. 12)

Pavlidis and Hawkins stated:

Affordability ... is not just about monthly price but is a multidimensional issue ... we define affordability as a consumer's ability to pay for and use telecommunications without sacrificing expenditure on other essential services and items. (2015, p. 29)

According to **ACCAN** (sub. 48):

Leading academics (Lewin and Milne 2010) define affordability as a consumer's ability to pay for and use telecommunications without sacrificing expenditure on other essential services and items. (p. 20)

A range of factors affect the affordability of telecommunications services. Clearly, the price of these services is an important factor. However, price by itself is not an indicator of affordability. What matters is how this price relates to the disposable income of individuals, and where telecommunications services fit into their hierarchy of needs (after food and shelter), which varies across individuals and their circumstances.

Accordingly, determining whether a *baseline* telecommunications service is affordable in practice is challenging, as it requires benchmarking prices and spending across a range of different categories of households. Some benchmarks on affordability have been suggested by the ITU and InfoDev (2016) (table 5.1). Another approach was adopted by Lewin and Milne (2010) in their assessment of the affordability of telecommunications services in the European Union. They defined a tariff package as 'affordable' if it satisfied the following two conditions.

-
1. It allows a household in the lowest income decile to make socially necessary use (up to 60 minutes of charged outbound calls and 1 gigabyte (GB) of data downloads per month) through sustainable expenditure (expenditure which is without detriment to other essential spending).
 2. The package helps such a household readily control the household expenditure on telecommunications.

However, implicit in Lewin and Milne’s approach is the assumption that all low-income households place telecommunications in the same position in a hierarchical ordering of needs.

Other studies have measured telecommunications affordability as the average cost of average monthly usage as a percentage of monthly income, or the availability of a variety of packages and payment options such as flat rate or low monthly subscription fees for telecommunications services (chapter 6).

‘Affordability’ is also one of the indices included in the *Australian Digital Inclusion Index* (Swinburne Institute for Social Research, Centre for Social Impact and Telstra Corporation Ltd 2015). However, this index does not distinguish between ‘essential’ versus ‘discretionary’ spending on digital services by households. A more robust approach would analyse the cost of ‘essential’ telecommunications services as a proportion of household spending disaggregated by household income. In practice, however, it may be difficult to disentangle ‘essential’ from ‘discretionary’ spending on telecommunications services. Spending which might be viewed as ‘discretionary’ by some could be regarded as ‘essential’ by others. Hence, it may be more effective to monitor the cost of and/or spending on various types of basic telecommunications services as a share of disposable income for different household types. This approach is adopted in chapter 6.

Currently, there are a number of policies designed to ensure that telecommunications services remain affordable (chapters 3 and 4). However, these (often overlapping) policies do not appear to rest on a systematic approach to either measuring or addressing the issue of affordability.

Overall, there is a range of definitional and functional outcomes underpinning the Commission’s proposed reframed universal service policy objective. The Commission envisages that the new universal service objective would be implemented once the NBN is fully rolled out. As technologies evolve over time, there may be repercussions for the scope of universal service. As these occur, the scope of universal service should be reviewed as required.

DRAFT RECOMMENDATION 5.1

The Australian Government should reframe the objective for universal telecommunications services to provide a *baseline* broadband (including voice) service to all premises in Australia, having regard to its accessibility and affordability, once NBN infrastructure is fully rolled out.

6 What might the market and the NBN deliver?

Key points

- A fundamental matter is the extent to which the market, including the National Broadband Network (NBN) can address the Commission's universal telecommunications service objective in absence of the telecommunications universal service obligation (TUSO).
- Following the full rollout of NBN infrastructure, expected in 2020, there is likely to be *availability* of retail broadband (including voice) services to all premises in Australia.
- The quality of broadband services supplied over NBN infrastructure will be superior to that which was previously available. However, the quality of voice services may be inferior to what was previously available in some areas.
 - Voice services supplied over nbn's fixed-line and fixed wireless networks can be equivalent in quality to those supplied by Telstra under the TUSO.
 - Voice services provided over nbn's *Sky Muster* satellites are likely to be of a lower quality than those supplied by Telstra under the TUSO in terms of latency and service fault repair timeframes.
 - Up to 90 000 premises within the NBN satellite footprint are estimated to be unable to receive a mobile voice service and, thus, may be solely reliant on nbn's *Sky Muster* satellites for voice calling. The need for further government support for alternative voice services for these premises is contingent on whether the quality of the services supplied over NBN infrastructure is below the *baseline* that the broader community would regard as acceptable.
- The telecommunications market is unlikely to provide *accessible* services for some groups of people following the full rollout of NBN infrastructure, even in the presence of the TUSO, due to the relatively high costs of, and narrow revenue bases for, these services, particularly in regional and remote areas.
 - These groups include people with disability and life-threatening health conditions, Indigenous people in remote communities, some older people, and people with no fixed address. Although advances in technology are expected to improve accessibility for some people, targeted government intervention is likely to continue to be warranted to address their particular needs.
- Given current market trends, telecommunications services are likely to continue to be *affordable* for most people following the NBN rollout.
 - However, some people on low incomes may continue to find it difficult to afford these services without targeted government support.
- Tentative estimates suggest that the extent of individual market gaps and particular user needs in telecommunications is likely to be small and differ between cases. This gives weight to a targeted approach to government intervention rather than a blunt one-size-fits-all approach such as the current TUSO.

Harnessing markets is a guiding principle used by the Commission for developing universal service policies, provided it is effective and efficient (box 1.1). This chapter examines the extent to which markets, in the absence of the telecommunications universal service obligation (TUSO) and given the public investment in National Broadband Network (NBN) infrastructure, can address the Commission's proposed universal service objective (draft recommendation 5.1) and the nature of any gaps that are likely to remain. The analysis in this chapter assumes the completion of the NBN rollout (expected in 2020) and the application of current policy settings (apart from the TUSO), including those with respect to NBN infrastructure. It also assumes that mobile services will continue to play an important role in the market (chapter 2).

It is challenging to assess the reach of the market in addressing the Commission's proposed universal service objective, particularly assuming the full rollout of NBN infrastructure. While data — and past trends in data — are used where possible to infer what might occur, there is an element of uncertainty associated with the assessment as it is contingent on outcomes that may or may not occur in the future.

Data may also necessarily reflect a range of existing policy settings and disregard future technological change. For example, a survey of consumers as to their attitudes to the affordability of telecommunications service may reflect, and be conditioned by, existing policies such as the Telephone Allowance and other telecommunications subsidies. To the extent that a certain proportion of these consumers report that a service is affordable may in fact reflect the influence of such policies, rather than a genuine market-based response.

Although a *baseline* telecommunications service is an essential component of the Commission's proposed universal service objective (draft recommendation 5.1), it is difficult to incorporate the Commission's *functional* definition when assessing the reach of the market without defining a *baseline* standard in *technical* terms. The assessment in this chapter instead focuses on more easily determined counterfactuals such as what occurs under the TUSO — for example, in relation to assessing the quality of voice services over nbn's satellite network, or the relative affordability to consumers of purchasing the lowest price bundle of telecommunications services (including voice services) available through NBN infrastructure or from mobile services.

This chapter addresses three questions — the extent to which markets and the NBN address universal service *availability* (section 6.1), *accessibility* (section 6.2) and *affordability* (section 6.3), noting that these different dimensions of the Commission's proposed universal service objective are interconnected. However, given the terms of reference, the chapter's principal focus is on universal availability rather than on other dimensions of universal service. Section 6.4 concludes with an overview of the size of market gaps and particular user needs in telecommunications. To the extent that the market is unlikely to fully address the different dimensions, chapter 7 considers some policy options.

6.1 To what extent might the market (and NBN) deliver universal service availability?

In line with the Commission's proposed reframed universal service objective outlined in chapter 5, this section presents the NBN as the primary vehicle for universal service delivery. However, it also acknowledges that mobile services can play a complementary role, especially for the supply of voice calling where adequate fixed voice services are not available.

High quality broadband (including voice) services will be universally available within the NBN fixed-line footprint

What will National Broadband Network infrastructure deliver?

The Australian Government expects that NBN Co Limited (nbn) will supply broadband infrastructure capable of providing peak wholesale download rates of at least 25 megabits per second (Mbps) to all premises in Australia (Fifield and Cormann 2016b). Within the fixed-line footprint (which will comprise 92 per cent of all premises), NBN infrastructure will replace the existing copper access network. As the TUSO is currently delivered over NBN infrastructure within its fixed-line footprint, it follows that the commercial delivery of voice services in fixed-line areas implies no loss of service quality.

As such, the Commission considers that *wholesale* universal broadband (including voice) availability within the NBN fixed-line footprint is likely to be met by the market after the completion of the NBN rollout.

Furthermore, at least one retail service provider (RSP) is likely to be willing to supply a *retail* broadband service — including a voice service of a quality commensurate with what is achieved under the TUSO — to each NBN-connected premises for the following reasons (discussed in detail below):

- the costs of retail service provision over the NBN are likely to be similar across Australia
- there is already evidence of NBN-wide retail service provision.

The costs of retail service provision over the NBN are likely to be similar across Australia

The provision of retail services over NBN infrastructure involves three input costs — wholesale,⁵⁶ transmission and administrative/marketing/service costs.

⁵⁶ In reality, there are three NBN wholesale charges (appendix B). However, it is the uniform/capped nature of these charges that is of significance here, rather than the structure of the charges themselves.

Wholesale costs

nbn currently operates with a uniform wholesale price model, where profits from commercial services (primarily fixed-line) cross-subsidise the provision of non-commercial services (primarily fixed wireless and satellite) (BCR 2015). In its response to the 2014 Vertigan Review (Vertigan Panel 2014), the Australian Government (2014) indicated it would grant nbn the flexibility to adjust prices on a non-uniform basis subject to existing price caps. The Government also requested the Bureau of Communications Research (BCR) design an explicit industry contribution-based funding model. This process is ongoing, but in late 2015 the BCR released a final consultation paper which recommended the introduction of a narrowly-based levy on nbn fixed-line and ‘nbn-equivalent’ services (BCR 2015).⁵⁷

Although the shift to a new model of funding NBN infrastructure may result in non-uniform wholesale prices, the levy design proposed by the BCR sees nbn as the primary contributor to the levy and, to some extent, mimics existing arrangements.

Transmission costs

The combined fixed-line and fixed wireless NBN footprints can be thought of as 121 geographically distinct networks, with access to each supplied through a local point of interconnection (POI) (more detailed information on the structure of the NBN can be found in appendix B). To supply retail services over NBN infrastructure, RSPs must access a transmission network to connect their core networks (typically located in capital cities) to each POI that they seek to access.

The four major RSPs accessing NBN infrastructure (Telstra, Optus, TPG and Vocus) each own substantial transmission networks (chapter 2), with Telstra and Optus both possessing sufficient infrastructure to connect to all 121 POIs. Those RSPs that do not own sufficient infrastructure to cover the POIs they wish to reach must access the transmission network of a third party. Many transmission networks connecting the POIs to capital cities are captured by the Australian Competition and Consumer Commission’s (ACCC’s) ‘domestic transmission capacity service’ declaration, which provides for access to these services and sets regulated access prices in areas where there is insufficient evidence of competition. At present, 46 POIs are located in price-regulated areas (ACCC 2014). nbn has recently announced it will also offer wholesale transmission services to remote POIs beginning in mid to late 2017, although further information is yet to be released (Lynch 2016).

While transmission costs are higher in regional and remote areas than in cities (ACCC, pers. comm., 9 September 2016), these differences are likely to be low. Using regulated transmission prices, Ockerby and Wongsosaputro (nbn, sub. 47, attachment, p. 20) found that the two-year transmission costs per NBN service ranged from \$3 to \$9 for an access seeker with a 50 per cent market share at a POI to \$5 to \$17 for an access seeker with a

⁵⁷ The BCR’s final report is yet to be released at time of publication.

25 per cent market share at a POI. At their highest, these costs represent less than 3 per cent of the wholesale rates charged by nbn.⁵⁸ Ockerby and Wongsosaputro (nbn, sub. 47, attachment), concluded that:

... given the uniform wholesale prices already being charged by nbn co, as well as the fact that the ACCC's benchmark backhaul [transmission] prices are fairly even across all 121 POIs, the costs faced by RSPs should be fairly uniform across Australia. (p. 21)

Other costs

While there do not appear to be any published data relating to the magnitude of administrative, marketing or service costs for RSPs accessing NBN infrastructure, there is evidence that, with the exception of satellite services, RSPs are developing retail NBN plans on a nationwide basis (ACCC 2016b). This suggests that marketing costs may be relatively geographically uniform.

There is already evidence of NBN-wide retail service provision

Although the rollout of NBN infrastructure is only around one quarter complete (appendix B), evidence suggests that retail 'gaps' are not emerging. As noted earlier, Telstra and Optus have a presence at each POI, and there are three or more access seekers at 118 POIs (table 6.1). Moreover, both Telstra and Optus are currently offering wholesale transmission services to every POI, and the remaining POIs with two access seekers are located in metropolitan areas, where transmission costs are lower.⁵⁹

Although at present nearly 95 per cent of NBN retail services are supplied by the four major providers (ACCC 2016g), there are around 140 RSPs offering retail services (nbn 2016e). Telstra and Optus are each offering broadband packages with pay-per-use voice services, bundled voice and broadband packages, and voice-only packages.

⁵⁸ The provision of a 12/1 Mbps retail broadband service over NBN infrastructure involves an access (activity virtual circuit) charge of \$24 per month (\$576 over two years), plus additional charges levied on an aggregated basis (the average total wholesale charge was \$43 per user in 2015-16 (nbn 2016a)). The maximum \$17 transmission charge is less than 3 per cent of nbn's minimum \$576 wholesale charge.

⁵⁹ Although this appears counter intuitive, it is likely to be because the NBN infrastructure rollout has prioritised non-metropolitan areas. The number of access seekers in metropolitan areas should increase as the rollout continues.

Table 6.1 Number of access seekers at each NBN point of interconnection^a
June 2016

Number of access seekers	Points of interconnection			Total
	Metro	Outer metro	Regional	
2	3	-	-	3
3	18	2	-	20
4	29	1	9	39
5	11	4	13	28
6	5	2	9	16
7	4	-	5	9
8	-	-	2	2
9	1	-	2	3
10	-	-	1	1
Total	71	9	41	121

^aAccess seekers include retail service providers and wholesale transmission network providers.

Source: nbn (sub. 47, p. 7).

What about mobile?

Although the Commission does not have any data relating to the overlap of mobile coverage with the NBN fixed-line footprint, it expects that mobile coverage is nearly ubiquitous within the fixed-line footprint. Telstra's mobile networks cover 99.3 per cent of the population, with Optus' networks at 98.5 per cent and Vodafone's networks at 96 per cent. This suggests a combined coverage of *at least* 99.3 per cent of the population, which exceeds the 92 per cent of premises covered by the NBN fixed-line footprint. Moreover, the ACCC (2016e) noted the continuing expansion of 4G coverage by each mobile network operator, providing improved mobile broadband speeds and data allowances. On current investment plans, Telstra has indicated that its 4G network coverage will reach 99 per cent of the population in June 2017 (Telstra 2016c).

Accordingly, the Commission expects that universal availability of broadband and voice services within the fixed-line footprint (with the voice services of quality commensurate with the TUSO) will be delivered by RSPs offering services over NBN infrastructure and complemented by mobile service provision.

... and broadband (including voice) services will be universally available outside of NBN's fixed-line footprint

The Australian Government's expectation that nbn will supply broadband infrastructure capable of providing peak wholesale download rates of at least 25 Mbps extends to all

premises in the fixed wireless and satellite footprints. However, nbn (sub. 47) has argued that it has designed the NBN infrastructure with the expectation that Telstra would continue to supply voice services over its existing networks under the TUSO and Copper Continuity Obligation.

What will National Broadband Network infrastructure deliver?

Much of the previous analysis relating to universal retail service delivery within the NBN fixed-line footprint applies to the fixed wireless and satellite footprints. The following observations are also pertinent:

- From the perspective of a RSP, supplying a fixed wireless service is very similar to supplying a fixed-line service, with the only significant difference being the connection speed that can be offered over different technologies. As nbn noted ‘there is no impediment to RSPs providing services to any location within an nbn POI area, once the RSP has made the decision to supply from that POI’ (sub. 47, p. 4).
- nbn applies the same wholesale price caps to fixed wireless and satellite services as it does to fixed-line services.
- It appears that a competitive market for the provision of retail satellite services has already emerged. There are currently 10 RSPs supplying satellite services (nbn 2016e),⁶⁰ with each servicing the entire satellite footprint. This is likely a result of nbn’s decision to direct all satellite traffic to a single metropolitan POI (nbn, sub. 47, p. 6), which reduces the impact on satellite RSPs’ transmission costs.
- All standard nbn wholesale access products are provided with the inclusion of 0.15 Mbps of symmetric prioritised bandwidth. Although the allocation of this channel is at the discretion of the RSP, it is sufficient to allow the delivery of a voice over internet protocol (VoIP) service.⁶¹

As such, the Commission considers that retail service provision over NBN infrastructure will lead to universal availability of broadband (including voice) services within the fixed wireless and satellite footprints.

DRAFT FINDING 6.1

After the full rollout of NBN infrastructure and in the absence of the telecommunications universal service obligation, retail broadband (including voice) services are likely to be available to all premises across Australia.

⁶⁰ Activ8me, Ant Communications, BorderNET, Clear Networks, Harbour ISP, iiNet, IPSTAR, Reachnet, SkyMesh and Westnet.

⁶¹ Although views regarding the required bandwidth for a VoIP service differ, 0.15 Mbps appears to be sufficient. For example, Cisco (2016b) suggests 0.087 Mbps, Maloff (2014) suggests 0.1 Mbps, VoIP Test (2016) suggest 0.09 Mbps (but note that 0.03 Mbps may be sufficient), and Psyllos (2012) suggests 0.095 Mbps for a ‘very good’ audio quality.

What about the quality of voice services outside the NBN fixed-line footprint?

As noted earlier, voice services delivered over nbn's fixed-line networks will be of equivalent quality to those supplied by Telstra under the TUSO.

However, the quality of voice services supplied over nbn's fixed wireless and satellite networks may fall short of what is currently supplied by Telstra under the TUSO. Due to restrictions in nbn's Wholesale Broadband Agreement (which governs the supply of NBN wholesale products), RSPs are not permitted to supply services attracting the Customer Service Guarantee (CSG) and Priority Assistance over nbn's fixed wireless and satellite networks.⁶² Further, many participants raised concerns regarding the quality of the voice service that nbn could supply within the satellite footprint.

In light of these potential shortcomings, the Commission has assessed relevant aspects of the quality of voice services supplied over the NBN in these two areas. In assessing service quality, three criteria were used (box 6.1).

Fixed wireless

Participants did not raise any concerns with the quality of voice services delivered over NBN fixed wireless. To the contrary, Telstra (sub. 30) noted that it:

... already provides voice services as part of a bundle to customers over NBN FW [fixed wireless] infrastructure. The actual service delivered is no different to other services offered in fulfilment of the USO. To date we have not received a complaint in relation to voice quality or voice service availability over NBN FW. (p. 15)

In terms of reliability and latency, voice services offered over nbn's fixed wireless networks are not materially different from those offered over its fixed-line networks. In terms of reliability, the fixed-line and fixed wireless networks operate with the same target reliability parameters of 99.9 per cent for each service (nbn 2016l).⁶³ Although these are targets rather than observed outcomes, both exceed the network-wide performance of Telstra's copper access network between 2011 and 2016, which was around 99.84 per cent and lower outside of metropolitan areas (discussed below).⁶⁴ Moreover, voice services offered over fixed wireless feature latencies of comfortably less than 200 milliseconds (nbn 2016l).

⁶² Although, as noted in chapters 2 and 4, a growing number of Australians are either agreeing to waive the CSG for fixed voice services or choosing to rely solely on mobile voice services which cannot attract the CSG.

⁶³ As a benchmark, the 'plain old telephone service' is generally attributed a reliability rating of 99.999 per cent availability (commonly known as 'five nines'). However, this applies to local exchange equipment and not the end-to-end network availability, which is in the range of 99.9 to 99.99 per cent availability (Kos, Klepec and Tomašič 2004).

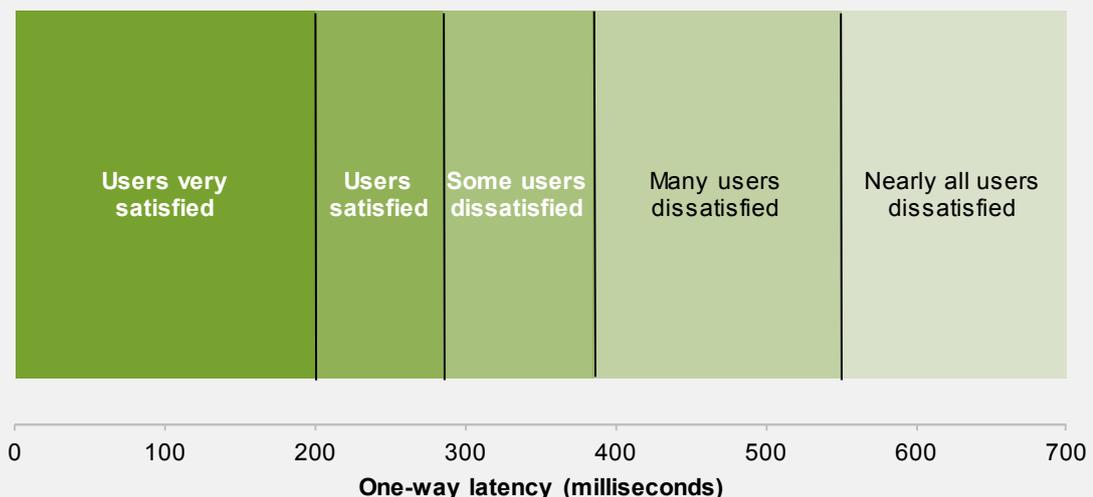
⁶⁴ On average, 1.73 per cent of non-urban services experience a fault each month compared with 1.58 per cent of urban services (ACMA 2015b).

Box 6.1 Criteria for assessing the quality of a voice service

- The *reliability* of a service — the proportion of time in which a voice call can be engaged.^a
- The *latency* of a service — the time taken for a signal to pass from the mouthpiece of one phone to the earpiece of the other (one-way latency). Users perceive latency in a nonlinear fashion (see figure below). Percy (1999, p. 3) stated:
... the user perception of the link quality deteriorates as the one-way latency exceeds 150 milliseconds. If the one-way latency exceeds 450 milliseconds, holding a conversation is very difficult and the latency becomes very annoying. If given a choice, most callers would choose to use a telephone line with less than 200 milliseconds of latency.
- *Repair timeframes* — the time taken to repair a service fault. Unlike the other criteria, this criterion is not inherent to the technology at hand but relates to providers' obligations under the Customer Service Guarantee and other contractual agreements.

Latency and user satisfaction

Perception of one-way voice call latency based on International Telecommunication Union modelling



Source: ITU (2003).

^a This is often referred to as *network availability*. *Reliability* is used to avoid ambiguity, as *availability* has a specific meaning in this report (chapter 1).

Regarding service repair timeframes, the timeframes for fixed wireless end user fault service repair set out in nbn's Wholesale Broadband Agreement are superior to those for services attracting the CSG (table 6.2). However, the CSG is intended to provide for compensation in the event that the provider does not meet its regulatory obligations. For residential customers, this is \$14.52 per business day for the first five days and \$49.40 per business day thereafter (ACMA 2016b). nbn has a performance objective of meeting fixed wireless and satellite end user fault repair timeframes of 95 per cent (nbn 2016l), and compensation is not expressly provided for.

Table 6.2 CSG versus nbn satellite and fixed wireless fault rectification^{a,b}

Comparison of end user fault service repair timelines

<i>Area</i>	<i>CSG-attracting services</i>	<i>nbn fixed wireless</i>	<i>nbn Sky Muster satellites</i>
Urban	End of next business day	3pm next business day	5pm next business day or 5pm third business day ^c
Rural	End of second business day	1pm second business day	5pm third business day
Remote	End of third business day	11am third business day	5pm fourth business day or 5pm tenth business day ^d

^a Urban areas have equal to or greater than 10 000 people, rural areas have 201 to 9999 people, remote areas have equal to or fewer than 200 people. ^b Some nbn rectification timeframes are tighter where the end user fault does not require plant work or nbn attendance at the premises. ^c The shorter timeline is where the end user fault does not require plant work or nbn attendance at the premises. ^d The shorter timeline is where the premises is not in a 'Very Remote' or 'Remote' geographical area as defined in the most recent 'Accessibility Remoteness Index of Australia plus' published by the Australian Population and Migration Research Centre of the University of Adelaide as at the Satellite Commercial Launch Date.

Sources: ACMA (2016a); nbn (2016l).

Satellite

Many participants expressed specific concerns about the latency and reliability of nbn's *Sky Muster* satellites for the provision of voice services, although one participant (Coutts Communications) considered the service to be satisfactory (box 6.2).

Several participants (Barcoo Shire Council, sub. 41; Broadband for the Bush Alliance, sub. 6; Remote Area Planning and Development Board, sub. 12) made specific reference to International Telecommunication Union Recommendation G.114 (2003), which addresses permissible degrees of latency in telecommunications networks. The recommendation states:

Regardless of the type of application, it is recommended to not exceed a one-way delay [latency] of 400 ms [milliseconds] for general network planning ... While delays above 400 ms are unacceptable for general network planning purposes, it is recognized that in some exceptional cases this limit will be exceeded. An example of such an exception is an unavoidable double satellite hop for a hard-to-reach location. (p. 2)

Box 6.2 Participants' views about voice services over nbn's Sky Muster satellites

Coutts Communications supported the use of the satellite service for voice calling

The current situation where NBN Fixed Wireless and NBN LTSS [long term satellite service] Satellite is not empowered to provide a 'quality equivalent voice service' needs to be assessed ... I would note for example that the NBN fixed wireless and the NBN LTSS satellite *can* provide a 'quality' equivalent fixed telephone service that cannot currently meet the [standard telephone service] definition. (Coutts Communications, sub. 5, pp. 3, 8)

... but many other participants said that the technology is not suitable for voice calling

... the NBN Satellite network does have significant issues as a 'safety net' platform for the [standard telephone service]. Firstly, the lower availability objective (equivalent to over two hours per month) means that the service may not meet community expectations from a performance perspective. In addition the transmission delays inherent in geo-stationary satellite networks mean that calls will have longer delays that affect call quality. Delays of over 200 to 300 milli-seconds begin to degrade the perceived quality of traditional voice calls. The satellite delay objective (see Section 14.5 of the latest Services Level Schedule) is 370 milli-seconds or less. As a result it is difficult for the NBN Satellite to provide a 'safety net' service with reasonable call quality ... I am unaware of any research in this area but have experienced first hand two-ended satellite video calls with delays of over 600 milliseconds and rate the experience as 'good'. However, this is unlikely to be satisfactory in times of end user stress or emergency ... RSPs, using VoIP technology, do sell voice services for use on the NBN Satellite service. Most calls to fixed telephone lines will be adequate as the delay is around 300 milli-seconds. However calls to mobiles and other satellite based users will be problematic. The most severe impact will be for communities that would need to rely totally on satellite communications for voice services within their community if there were no terrestrial alternative. This would be the case on many islands communities (such as Christmas Island, King Island or Magnetic Island) or remote townships and indigenous communities if the existing copper networks were closed down. All calls within these communities would suffer long delays of over 600 milli-seconds and resultant poor quality as both parties would be relying on satellite links (ie. double hop calls). This would be a significant backward step for these communities. (McLaren, sub. 18, pp. 4-7)

All geostationary satellite services are subject to high latency, weather effects, and sunspot activity which make NBN Satellite a substandard service compared to other fixed services. Hence NBN Satellite should not be considered as a candidate for providing fixed services to all but the most remote of locations, typically islands and other extremely remote locations. (Great Northern Telecommunications, sub. 2, p. 2)

For many distance education students reliant on satellite technology to access curriculum and interactive web conferencing lessons with classmates and teacher, the VoIP methodology would cause significant latency issues due to double hopping from one student on satellite to another student on satellite. This would mean that the overall experience of a class lesson would be hindered and interactive group lessons like music would not be possible. Students requiring one on one lessons to develop reading skills or those accessing speech pathology services find it impossible to take part when hindered by latency. It is important that the fixed telephone system be available to be the default for voice communication in distance education home schoolrooms. (ICPAA, sub. 11, p. 3)

For those on a satellite connection the NBN cannot be treated as an alternative USO voice service ... For remote consumers on the NBN SkyMuster™ VoIP calling as a standard voice service is not an option. (Broadband for the Bush Alliance, sub. 6, p. 6)

(continued on next page)

Box 6.2 (continued)

RAPAD urges the Commission not to consider VoIP type technology/services as an option for a voice Universal Service, if the access technology is satellite technology. (Remote Area Planning and Development Board, sub. 12, p. 4)

For remote consumers on the nbn SkyMuster™ VoIP calling as a standard voice service is not an option because of latency issues. (Ninti One, sub. 16, p. 3)

For users of satellite, the latency or ping of this technology serves to throttle the Voice over Internet Protocol (VoIP) experience. The vulnerability of satellite based services to climatic conditions is further exacerbated in northern Australia with the tropics' distinct and often intense wet season. Monsoon trough events can disrupt services for significant periods of time. In areas with no mobile coverage this would significantly impact community safety if no 'landline' service was available. (Isaac Regional Council, sub. 26, p. 7)

The NBN SAT operates at the higher frequencies in the Ka band (17 Ghz - 30 Ghz). At these frequencies signals broadcast over the satellite are more likely to be disrupted by rain particularly at tropical latitudes north of 23° S. On average, a user living in the tropics will experience a greater loss of their service than a user on a different system that utilises lower frequencies. While this impact may be inconsequential for typical household usage, this may have public safety consequences in the event of an emergency. Also NBN SAT is not configured to manage voice call latency that is introduced into calls that are made between two customers on satellite. This issue is known as double hop as illustrated in the figure below. (Telstra, sub. 30, p. 13)

The NBN theoretically presents the opportunity for consumers to make voice calls by utilising Voice over Internet Protocols (VoIP). However, many users that currently use satellite services for internet access risk a total telecommunications outage in case of a blackout if they transitioned to receive their voice services via VoIP instead of their current landline connection. Given the manner in which weather conditions can interfere with satellite coverage, this is a real not a hypothetical risk for rural Australians. The nature of living remotely dictates that reliable telecommunications services cannot always be delivered wirelessly. (National Farmers' Federation, sub. 31, p. 16)

Quality VoIP calls using the nbn SkyMuster™ VoIP calling as a standard voice option is not an option. (Barcoo Shire Council, sub. 41, p. 3)

... nbn notes that its Satellite network has been deployed specifically to optimise broadband throughput. As a result, if two Satellite end users make a voice call to each other, their voice signal would experience a 'double hop' (i.e., both end users would have their signal go up to the geostationary satellite and back to the ground station), which would roughly double the latency of the signal compared to 'single hop' satellites that have been designed and optimised for voice. It may be the case that this degree of latency is still acceptable for the provision of a baseline service, but it is clearly a factor that would need to be addressed in the process of defining what the features of a baseline service should be. Consideration would also need to be given to the capacity requirements for the committed information rates (Traffic Class 1) required to support voice services. Again, this relates to the design decisions made in relation to the nbn Satellite service, which were predicated on the delivery of retail-level broadband services, rather than voice services. Another relevant factor specific to the Satellite service is the potential impact that 'rain fade' could have on voice availability, and whether this would be acceptable in all locations. (nbn, sub. 47, p. 16)

... nbn satellite technology, which suffers from high latency, will not be able to provide such a [mobile and fixed wireless equivalent] service standard. Consumers in these areas will need to have an alternative network available to ensure they can access both voice and data services. (ACCAN, sub. 48, p. 7)

The latency of an nbn satellite call to a fixed-line, fixed wireless or mobile service (a ‘single hop’) is around 260 to 300 milliseconds, and around 520 to 600 milliseconds to another satellite service (a ‘double hop’) (Gregory 2016; McLaren, sub. 18). By comparison, Telstra’s USOSat features ‘meshing’ technology, which prevents this extended latency for double hop calls (Telstra, sub. 30, p. 13).

Several participants (Great Northern Telecommunications, sub. 2; McLaren, sub. 18; Isaac Regional Council, sub. 26; Telstra, sub. 30; National Farmers’ Federation, sub. 31) also noted the potential for weather conditions to affect the reliability of satellite services. This may especially be an issue during a severe weather event, where emergency calls may be disrupted. While USOSat transmits data over Ku band radio signals, nbn’s *Sky Muster* satellites operate in the higher frequency Ka band, which enables higher data throughput at the expense of being inherently more prone to signal attenuation.

Nevertheless, nbn’s target reliability of 99.7 per cent (nbn 2016l) is comparable with the recent performance of Telstra’s fixed networks outside of metropolitan areas. The network-wide reliability of CSG-attracting services supplied over Telstra’s networks averaged around 99.9 per cent between January 2003 and August 2016, but has trended downward in recent years, averaging 99.84 per cent in the five years to August 2016 and reaching a low of 99.73 per cent in June 2015 (chapter 4; Productivity Commission estimates based on unpublished data from the ACMA). Moreover, preliminary analysis of more granulated data indicates that network reliability outside of metropolitan areas is around 0.06 percentage points lower than in metropolitan areas. It is probable that premises served by Telstra’s HCRC radio and USOSat experience even lower reliability due to the more variable nature of these technologies, although the Australian Communications and Media Authority (ACMA) does not collect data at this level. For context, each 0.01 percentage point reduction corresponds to an average additional network unavailability of around 25 minutes per month.

nbn’s service repair timeframe targets for the satellite service are below those of CSG-attracting services (table 6.2).

Poor experiences with nbn’s interim satellite service and satellite support scheme (often referred to as the ISS and NSS, respectively) may have unduly led to concern with the quality of the service offered over nbn’s *Sky Muster* satellites. The interim satellite service offers only 0.06 Mbps per premises of symmetric prioritised traffic for voice service provision, and operates with a 99.5 per cent network reliability level (nbn 2015c).

What are the alternatives to nbn’s Sky Muster satellites?

The majority of *Sky Muster* satellite users will be able to access an alternative voice service (table 6.3), with mobile services likely to be preferred where it is available (chapter 2). Based on Telstra’s stated mobile coverage and nbn forecasts, the Commission conservatively estimates that, at the completion of the NBN rollout, at least 320 000 premises in the satellite footprint will be able to receive a mobile service, leaving

a maximum of around 90 000 premises reliant on satellite for the provision of voice services.

Table 6.3 Voice service options within nbn’s satellite footprint

All figures are approximate, based on nbn forecast of 11.9 million premises in 2020 unless otherwise stated

<i>Technology</i>	<i>Number of premises covered</i>	<i>Number of premises not covered</i>
nbn’s <i>Sky Muster</i> satellites	412 000	0
Other satellite providers	412 000	0
Mobile coverage (Commission estimate) ^a	Min 322 000	Max 90 000
Mobile coverage (Optus estimate) ^b	262 000 to 312 000	100 000 to 150 000
Telstra fixed networks (copper, HCRC radio, USOSat)	Unknown (in the absence of the TUSO)	Unknown (in the absence of the TUSO)

^a Actual mobile coverage is likely to exceed this. The estimate assumes i) Telstra mobile networks entirely encompass Optus and Vodafone networks ii) 100 per cent mobile network coverage in the fixed-line and fixed wireless footprints iii) Telstra mobile network coverage is 99.25 per cent of the population (currently reported as 99.3 per cent, and likely to expand in coming years) iv) the average number of people per premises is equal across satellite and fixed-line and fixed wireless footprints. ^b The estimate applies to current population size.

Sources: Optus (sub. 4, p. 17); Productivity Commission estimates based on nbn (2016a); Telstra (2016c).

For those unable to receive mobile coverage, the low-latency Globalstar satellite service may be an alternative.⁶⁵ However, the service is much less reliable than nbn’s satellite service (table 6.4) and relatively more expensive. For example, Pivotal Globalstar retail service plans feature call costs of \$0.80 to \$1 per minute and monthly access fees of around \$15 (Pivotal 2016b). There are also possible technological alternatives to raise emergency assistance such as two-way HF radios and personal locator beacons.

nbn offers a ‘technology choice’ program, which allows consumers to fund an upgrade of their access network. For satellite customers, an ‘area switch’ (where a group of premises collectively fund the upgrade) can be made to fixed wireless or any fixed-line technology except hybrid fibre coaxial (HFC) cable, and an ‘individual switch’ (funded by an individual premises) can be made to fibre to the premises (FTTP) (nbn 2016n). However, as the Australian Communications Consumer Action Network (ACCAN) noted:

Both of these options can cost a significant amount of money. Costs range from a few hundred thousand dollars to millions of dollars, depending on the complexity and size of the switch required. (2016d, p. 7)

Other alternatives are less certain. It is difficult to estimate the extent to which Telstra would maintain its fixed networks if the TUSO was discontinued. Of course, given the dynamic nature of the telecommunications sector (chapter 2), new technologies and

⁶⁵ Low earth orbit (LEO) satellites are able to deliver a lower-latency connection than geostationary satellites.

commercial low earth orbit networks may come into prospect and mobile coverage may expand further. Population movements away from isolated areas may also reduce the number of people dependent on satellite.

Table 6.4 Latency and reliability of networks

<i>Network</i>	<i>One way latency</i>	<i>Reliability</i>
Telstra copper	<200ms	99.84 per cent ^a
Telstra HCRC radio	<200ms	Probably less than 99.78 per cent ^b
Telstra USOSat	Around 260 to 300ms (single and double hop)	Probably less than 99.78 per cent ^b
Mobile networks	<200ms	>95 per cent ^c
Globalstar (LEO satellite network)	<200ms (single and double hop)	Around 90 per cent south of the Queensland and New South Wales border, less than 80 per cent north of Mackay, and 80 to 90 per cent in the middle
Iridium (LEO satellite network)	Highly variable, with average >800ms (single hop) ^d	Superior to Globalstar
nbn fixed line	<200ms	Target 99.9 per cent
nbn fixed wireless	<200ms	Target 99.9 per cent
nbn Sky Muster satellites	Around 260 to 300ms (single hop), 520 to 600ms (double hop)	Target 99.7 per cent

^a Average across *all* Telstra CSG services from August 2011 to August 2016. ^b Based on average 0.06 percentage point lower reliability outside of metropolitan areas. ^c Reliability estimated by OpenSignal from crowdsourced data. Many factors affect mobile network reliability, so this figure may not reflect actual reliability in every circumstance. ^d Figure is taken from circuit-switched data experiments conducted by McMahon and Rathburn (2005), which measured the latency of transmissions between a fixed-line and an Iridium satellite connection in the United States.

Sources: Gregory (2016); McMahon and Rathburn (2005); McLaren (sub. 18, pp. 4–7); nbn (2016); Pivotal (2016a); Productivity Commission estimates based on unpublished data from the ACMA.

Risks in relying on the NBN infrastructure for the provision of voice services

nbn may require additional funding

nbn (sub. 47) has maintained that its mandate and funding have been directed at delivering broadband (rather than voice) services outside of the fixed-line footprint, and that it designed its fixed wireless and satellite networks assuming that Telstra would maintain its infrastructure in these areas:

nbn has planned, designed and deployed its networks outside its fixed line footprint to meet expected demand for broadband services. nbn’s mandate has never been to deliver voice services in these areas, given Telstra’s contracted responsibility and funding for voice services. Any expansion of nbn’s required role to support the delivery of voice-only services would mean additional services being supplied over its fixed wireless and satellite networks compared

to what it has designed and budgeted for. In addition, nbn has designed its wholesale products on these networks to support the delivery of broadband services to end users. If service levels consistent with the voice CSG were required on nbn's fixed wireless and satellite networks, this would also increase nbn's costs ...

As nbn has not designed or deployed its Fixed Wireless or Satellite networks with a view to supporting voice services, further detailed analysis would be required to understand the technological, operational and service quality implications of having to do so ... (pp. 15–6)

The Commission recognises these concerns, and acknowledges that changes to the TUSO may place additional demands on nbn's fixed wireless and satellite networks as well as increased consumer expectations regarding the quality of voice services delivered over these networks.

However, a moderate increase in demand for fixed wireless and satellite services may not necessarily impose a higher net cost on nbn. In its *Fixed Wireless and Satellite Review*, nbn forecasts the take up of fixed wireless services at 40 to 55 per cent and satellite services at 50 to 65 per cent by 2020–21 (nbn 2014b). It found that take up rates toward the higher end of these ranges (and higher average revenue per user growth) would have 'little impact on the short-term economics of any given scenario' and a positive impact on long-term profitability in every scenario up for consideration (nbn 2014b, p. 90).

Additional voice customers may place a strain on the Sky Muster satellites

Regarding capacity constraints, nbn (sub. 47) stated that:

Consideration would also need to be given to the capacity requirements for the committed information rates (Traffic Class 1) required to support voice services. Again, this relates to the design decisions made in relation to the nbn Satellite service, which were predicated on the delivery of retail-level broadband services, rather than voice services. (pp. 15–6)

nbn's *Sky Muster* satellites (*Sky Muster and Sky Muster II*) are expected to supply a combined capacity of 135 gigabits per second (Gbps), allocated as 107 Gbps for downloads and 28 Gbps for uploads (BCR 2015). Assuming that 90 000 premises — the Commission's upper range estimate of the number of premises that cannot receive mobile services — would be reliant on the satellite service for voice calling purposes, this would contribute a maximum of around 13.5 Gbps of additional symmetrical traffic.⁶⁶

However, this is hypothetical estimate that assumes each premises places simultaneous voice calls using 0.15 Mbps of bandwidth. At present, the average household engages in less than 40 minutes per day of combined fixed and mobile voice calls⁶⁷ and, as noted

⁶⁶ If all 90 000 premises were simultaneously engaged in voice calling through the prioritised symmetric channel of 0.15 Mbps offered with every standard wholesale nbn service.

⁶⁷ The ACCC (2016b) reports that 71.5 billion outbound voice call minutes were made from Australian fixed and mobile connections in the year to June 2015. Doubling this to account for incoming calls and averaging across the approximately 9.3 million premises in Australia (nbn 2014b) gives a figure of

earlier, an adequate quality VoIP call can be made using less than around 0.1 Mbps of bandwidth. A rule of thumb is to provision one voice circuit for every 10 end users, resulting in a per-user bandwidth requirement of 0.01 around Mbps. Hence, the actual additional demand on satellite capacity is likely to be much lower than estimated above.

Of course, there may be an additional ‘gateway’ effect, where formerly voice-only users purchase an NBN satellite service for the purpose of voice calling but then choose to access the internet as well.

Is this good enough?

nbn’s fixed wireless networks appear to be able to offer voice services of equivalent quality to those offered under the TUSO, while voice services offered over the *Sky Muster* satellites are of a lower quality by in terms of latency and service repair timeframes. Hence, up to 90 000 premises (those that cannot receive a voice service via mobile) in the satellite footprint may receive a lower quality voice service if the TUSO were to be discontinued.

However, this does not itself suggest an availability ‘gap’. Premises connected to the *Sky Muster* satellites will receive a broadband service that is far superior to what was previously available, if indeed they were previously able to receive any broadband service.⁶⁸ This is especially significant given Australians’ increasing preference for broadband and decreasing preference for voice services (chapter 2).

Moreover, it may be too soon to adequately compare services offered over the *Sky Muster* satellites with those offered under the TUSO. The first *Sky Muster* satellite only became operational in April 2016, with the second expected to become available in 2017. As a result, observed long-term reliability metrics are not yet available, and issues experienced thus far may be transitory. A more informed assessment may not be possible for several years.

Ultimately it is for the Australian Government to determine whether further intervention is warranted to supply improved voice services to these premises. Such an assessment should consider whether these services meet a *baseline* quality that the broader community would regard as acceptable for a universal service, and balance this against the cost of any proposed intervention and the extent to which it will provide improved connectivity. At this stage, the Commission has not made a call about the adequacy of nbn’s satellite voice services from an acceptable *baseline* perspective and is seeking further feedback on this issue. The Commission is also interested in information about alternatives to nbn’s *Sky Muster* satellites for voice services, and their relative merits and costs.

42 minutes per premises per day. Included in these minutes are calls made to large businesses (which are typically located in capital cities), which are likely to account for a significant proportion of the traffic.

⁶⁸ The Department of Communications (2013) found that 6 per cent of premises — almost twice as many as those in the satellite footprint — were unable to access a fixed (non-satellite) broadband service in 2013.

DRAFT FINDING 6.2

The quality of the broadband service supplied by NBN infrastructure will be superior to the quality of service previously available across all Australian premises.

However, as is the case under the existing telecommunications universal obligation (TUSO), the quality of voice services will vary across technologies.

- Voice services offered to premises in the NBN fixed-line and fixed wireless footprints will be of a high quality and equivalent to the standard offered under the TUSO.
- Voice services offered to premises in the NBN satellite footprint will be of an adequate quality for most purposes, but will fall short of the quality of those offered under the current TUSO in terms of latency and service repair timeframes. Up to 90 000 premises may be solely dependent on nbn's *Sky Muster* satellites for voice calls.
- Whether further government support for some alternative voice service for these premises is warranted is contingent on whether the quality of nbn's services is below the *baseline* that the broader community would regard as acceptable for a universal service.

INFORMATION REQUEST 6.1

Participants are invited to provide evidence on the adequacy of NBN's satellite voice services in relation to defining an acceptable baseline for a universal service. Information on practical and cost effective alternatives to NBN's satellite voice services in areas that currently have no mobile coverage, and their relative merits and costs is also sought.

6.2 What about accessibility?

A number of participants expressed concerns about the *accessibility* of available telecommunications services — including those involving NBN infrastructure — to particular groups of people. They argued that, accordingly, government intervention is warranted to address accessibility.

The main groups of users for which accessibility is said to be an issue include people with disability and life-threatening conditions, Indigenous and other people in remote communities, some older people, people without a fixed address, and people in remote communities who rely on telecommunications to access telehealth, distance education and emergency services.

The specialised nature of the needs of these user groups may mean that users are either unable to access a *baseline* standard of telecommunications services (say, due to a

disability) or, where a *baseline* standard of services were accessible, it would not be sufficient to meet their needs (such as a telehealth service). There may be genuine cost constraints for a service provider to meet the needs of these users, particularly where the relatively small numbers make it difficult to generate sufficient revenue, with the possible result that needed services are not provided, or are provided at a high cost to users. This may particularly be the case in regional and remote areas.

The remainder of this section examines the main accessibility issues arising for these groups and the extent to which the market and NBN infrastructure can meet their needs, particularly in the absence of the TUSO. As a wholesale provider, nbn does not have a direct relationship with end users and, thus, its role in addressing the particular needs of user groups is somewhat limited. However, NBN infrastructure does provide the means by which those user needs can be addressed by RSPs.

People with disability

Some 1.1 million Australians with disability, accounting for about 5 per cent of the population, use a range of aids or equipment for communications (table 6.5). Within this group, around 310 000 use email or internet.

A number of participants emphasised the importance of government supporting the accessibility of people with disability to telecommunications services. For example, ACCAN said that ‘There is a clear need for greater intervention to ensure that all Australians with disability can access and benefit from our increasingly ubiquitous connected society’ (sub. 48, p. 23). Australian Communication Exchange (ACE) said that:

For people who are Deaf or have a disability, the NBN may one day open the door to an alternative USO service to the [National Relay Service] NRS, however, there is more investigation required to understand how a transition could happen. Currently, a third party — a relay office who can bridge current communication gaps and technological limitations — is required.

Until all Australians acquire the necessary hardware and technical skills to use computers and the internet, removing their access to suitable services such as the standard telephone could lead to further isolation and disadvantage. (sub. 22, p. 5)

And nbn recognised that:

... continued regulatory intervention will be necessary to ensure that telecommunications solutions are provided to groups with specific needs such as persons with hearing impairments or those with documented life-threatening medical conditions, or to address challenges of affordability. (sub. 47, p. 17)

Table 6.5 Number of people using communication aids
2015

<i>Type of communication aid used</i>	<i>Number of users</i>
	('000)
Electronic communication aids	
Reading or writing aids	45.9
Speaking aids	10.5
Email or internet	310.0
Non-electronic communication aids	
Reading or writing aids	50.2
Speaking aids	21.1
Reading, writing or speaking aid not specified	108.1
Hearing aid	701.6
Cochlear implant	10.2
Other hearing aids	48.9
All using communication aids ^a	1 110.3

^a Total may be less than the sum of the components as persons may be using more than one type of aid.

Source: ABS (*Disability, Ageing and Carers, Australia: Summary of Findings, 2015*, Cat. no. 4430).

The telecommunications needs of people with disability are currently met through such government measures as the TUSO, the National Relay Service, and the National Disability Insurance Scheme (chapters 3 and 4). Furthermore, the *Disability Discrimination Act 1992* (Cth) imposes a general obligation on telecommunications service providers to ensure their services are accessible to people with disability. The ACMA (2010b) noted that this obligation may extend to the provision of equipment.

In addition to existing government measures, there are some initiatives by providers to address the specific equipment needs of people with disability. For example, Optus (2016a) has a program that provides disability equipment to its customers in Optus-cabled areas in Sydney, Brisbane and Melbourne (DoCA 2016a). In addition, resellers of Telstra's services have a commercial agreement with Telstra to provide their customers with disability equipment (ACMA 2010b). Disability equipment, such as teletypewriters (TTYs), may also be supported over parts of the NBN infrastructure.

Despite existing government and voluntary measures, there are some limited data that suggest that the accessibility of telecommunications services, in the broad, for people with disability is on the whole lower than that for people without disability. For example:

- ABS data show that in 2014 around 46 per cent of people with disability (around 2.6 million people) did not access government services via the internet compared with 30 per cent of people without disability (2015, table 11.3)
- according to Thomas et al. (2016), the 'Australian digital inclusion index' was very low for people with disability (44.4) compared with the national average of 54.5 in 2016, particularly in relation to basic skills, internet access, digital activities and digital

ability.⁶⁹ That said, scores have improved slightly over the previous 3 years (2.4 points from 2014 to 2016).

There also appears to be an increasing demand by people with disability under the National Relay Service (chapter 4). While the number of individual users of this service is unclear, the Department of Communications and the Arts (DoCA) (2016a) noted an increased demand from its previous estimate of 5000 to 10 000 users with recent innovations in the service.

That said, the following is worth noting.

- In its submission to the Australian Government review of the National Relay Service, Telstra (2016d) noted that there is a decreasing reliance on its disability equipment program as customers increasingly choose to shift away from fixed-line telephone services to mobile and internet-based communications. This is consistent with consumer trends more generally (chapter 2).
- Improvements in technology can help to meet some of the needs of people with disability (as well as those of other user groups). For example, some software and apps have improved the accessibility of telecommunications for many people with disability (table 6.6) who have traditionally relied on the National Relay Service (DoCA 2016a). However, it is also important to be mindful of the technological preferences of different age groups as well as of people with different disabilities — for example, Printacall Communications Technology stated:

It is an accepted fact that younger deaf and hearing impaired people will more readily embrace new technologies such as tablets, smart phones, social networks and those such as video relay available through the [National Relay Service]. However it may be that the status quo suits the elderly profoundly deaf who prefer to continue to use a traditional TTY. (sub. 15, p. 4)

On balance, the Commission considers that, in the absence of the TUSO, government intervention to address the accessibility of telecommunications for people with disability continues to be warranted. That said, it is not clear what is likely to be the full extent of particular needs for this group, particularly after the full NBN infrastructure rollout. The Commission notes that the Australian Government is considering potential options for reform, including to the National Relay Service, to improve communications for people with disability (DoCA 2016a). It expects that this should cast light on the full extent of telecommunications needs for this group.

⁶⁹ The authors' digital inclusion index is made up of three sub-indices — 'access', 'affordability' and 'digital ability'. 'Access' is made up of: internet access, which covers frequency, places and number of access points; internet technology, which covers computers, mobile phones, mobile broadband, and fixed broadband; and internet data allowance, which relates to mobile and fixed internet. 'Affordability' is made up of: relative expenditure, which means the share of household income spent on internet access; and value of expenditure, which means total internet data allowance per dollar of expenditure. 'Digital ability' is made up of: attitudes, which includes notions of control, enthusiasm, learning and confidence; basic skills including mobile phone, banking, shopping, community and information skills; and activities including accessing content, communication, transactions, commerce, media and information. A digital inclusion index score less than 45 is 'low', a score between 50 and 60 is 'medium', and score above 65 is 'high'.

Table 6.6 Potential substitutes for the National Relay Service options

<i>National Relay Service option</i>	<i>Potential mainstream service options</i>
SMS relay	SMS, WhatsApp, Facebook Messenger, email, iMessage, Twitter Direct Messages
Internet relay, TTY type and read	Live chat, Facebook Messenger, email, Twitter Direct Messages
Video relay	Skype, Face Time, Viber, Google Hangouts

Source: DoCA (2016a, p. 11).

People with life-threatening health conditions

Around 187 000 registered customers with life-threatening health conditions are entitled to receive from Telstra (as part of its carrier licence conditions) priority connection and fault repair of their fixed-line home telephone service without any additional cost (Priority Assistance) (chapter 3). Connection to, or fault repair of, the service must occur within 24 hours in urban and rural areas and within 48 hours in remote areas if the priority assistance customer has no other working fixed-line phone service from Telstra or another RSP. Providers other than Telstra do not have to provide Priority Assistance and only Primus (Optus 2016c) does so voluntarily.

Some participants believed that Priority Assistance is important for vulnerable customers and should be improved. For example, the Telecommunications Industry Ombudsman (TIO) (sub. 52) stated that consumers with life-threatening health conditions were likely to be disproportionately affected by the lack of access to a *standard telephone service*.

With respect to NBN infrastructure, the Government’s Migration Assurance Policy (DoCA 2016d, 2016c) focuses on ongoing improvement of the migration of customers from Telstra’s copper networks to the NBN fixed-line network, including minimising disruption to services. It identifies people who may need extra support to migrate before the disconnection date and contains several sections on vulnerable end users and medical alarms. nbn is currently working with DoCA on an update, which is expected to be finalised early next year. In addition to this policy, nbn has committed to support RSPs who provide a priority assistance service (nbn 2016j). This suggests that in relation to NBN fixed-line services at least, Priority Assistance registered customers will continue to be serviced.

However, Priority Assistance is not available over NBN fixed wireless and satellite networks. The Wholesale Broadband Agreement restricts RSPs from using these services to supply end-users with a CSG or Priority Assistance voice service. Further, nbn (2016h) noted that its satellite service is not designed to support such equipment as medical alarms, autodiallers, and emergency call buttons.

There is also the issue of how discontinuation of the TUSO might affect Priority Assistance. Both policies are closely related and reflect Telstra's legacy as a former government-owned monopoly. Telstra's Priority Assistance obligations set out in its carrier licence conditions make frequent reference to the TUSO, such as with respect to the standard telephone service and the Customer Service Guarantee. Therefore, any changes to the TUSO will inevitably result in consequential amendments to Priority Assistance.

A discontinuation of the TUSO is likely to 'weaken' Priority Assistance as a consumer safeguard, as its availability will no longer be guaranteed to all Australians. But it may not render Priority Assistance as totally ineffective. While existing Priority Assistance customers could continue to receive services (as long as they continue with Telstra), new customers to the market would no longer be guaranteed to have access to Telstra fixed-line services (and the Priority Assistance benefits that come with them).

It appears, therefore, that a potential gap exists relating to the offer of Priority Assistance over nbn's fixed wireless and satellite networks as well as possibly more broadly resulting from any discontinuation of the TUSO. However, the Commission is uncertain as to how many of the existing (or future) Priority Assistance customers are affected and may require further government support. This is a matter for the Australian Government to address in its consumer safeguard review and, because of the relationship between Priority Assistance and the TUSO, may have implications for the renegotiation of the TUSOP Agreement with Telstra (chapter 9).

Indigenous people living in remote communities

There are an estimated 670 000 Indigenous people, or 3 per cent of the total Australian population (SCRGSP 2016a).

Like other Australians, Indigenous people in remote communities also face telecommunications availability, accessibility and affordability concerns but at a typically worse intensity. For example:

- a higher proportion of Indigenous people than non-Indigenous people live in regional and remote areas (66 per cent of Indigenous people compared with 29 per cent of non-Indigenous people as at June 2011) where only limited telecommunications services are available (SCRGSP 2016a). In remote areas, the relative proportion of Indigenous people compared with non-Indigenous people is again higher at 22 per cent compared with 2 per cent (SCRGSP 2016a)
- higher proportions of Indigenous people than non-Indigenous people are on low income and have disabilities (SCRGSP 2016a), thus exacerbating their ability to access available telecommunications services
- there is a higher rate of homelessness among Indigenous people than non-Indigenous people, which makes it more difficult for them to access available fixed telecommunications services and, perhaps, creating a preference for mobile services.

Around 26 744 Indigenous people were counted as homeless on the night of the 2011 Census, around 4.9 per cent of the Indigenous population,⁷⁰ compared with 70 085 non-Indigenous people, or around 0.4 per cent of the non-Indigenous population (ABS 2012a, 2012c)

- a lower proportion of households with Indigenous people (63 per cent) than households without Indigenous people (77 per cent) had an internet connection (in 2011), thus potentially adding to their ‘digital exclusion’ (ABS 2012b). (Box 6.3 shows more recent ABS data on internet usage by Indigenous people.)
- more recent analysis by Thomas et al. (2016), suggested that Indigenous people have very low digital inclusion scores compared with the national average (46.6, or 7.9 points below the national average). In terms of all components of their digital inclusion index, Indigenous people experienced the lowest score compared with the national average, particularly with respect to basic digital skills (38.1 compared with 51.6), affordability – value of expenditure (43 compared with 54.5) and digital activities (26.9 compared with 37.3) (Thomas et al. 2016, pp. 5, 11). While Indigenous peoples’ digital inclusion is low, it has improved over the three years to 2016, albeit at below the rate of improvement experienced nationally.

In addition to the relative disadvantages that Indigenous people face compared with non-Indigenous people, and recent data showing low digital inclusion, there is a number of complex culturally-specific issues relating to their use of, and preferences with respect to, telecommunications services, particularly in remote areas (ACCAN, sub. 48; CAYLUS, sub. 25; Rennie et al. 2015, 2016).

One important issue relates to the strong preference among many Indigenous people in remote areas for pre-paid mobile broadband services where there is mobile coverage. The *Home Internet in Remote Indigenous Communities* project found that:

Households in remote communities are choosing not to acquire satellite broadband services, preferring pre-paid mobile broadband in areas where there is mobile coverage. The consumer preference for pre-paid billing, as well as practical difficulties associated with satellite internet connections, means that households are more likely to go without internet than enter into satellite internet contracts. Our findings suggest that policy objectives aimed at improving internet quality (such as faster speeds), although desirable for services and business in remote Australia, will not encourage residents of remote communities to adopt broadband. We question whether satellite internet ... can meet the needs of remote communities under current arrangements. However, changes to the way that satellite internet is sold and supported could make a significant difference. (Rennie et al. 2015, p. 1).

The sharing culture associated with Indigenous communities is another important issue. Some participants noted the financial hardships experienced within Indigenous

⁷⁰ However, as noted by the ABS (2012c), the estimate of homeless Indigenous people is likely to be an underestimate, particularly for those staying temporarily with other households, reflecting both a relatively large under-enumeration of Indigenous persons in the Census and because, for some of them, a usual address may be reported that is associated with a ‘place’ rather than with a home or dwelling.

communities as a result of their sharing culture, with one participant citing the case where an Indigenous member of a community received a very large phone bill because the phone was largely used by other community members. On the other hand, the *Home Internet in Remote Indigenous Communities* project found that, with respect to computers, individuals wanted to identify as the ‘owners’ with computer access and usage, restricted to their household or immediate family members.

[This] has implications in considering models for the provision of ICT and internet access in remote communities. Specifically, telecentre or ‘internet café’ type arrangements which are run by Indigenous community members may not be the most suitable mechanism for providing equitable access to the broader community, owing to family and other cultural obligations (kinship). (Rennie et al. 2015, p. 5)

A third important issue is the strong preference of many Indigenous communities to themselves manage certain telecommunications activities to prevent anti-social or problematic behaviours such as cyberbullying and access to porn and gambling websites:

There are culturally specific factors to connectivity and particularly mobile telephony and data services that impact strongly on levels of risk, and on community and personal safety in remote Aboriginal communities. (CAYLUS, sub. 25, p. 2)

A final important issue arises from the fact that Indigenous people are relatively more mobile than non-Indigenous people (SCRGSP 2016a, p. 3.10), which could affect their demand for telecommunications services. For example, the *Home Internet in Remote Indigenous Communities* project found that:

Residents’ degree of mobility both within and outside the community has implications for ICT provision in relation to access, ownership, management of billing and sustainability. ICT arrangements need to be flexible in response to residential mobility, and some devices and equipment may be more suitable than others depending on community members’ degree of mobility. For instance, residents moved houses within the community for a range of reasons, including available housing stock, maintenance issues in some houses, the cost of power, and cultural customs surrounding death. Such inter-community mobility has consequences for fixed infrastructure costs such as satellite dishes.

The high level of mobility does not necessarily equate to a preference or requirement for mobile devices. PCs can be easier to manage in the domestic setting. In contrast, there is a high degree of sharing of mobile devices. (Rennie et al. 2015, pp. 5–6)

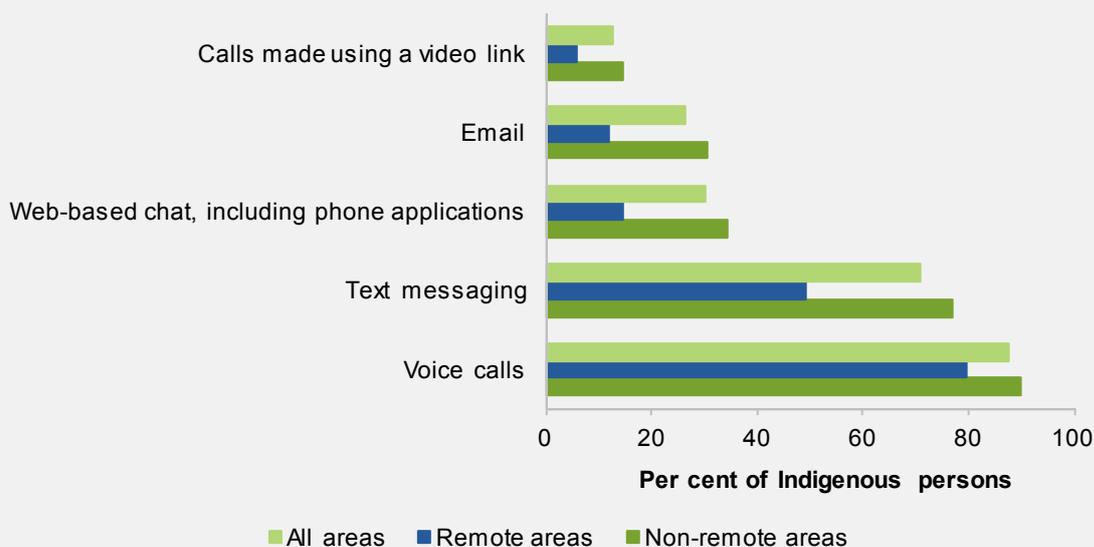
Box 6.3 Internet usage by Indigenous people

Recently published data from the ABS *National Aboriginal and Torres Strait Islander Social Survey 2014-15* showed a number of particular telecommunications usage patterns by Indigenous people.

- The main types of telecommunications contact Indigenous people made with people outside their household were voice calls and text messaging rather than contact through internet-based applications (figure a).
- Just over 20 per cent of Indigenous people had not accessed the internet in the previous 12 months.
- The most common sites for accessing the internet were the house of a neighbour, friend or relative, work, educational institution or public library (figure b).
- The main type of government services accessed by the internet were the lodgement of bills and the lodgement of claims or applications for benefits, although over a quarter of Indigenous people did not access government information or services over the internet.

A Type of telecommunications contact with persons outside the Indigenous household^{a,b,c}

Proportion of Indigenous persons by non-remote or remote area, 2014-15



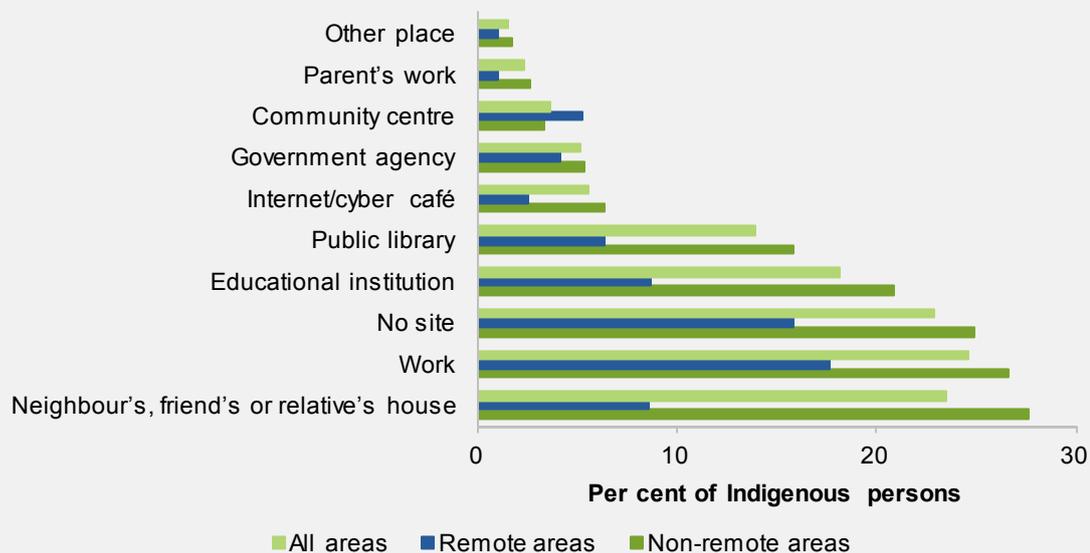
^a Contact is with family or friends living outside the Indigenous household in the previous 3 months. ^b 'Non-remote areas' includes major cities, inner and outer regional areas and 'remote areas' includes remote and very remote areas. The Australian Standard Geographical Standard is used by the ABS for the collection and dissemination of geographically classified statistics. ^c Voice calls include calls made through mobile, fixed telephone or internet.

(continued on next page)

Box 6.3 (continued)

B Sites where internet is accessed^{a,b,c,d,e}

Proportion of Indigenous persons by non-remote or remote areas, 2014-15



^a 'Non-remote areas' includes major cities, inner and outer regional areas and 'remote areas' includes remote and very remote areas. The Australian Standard Geographical Standard is used by the ABS for the collection and dissemination of geographically classified statistics. ^b 'Educational institution' includes school, TAFE, or university. ^c 'Government agency' includes government shopfront or department. ^d 'Community centre' includes voluntary organisation. ^e 'Parent's work' includes parent's study place.

Source: ABS (National Aboriginal and Torres Strait Islander Social Survey, Australian 2014-15, Cat no. 4714.0).

nbn and a number of telecommunications service providers have sought to address Indigenous users' telecommunications needs. For example, nbn has a reconciliation action plan in which it undertakes to investigate opportunities to support people and organisations in Aboriginal and Torres Strait Islander communities to 'bridge the digital divide' (Morrow and Mohamed 2016). And Telstra has sought in 2013 to 'assess the barriers to digital inclusion for Aboriginal and Torres Strait Islander peoples across remote, regional and urban settings' (Featherstone 2013), and has programs directed at Indigenous people, particularly with respect to 'keeping remote communities connected' (Telstra 2016f).

However, a reliance on markets is unlikely to fully address the disadvantages in which Indigenous people are placed compared with non-Indigenous people, or the culturally-specific issues that they have, with respect to telecommunications services. The Commission considers there is no question as to whether there is scope for government intervention here. However, the form that this intervention should take — whether it should target Indigenous communities' telecommunications needs specifically or meet those needs indirectly through more generic policies broadly available to the community requires further consideration (chapter 7).

Today's older people and digital inclusion

Older people (aged 65 years and over) — around 3.5 million people or 15 per cent of Australia's population — are often seen as being at risk of digital exclusion (ACMA 2016c; Thomas et al. 2016; chapter 5).⁷¹ As the ACMA (2016f, p. 1) noted, this group of people would have been in their 40s or older before consumer access to dial-up internet 'gained momentum' in the mid-1990s.

The risks of digital exclusion for this age group were articulated further by the Victorian Government in developing its 2014 Digital Literacy for Older Victorians program (Victorian Department of Education and Training 2014). It considered that the risks included: less familiarity and limited access to digital technologies later in life; issues of training access, travel and internet connectivity, particularly in regional and rural areas; limited understanding of what digital literacy is and how these skills can improve quality of life, maintain community connections and reduce isolation; generic computer courses not meeting learner needs (for example, too long in duration, or the content not specific to needs); and difficulty applying digital literacy skills at home without ongoing support.

Research by the ACMA (2014c, 2016f) found, among other things, that:

- a lower proportion of older people aged 65 years and over (79 per cent) accessed the internet compared with younger people aged 18 years and over, and the proportion of older people who accessed the internet declined with older age groups (as at June 2015)
- internet access among older people increased over the five years to June 2015 by over 20 per cent
- older people used the internet less frequently than younger people (50 per cent of people aged 65 years and over used the internet 3 or more times a day compared with 86 per cent of people aged 18 to 44 years) (as at June 2015)
- older people preferred accessing the internet through desktops computers and tablets whereas younger people preferred internet access through mobile phones and laptop computers (as at June 2015)
- an estimated 21 per cent of people aged 65 and over had never accessed the internet compared with 1 per cent of people aged 18 to 44 years and 4 per cent of people aged 45 to 64 years (as at June 2015)
- fixed phone calls were the 'most used' communications service for a greater proportion of older people (55 per cent) than the rest of the population (10 per cent) (as at May 2014)
- fixed telephone retention and mobile phone ownership was markedly different for older people than for younger age groups. The vast majority of older people (93 per cent) had a fixed telephone connection at home (as at December 2013), which was the highest percentage across all age groups. In contrast, older people were the least likely age

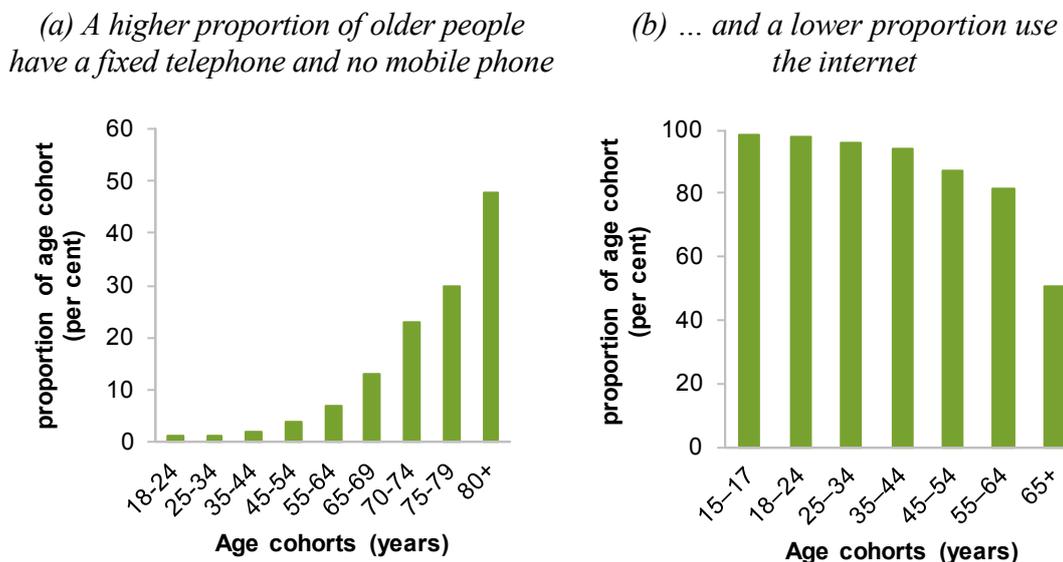
⁷¹ As at 30 June 2015 (ABS 2016b).

group (74 per cent) to own or use a mobile phone. A quarter of older people had a fixed telephone at home but no mobile phone (as at December 2013) (figure 6.1, panel a).

Similar findings were evident in recent ABS data on internet use by households across different age groups. Those data show that the proportion of people aged 15 years and over who accessed the internet (in or out of the home) decreased with age, with 99 per cent of persons aged 15 to 17 years (828 000 persons) accessing the internet during 2014-15 compared with 51 per cent of people aged 65 years and over (1.7 million persons) (figure 6.1, panel b).

According to their *Australian Digital Inclusion Index*, Thomas et al. (2016) found that people aged 65 and over were Australia’s least digitally-included demographic group (with a score of 41.6, or 12.9 points below the national average). In terms of most components of their digital inclusion index, the 65 years and over age cohort experienced the lowest score of all the age cohorts, particularly with respect to attitudes (32.2 compared with 64.3 for the 14 to 24 year age cohort), basic digital skills (30 compared with 54.4), internet access (66.6 compared with 90.7) and digital activities (20.5 compared with 40.8). They considered that the ‘age gap’ had remained relatively steady since the index was first estimated in 2014 (Thomas et al. 2016).

Figure 6.1 Telecommunications usage by people of different ages
 Proportion of age cohort with a fixed telephone and no mobile phone, December 2013; proportion of age cohort who access the internet, 2014-15.



Sources: ABS (*Household Use of Information Technology, Australia, 2014-15*, Cat. no. 8146.0); ACMA (2014, figure 6).

A survey for the Digital Transformation Office (now the Digital Transformation Agency) also found a strong preference amongst older people (aged 65 years and over) to *not* access

government services online (DWA + JM Bruce 2015). Around 57 per cent of older people ‘prefer not to’ or ‘will not’ use digital channels to interact digitally with the Australian Government — more than double that of younger people (aged 18 to 49 years).

Research by nbn (2016) (based on an online survey that involved around 1000 participants), however, found that nearly 80 per cent of Australian grandparents used technology to stay connected with friends and family; around 93 per cent used the internet every day; and more than 70 per cent could not imagine life without the internet.⁷²

However, all this evidence generally applies to today’s cohort of people aged 65 years and over. It is to be expected that these patterns of telecommunications use and preferences will change as today’s younger-aged cohorts — with their preference for accessing the internet and mobiles over fixed services — move into older-aged cohorts.

There are signs of telecommunications service providers offering incentives to older people to assist their migration from voice to digital platforms. For example, Vodafone (in partnership with Seniors Card NSW) has begun to offer people aged over 60 discounts on their mobile phone bills and in-store workshops on how to set up and use a smartphone (VHA 2016a). Telstra’s provides a Tech Savvy Seniors program to older people, particularly in regional and remote areas of New South Wales, Victoria and Queensland to give them the opportunity to develop their digital skills (Telstra 2016a). Such market-driven initiatives appear to be motivated by providers’ desire to capture this segment of consumers.

Overall, this evidence shows that, while there is an increasing trend among older people to go online, and signs of market-driven measures to support this, this age group is still less likely than younger age groups to access the internet and is more likely than younger age groups to have a fixed telephone. The implication of this is that, at the time of the full rollout of the NBN, a small proportion of older people is at risk of digital exclusion and, in particular, being reliant on voice-only services. There is possible scope, therefore, for further government intervention to promote the accessibility of broadband services to the current cohort of older people and, indeed, to support the transition of this group from voice-only services available under the current TUSO. However, it is to be expected that this is a transient issue — the accessibility of broadband services will be less of a concern for future cohorts of older people.

People with no fixed address

The objective and scope of universal service as proposed in this draft report is premises-based (chapter 5). However, some groups are not attached to fixed premises such as homeless people, domestic tourists, itinerant workers as well as some Indigenous people living in remote and very remote communities.

⁷² As an online survey, the results are likely to suffer from a selection bias.

It is difficult to gauge the full extent or nature of the telecommunications needs of people without a fixed address. Data are generally scant, although there are some exceptions (for example, homeless people and Indigenous people) for which it is possible to make some inferences.

For example, there were estimated to be over 100 000 homeless people in 2011 (ABS 2012c; table 6.7). The majority resided in the major cities and, hence, were likely to be served by mobile services (chapter 2). In a small survey of homeless people in inner and outer metropolitan Sydney and Melbourne, Humphry (2014) found that around 90 out of 95 families surveyed had a mobile phone. However, for the 45 per cent of homeless people who resided in regional and remote areas (table 6.7), mobile coverage is likely to be poorer than in major cities, and as such this group may face accessibility issues.

The telecommunications needs of people without a fixed address can be met by the provision of mobile and community telecommunications services such as payphones and WiFi. There are also signs that Telstra is offering a free online service to homeless people (Tasker 2016). Most of Australia's population is within mobile coverage and city areas are increasingly providing free WiFi areas (chapters 2 and 4). However, of the approximately 17 500 payphones provided by Telstra as part of the TUSO, only 5 per cent are located in areas with no mobile phone coverage (chapter 3). In the absence of the TUSO, some government intervention may be needed to address the particular telecommunications needs of this group of people.

Table 6.7 Homeless people by remoteness
2011

<i>Remoteness</i>	<i>Number</i>	<i>%</i>
Major cities of Australia	60 541	57.5
Inner regional Australia	13 449	12.8
Outer regional Australia	9 785	9.3
Remote Australia	4 220	4.0
Very remote Australia	17 239	16.4
Total	105 234	100.0

Source: ABS (Census of Population and Housing: Estimating homelessness, 2011, Cat. no. 2049.0).

Users of telehealth, distance education and emergency services in regional and remote areas

A number of participants (for example, ACCAN, sub. 48; Isolated Children's Parents' Association of Australia and branches, subs. 7, 14, 19 21; the National Farmers' Federation (sub. 31); and Victorian Farmers Federation, sub. 32) considered there was a role for government to ensure that telecommunications services were available to enable access to

a range of services to people in regional and remote areas — in particular, telehealth, distance education, and emergency services.

In the absence of the TUSO, the main concerns of participants centred around accessing these services over the nbn's satellite network where they considered that the relatively low quality of voice and video services would be an impediment. As noted earlier, the Commission estimates up to 90 000 premises may not be able to access an alternative voice service within the NBN satellite footprint. The remainder of this section considers the nature of telecommunication user needs in accessing telehealth, distance education and emergency services, including any government and private sector initiatives that may exist in the absence of the TUSO.

Telehealth

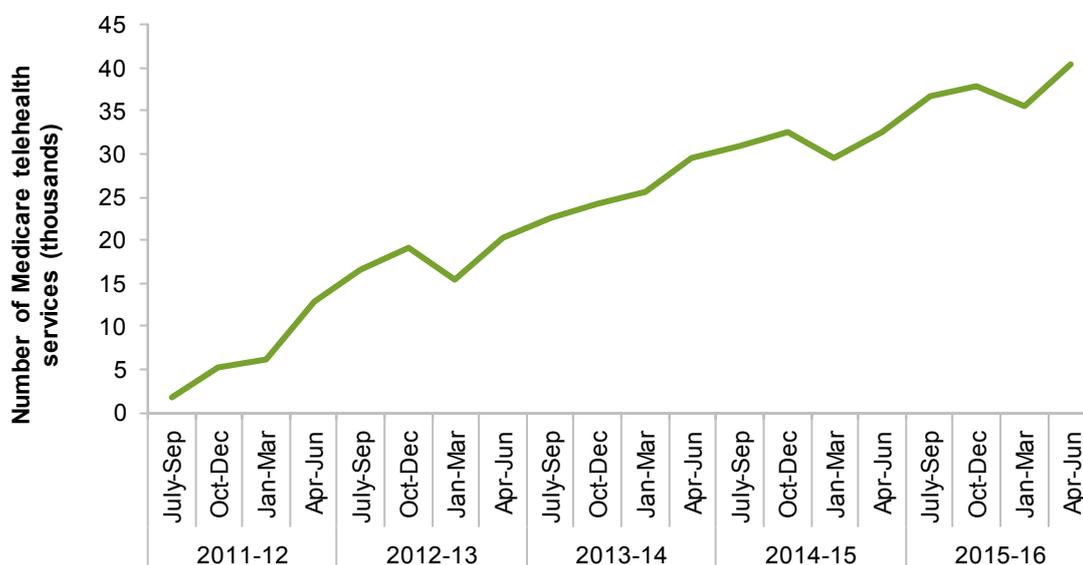
There are some data on the extent of demand for telehealth services, particularly in regional and remote areas. For example, Department of Health (2016) data showed that Medicare claims were processed for around 476 000 telehealth services provided to 144 400 patients between 1 July 2011 and 30 June 2016. There was a significant increase in claims processed over the period, by over 2000 per cent (figure 6.2). Most of the processed claims (around 83 per cent) originated from patients in regional areas, whereas a very small proportion (around 7 per cent) originated from remote areas, with the remainder from major cities (table 6.8).

The Royal Flying Doctor Service provided around 62 700 'remote consultations' by general practitioners over the phone or radio in 2015-16 to individuals and health workers in regional and remote areas that do not have a locally-residing general practitioner (RFDS, pers. comm, 26 October 2016).⁷³ Remote consultations ranged from helping to manage chronic conditions such as diabetes, asthma and heart conditions to emergency work such as poisons and injuries. The vast majority of remote consultations was delivered by telephone (99.9 per cent) with the remainder by radio or video.

NBN infrastructure is being, or will be, used to facilitate telehealth services, particularly in regional and remote areas. nbn proposes to offer *Sky Muster* services to users of telehealth in remote and isolated communities in partnership with providers of these services (chapter 4). Australian Government funding has also, in the past, been directed to pilot telehealth services over NBN infrastructure. For example, the CSIRO has been funded to conduct a telehealth pilot to combat diabetes-related blindness in remote Indigenous areas with services delivered over NBN infrastructure (nbn 2015d). Further, there is now a dedicated telehealth practice (GP2U) providing a range of telehealth services over NBN infrastructure, including by way of video-conferencing (nbn 2016g). On the basis of these initiatives in the absence of the TUSO there does not appear to be a gap warranting further government intervention.

⁷³ These remote consultations involve the resolution of issues in the absence of medical infrastructure — that is, there is no access to emergency departments or on-site services.

Figure 6.2 **Medicare telehealth services**
Claims processed each quarter between 1 July 2011 to 30 June 2016



Source: DoH (2016).

Table 6.8 **Medicare telehealth services by patient remoteness area^{a,b}**
Total claims processed between 1 July 2011 and 30 June 2016

Location	No of services	Proportion of services
	No.	%
Major city	46 472	10
Inner regional	213 224	45
Outer regional	182 725	38
Remote	23 122	5
Very remote	9 964	2
Unallocated ^b	38	0
All locations	475 545	100

^a Covers supported and unsupported telehealth services. Supported telehealth services are attributed to the location of the supporting provider, and unsupported telehealth services are attributed to the residential address of the patient. ^b Small discrepancies occur due to the apportioning of postcodes for remoteness areas.

Source: DoH (2016).

Distance education

There are limited data on the number of children and families reliant on distance education services (services from kindergarten to year 12) through a telecommunications network. According to the Isolated Children's Parents' Association of Australia (2016), in remote

Australia, there are around 280 children aged 4 years who access early childhood programs in their transition to school and around 1500 families who require a distance education tutor.

As noted above, nbn will be offering *Sky Muster* services to users of telehealth and distance education to remote and isolated communities in partnership with providers of these services (chapter 4). At the moment, nbn offers educational services delivered in partnership with state and territory Departments of Education. The process for connecting to NBN infrastructure for these services will differ depending on the body delivering the service. Premises with children who receive distance education may be eligible to receive a second service to their premises which offers an additional 50 gigabytes (GB) of data per month per student (up to 150 GB for 3 students) (ACCAN 2016d; BIRRR 2016; nbn 2016m). As with telehealth services, on the basis of these initiatives in the absence of the TUSO there does not appear to be a gap warranting further government intervention.

Emergency services within the NBN satellite footprint

As noted in chapter 4, the availability of telecommunications services to enable access and provision of emergency services can be critical for public safety, particularly in regional and remote areas most at risk of natural disasters. Emergency service organisations require telecommunications services that are widely available, secure, interoperable and time critical. People seeking emergency services have a preference for telecommunications services that are easy to use when under stress and allow voice calls. For example, a consumer survey undertaken as part of an Australian Government review of the national Triple Zero emergency call service found that 72 per cent of survey respondents preferred voice calls as the primary method for contacting Triple Zero (DoC 2015a).

In the absence of the TUSO, market conditions are likely to ensure that, in most cases, emergency services are accessible through a telecommunications network, including in regional and remote areas. For example, there is a strong preference for using mobile phones for raising emergency assistance. The majority of calls to Triple Zero in 2014-15 originated from mobile phones (67 per cent), and less frequently from fixed lines (31 per cent) and public payphones (2 per cent) (chapter 4). Moreover, there are technological alternatives to conventionally-used terrestrial networks for raising emergency assistance in regional and remote areas — for example, satellite mobile phones, satellite-based messenger devices (such as Spot), two way HF radios, and personal locator beacons. Further, technological advances are also likely in this area.

Existing policy settings are likely to ensure that emergency services are accessible to most people in Australia. Regulation requires that all mobile phone users are able to access Triple Zero, even without credit, a current service, or a SIM card — as noted above, there is evidence of a strong consumer preference for using mobile phones for emergency calls. All nbn customers who have a *standard telephone service* provided by an RSP (that is, a service on the NBN fixed-line network) are able to access Triple Zero. And the Australian Government (Fifield 2016) is seeking expressions of interest from providers for the future provision of the Triple Zero service in an internet protocol-based environment (chapter 4).

Some participants, however, noted that access to emergency services over the NBN satellite and mobile networks may be difficult in certain situations. For example, Gregory (2013) expressed concern that some people might not have an NBN connection (because it is too expensive) or, if they are in mobile coverage, are not capable of using a mobile phone — such as the older people or people with disability. McLaren noted that using the NBN satellite network for (two-ended satellite) voice calls ‘is unlikely to be satisfactory in times of end user stress or emergency’ (sub. 18, p. 5). Microsoft noted that :

VoIP apps do not enable inbound and outbound live voice conversations with any other person on the planet that has a telephone number — regardless of which provider supplies that telephone number — a valuable capability for some consumers. In addition, existing geolocation capabilities used for emergency calling were designed and optimised for use on traditional telephone networks, not the internet. (sub. 20, p. 2)

Indeed, that the NBN satellite network is not configured to provide voice call access to emergency services is emphasised by nbn in its Sky Muster Service Users Guide:

Your internet service provider may offer a VoIP service and may need additional equipment. This service does NOT replace your normal telephone landline and should not be relied upon for emergency calls. (nbn 2016h, p. 12)

As such, there is scope for further government intervention (beyond existing policy settings) to ensure that access to emergency services is available to users within the NBN satellite footprint in areas without mobile phone coverage. As noted earlier, an estimated 90 000 premises within the NBN satellite footprint may require an alternative voice service. The Government’s expressions of interest process for the future provision of the Triple Zero service could consider options for this group (Fifield 2016). However, that process should not confine itself to telecommunications over terrestrial networks, and could consider alternative communications devices for raising emergency assistance. Chapter 7 considers other options for addressing the provision of a *baseline* voice service to this group — this potentially could be married to the provision of emergency call services.

DRAFT FINDING 6.3

In terms of the availability and accessibility of telecommunications services, certain groups of people with particular needs may experience difficulties following the full rollout of NBN infrastructure and in the absence of the telecommunications universal service obligation.

The costs of providing specialised services to these groups are likely to result in providers not offering the services, or providing them at a high price. Notwithstanding that technological advances could reduce these costs, the particular needs of some people in these groups warrant targeted government intervention.

The groups most likely to experience difficulties include: people with disability and life threatening conditions; Indigenous people living in remote settlements; some older people; people with no fixed address; and a small number of users of emergency services within the NBN satellite footprint.

6.3 What about affordability?

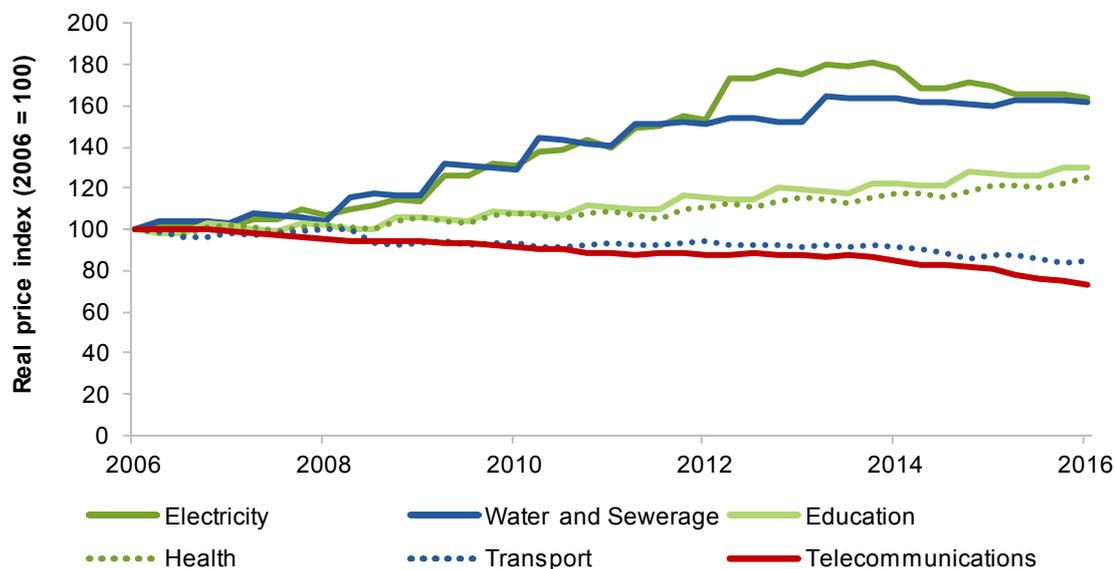
As noted in chapter 5, there are a number of different ways of characterising the affordability of telecommunications services. While price plays an important role, the affordability of telecommunications services refers to the ability of a person (or a household) to pay for that service relative to their income, as well as where telecommunications services fit into their hierarchy of needs (after food and shelter), which varies across individuals and their circumstances (chapter 5).

Telecommunications services are affordable for most people

Real prices of both fixed and mobile services have continued to decline rapidly over time (chapter 2). For example, real prices of mobile services and fixed voice services declined by around 37 per cent and 60 per cent, respectively, over the decade to 2015 and prices of broadband services declined by around 20 per cent over the eight years to 2015 (ACCC 2016e). This downward trend in real telecommunications prices is in contrast to trends in many other key services such as electricity, water and sewerage, education, and health (figure 6.3). Furthermore, mobile services in Australia — which are available to at least 99.3 per cent of the population — are well-ranked internationally in terms of its low tariffs (chapter 2).

Figure 6.3 Trends in the real prices of key services

Real price indices, June 2006 to June 2016



Source: Productivity Commission estimates based on ABS (*Consumer Price Index, Australia*, Cat no. 6401.0).

Even though in absolute terms household spending on telecommunications services has grown for most of the past decade (figure 6.4, panel a),⁷⁴ it typically accounts for a small share of household income (figure 6.4, panel b; table 6.9). According to ABS data, average household expenditure on telecommunications services in 2009-10 accounted for less than 2.5 per cent of gross household income, and less than 3 per cent of disposable household income (table 6.9).⁷⁵

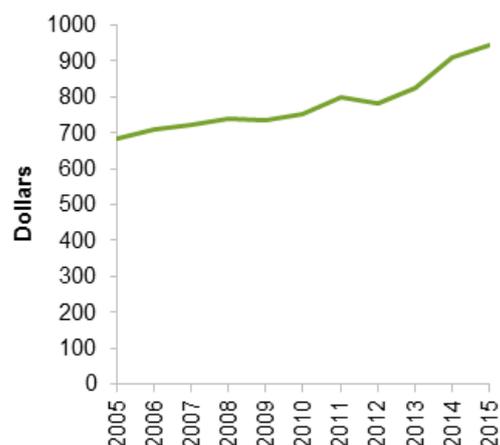
As a key measure of affordability, average household spending on telecommunications services as a proportion of household income has been falling over time. Based on data from the Household Income and Labour Dynamics in Australia (HILDA) survey, the share of disposable household income spent on ‘telecommunications’ — which covers telephone (fixed and mobile), fax and the internet (fixed and mobile) — for an average household fell by 0.7 percentage points from 3 per cent in 2006 to 2.3 per cent in 2014 (figure 6.4, panel b), pointing to an improvement in affordability over time.

⁷⁴ Thomas et al. (2016) also noted that households spent a growing proportion of their gross income on internet services in the past two years (1.17 per cent in 2016 compared with 1 per cent in 2014). This growth, could, however, reflect increased demand for internet services and also a substitution from expensive services to much less expensive services (for example, cable TV to streaming services).

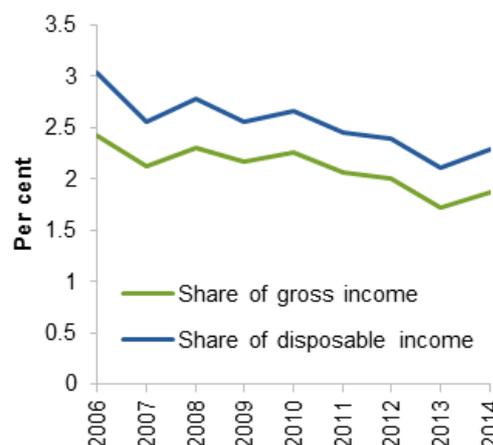
⁷⁵ Using disposable income is the more relevant measure than gross income (which is inclusive of tax) in assessing the affordability of telecommunications. It better reflects that portion of income available to users for discretionary spending. That said, for low-income users (the group of most interest from a policy perspective), disposable and gross income are likely to be quite similar.

Figure 6.4 Real expenditure on communications is increasing overall, but declining as a share of household income^a

(a) Real annual communications expenditure per person, 2005–2015^a



(b) Share of household income spent on telecommunications services, 2006–2014^b



^a 'Communications' includes postal services, telephone and facsimile services and internet services. ^b 'Telecommunications services' includes telephone rent and calls, and the internet charges

Sources: Productivity Commission estimates based on ABS (*Australian National Accounts: National Income, Expenditure and Product, Jun 2016*, Cat. no. 5206.0; *Australian Demographic Statistics*, Cat. no. 3101.0; *Household Income and Income Distribution, Australia, various years*, Cat. no. 6523.0; *Household Income and Wealth Australia, 2013-14*, Cat. no. 6523.0) and HILDA release 14.

Table 6.9 Telecommunications expenditure as a share of gross household income^a
2009-10

Income quintile	Household weekly expenditure on telephone, fax and the internet	Mean gross household income per week	Share
	\$	\$	%
Lowest ^b	22.55	360	6.3
Second	29.81	780	3.8
Third	40.19	1323	3.0
Fourth	47.14	2032	2.3
Highest	59.01	3942	1.5
Average household	39.73	1688	2.4
Average household (disposable income)	39.73	1430	2.8

^a Telecommunications expenditure covers expenditure on telephone (fixed and mobile), fax and internet (fixed and mobile). ^b For the lowest income quintile, gross household income and the disposal household income (which is gross income minus taxes and levies on income) are similar.

Sources: ABS (*Household Expenditure Survey, Australia: Detailed expenditure Items 2009-10*, Cat. no. 6530.0; *Household Income and Income Distribution, Australia: Detailed tables, 2009-10*, Cat. no. 6523.0).

While the BCR (2016a) used a different approach to measuring affordability than used by the Commission above, it also found that the affordability of telecommunications had improved over time. Also using HILDA data, the BCR looked at the average spending of households on telephone, fax and internet as a proportion of total household expenditure, and found that it fell from 4.5 per cent in 2006 to 4.1 per cent in 2014.

Under its Special Access Undertaking (chapter 2), nbn has committed to a number of long-term price controls, including that prices of individual nbn wholesale products may increase by no more than the consumer price index increase minus around 1.5 percentage points (subject to a lower bound of zero) in any year (nbn, sub. 47). As noted earlier, nbn has also committed to a capped wholesale pricing model, and is trialling volume-based price discounts to RSPs (Mason 2016a, 2016b; appendix B). With anticipated competition among RSPs over NBN infrastructure, these commitments are expected to assist with the affordability of retail telecommunications services, particularly in regional and remote areas.

As noted previously, mobile services play an important complementary role in enabling ubiquitous universal services provision. Hence, the price and affordability of mobile services also matter. Mobile service providers offer a range of packages and payment options that can be tailored to users with diverse usage and expenditure patterns. For example, pre-paid mobile plans, which help users control their spending, are widely available in the market. Real prices of pre-paid mobile telecommunications services fell by around 18 per cent over the five years to 2015 (ACCC 2016e).

Several household surveys of consumer attitudes to telecommunications affordability — for example, the ABS *Multipurpose Household Survey*, the HILDA survey, Lane et al. (2016), and Thomas et al. (2016) — indicated that most people viewed telecommunications services as affordable. For example, according to the HILDA survey, less than 0.1 per cent of households in 2014 (around 9000 households) did not have a telephone (fixed or mobile) and around 1.7 per cent of households (around 150 000 households) did not have access to the internet at home because ‘they could not afford it’. ABS (2016d) data revealed that, in 2014-15, around 2.2 per cent of households (nearly 200 000) compared with 3.2 per cent in 2005-06, did not have access to the internet at home because of ‘cost’.

Analysis by the Commission of the affordability of existing packages offered by Telstra and other RSPs over the NBN (appendix D) suggests that:

- basic fixed broadband packages over NBN infrastructure are expected to be relatively more affordable for most people as the NBN rolls out
- affordability of voice-only services migrating to nbn’s fixed-line and fixed wireless services will not be affected.

Overall, this evidence suggests that telecommunications services are, and are likely to continue to be, affordable for most people.

... but possibly not affordable for some consumers

While the telecommunications market is likely to provide affordable broadband and voice services for most people, this may not be so for particular user groups.

Based on its *Affordability Map* (ACCAN 2016b), ACCAN (sub. 48) identified a broad range of groups facing unique barriers to telecommunications affordability, including:

... people facing homelessness; low-income families; people with disability; students; older people; people receiving the lowest government income support payments (Youth Allowance and Newstart Allowance); migrants and asylum seekers; Aboriginal Australians and Torres Strait Islanders; the unemployed; prisoners; and people who live in social housing. (p. 20)

ACCAN also noted that ‘many of these consumers may not qualify for assistance through either of the current measures that address affordability’ (sub. 48, p. 21). As noted in chapters 3 and 4, these affordability measures form part of Telstra’s carrier licence conditions and the Australian Government’s Telephone Allowance. Moreover, drawing on a range of evidence (ABS 2016d; ACCAN 2016e; de Ridder 2015a), ACCAN argued ‘that the current measures are not supporting all consumers who may be facing affordability barriers’ (sub. 48, p. 20).

Low-income users — estimated at over 4 million households in 2013-14 — may face affordability issues.⁷⁶ For example, in 2009-10, people in the lowest gross income quintile (mean income of around \$19 000 per year) spent around 45 per cent less on telecommunications services than an average household (table 6.9).⁷⁷ However, their share of household income spent on telecommunications services (6.3 per cent) was more than 2.5 times that of an average household.

Furthermore, based on a survey that involved around 500 low-income Centrelink beneficiaries, Musolino and Ogle (2016) reported that 62 per cent of the respondents experienced either difficulty in paying for, having to cut back, or having to stop using one or more telecommunications services due to financial hardship in 2015-16.

Finally, some people who just want a voice service may be forced to purchase a higher level of service than they want or need if they move to NBN services. That said, the Commission estimates that, for users within the NBN satellite footprint who have a moderate voice calling pattern, purchasing a VoIP service over nbn’s satellite network may be more affordable than Telstra’s existing basic home phone package (appendix D).

⁷⁶ According to ABS data (2016c), over 4 million people lived in low-income households which are defined as households with equalised disposable income (disposable income adjusted for household size) below 60 per cent of the median equalised disposable income (below around 27 000 per annum for a lone person and below around 56 000 per annum for a couple with two children).

⁷⁷ For the lowest income quintile, gross income and the disposable income (which is gross income minus taxes and levies on income) are almost the same.

DRAFT FINDING 6.4

Telecommunications services are likely to continue to be affordable for most people. However, government subsidies may be required for a small number of low-income users

6.4 Summing up

As noted at the beginning of this chapter, it is challenging to assess the reach of the market in addressing universal service objectives taking account of the full rollout of the NBN and in the absence of the TUSO.

That said, the Commission has tentatively estimated the extent of the various market gaps and particular needs in telecommunications using currently available data and other evidence — table 6.10. These estimates should be viewed with caution. First, they do not reflect future changes in technology, which could result in a narrower set of gaps and needs. Second, the estimates are based on data collected from different sources, over different time periods, and subject to different survey methods and estimation techniques, which make it difficult to compare the estimates. And finally, there are overlaps in the estimates for the different groups — for example, some people may have multiple needs — making any aggregation of the estimates impossible.

Nonetheless, these tentative estimates suggest that a relatively small number of people (when compared with the whole Australian population) is likely to be affected by telecommunications market gaps or have particular telecommunications needs. As such this gives weight to a targeted approach to government intervention rather than a blunt ‘one-size-fits-all’ approach, such as the current TUSO.

DRAFT FINDING 6.5

In the absence of a telecommunications universal service obligation, and given current policy settings and the full rollout of NBN infrastructure, the extent of market gaps and particular user needs in telecommunications are likely to be small and differ across groups. This gives weight to a targeted approach to government intervention.

Table 6.10 Some tentative estimates of the scale of market gaps and particular user needs in telecommunications

<i>Market gap or particular user need (information source and year)</i>	<i>Estimated size after the NBN rollout^{a, b}</i>
	No. of people (or premises, households)
Users of retail voice services within the NBN satellite footprint	
With no mobile coverage (PC estimate)	up to 90 000 premises
People with disability	
NRS customers (DoCA, 2016)	5 000 to 10 000
People with life-threatening health conditions	
Priority assistance customers (ACMA, 2014-15)	up to 187 000
Indigenous people	
In rural and remote areas (ABS/SCRGSP, 2011)	436 000
In remote areas (ABS/SCRGSP, 2011)	142 000
Who are homeless (ABS, 2011)	27 000
Without an internet connection (ABS, 2011)	247 000 households
Older people (aged 65 and over)	
For whom fixed-line phones are the 'most used' communications service (ACMA/ABS, 2014)	1.8 million
Who don't own a mobile phone (ACMA/ABS, 2013)	868 000
Who have a fixed line but no mobile phone (ACMA/ABS, 2013)	855 000
Who have never accessed the internet (ACMA, 2014-15)	739 000
Who 'prefer not to or will not use digital channels to interact with the Australian Government' (DTO, 2016)	2 million
People with no fixed address	
Homeless (ABS, 2011)	105 000
Homeless in major cities (ABS, 2011)	61 000
Homeless in regional and remote areas (ABS, 2011)	45 000
Users of telehealth	
Patients receiving Medicare telehealth services (DoH, 2011–2016)	145 000
RDFS 'remote consultations' (RFDS, 2015-16)	63 000
Users of distance education (K to Y12) (2016)	
Children aged 4 years in remote areas who accessed early childhood programs (ICPA(Aust), 2016)	280
No. of families who require a distance education tutor (ICPA(Aust), 2016)	4500
Users of emergency services	
Within the NBN satellite footprint with no mobile coverage (PC estimate)	Up to 90 000 premises
People on low income	
Who don't have a telephone (landline or mobile) because they cannot afford it (HILDA/ABS, 2015)	9 000 households
Who don't have access to the internet at home because of cost (ABS, 2016)	200 000 households

^a Estimates have been rounded. ^b Estimates may overlap and should not be aggregated.

7 Universal service policy options

Key points

- As universal service availability will largely be met by the telecommunications market and the National Broadband Network (NBN), any government intervention should be closely targeted to particular user needs rather than involve a retail universal service obligation.
- Options to address universal availability should leverage off NBN infrastructure, as it is designed to provide wholesale broadband (including voice) services to all Australian premises and given the substantial Australian Government investment (\$29.5 billion) in the NBN.
 - The wholesale universal service role of NBN Co Limited (nbn) should be made explicit in legislation.
 - There should be minimal intervention to guarantee the retail provision of broadband services on the NBN. It could involve the Government monitoring retail presence on the NBN with a (non-automatic) trigger for it to competitively tender for retail services where a retail presence is absent and where it is feasible.
 - A future legislative review of nbn should not be conditional on its privatisation and should assess its structure, and the regulatory and funding environment in which it operates.
- The ‘additionality’ of the Mobile Black Spot Programme should be enhanced before proceeding to the third round of funding. This requires: funding areas where it is highly likely that significant additional coverage would result; revising the current approach to sharing of the funded infrastructure; and requiring local community input rather than political input on priority areas to be funded.
- Although the number of payphones has fallen, there may be some limited circumstances in which they, or some other form of community telecommunications service, could be funded by the Government. Any funding of these services should: be flexible as to the form of service to be provided; target locations that do not have an alternative voice service such as a mobile service; target a particular need of a user group; reflect the telecommunications preferences of that user group; and involve competitive tendering where feasible.
- A universal service fund has conceptual appeal in that it could consolidate multiple telecommunications funding programs and enable broad assessments of telecommunications alternatives. However, the administrative effort involved in its establishment and getting its governance right could be problematic and not worthwhile for a small fund. This is likely to be the case where the NBN infrastructure is the primary means of addressing universal availability, and its funding is kept separate. It would be better to ensure that measures to address telecommunications service gaps are trialled and evaluated before any universal fund is established.
- Options to address accessibility, affordability and other particular user needs should be targeted and flexible, facilitate informed consumer choice, and support efficient competition.

As noted in chapter 5, universal telecommunications services bring potential community-wide benefits.

While a competitive and contestable telecommunications market will enable most users to enjoy these benefits, there may be gaps relating to the possible absence of retail service providers (RSPs) on parts of the National Broadband Network (NBN), gaps relating to the quality of voice services provided over NBN Co Limited's (nbn's) satellite network, and accessibility and affordability concerns (chapter 6).

However, government intervention is not always justifiable, even where there is solid evidence of market gaps and particular user needs. This is because the intervention may not generate value for money for the wider community, and may involve high costs relative to the benefits it is trying to achieve in the first place (chapter 5).

This chapter examines policy options in terms of their relative cost-effectiveness in addressing the Commission's proposed universal service objective (draft recommendation 5.1).

As set out in chapter 1 (box 1.1), a universal service policy is likely to be **effective** in meeting a universal service objective **at least cost** to the community by:

- **harnessing markets** where efficient to do so
- **targeting** areas where efficient market solutions are not feasible
- being **technologically neutral**
- promoting efficient **contestability** or **competition** in the telecommunications sector and being **competitively neutral**
- promoting **administrative simplicity** and reducing regulatory compliance burdens
- being sufficiently **flexible** to adjust with future changes.

This chapter begins with a review of general approaches to addressing universal service objectives (section 7.1). It then looks at specific options to address universal service *availability* (section 7.2), which is the primary focus of this chapter. To the extent that these specific options do not meet the differing needs of particular sections of the Australian community — for example, because of concerns about *accessibility* and *affordability* — further policy options are considered (section 7.3). The merits of consolidating these various options within the context of a universal service fund are also examined (section 7.4). The chapter concludes with a discussion of options that address the wider economic efficiency of the telecommunications sector (section 7.5), which may also assist in addressing the Commission's proposed universal service objective.

In examining specific options, the Commission has assumed that there would be a *baseline* standard of quality that would apply to services received by telecommunications users. The Commission has proposed a functional definition in chapter 5 and is proposing that

technical standards underpinning that functional definition be incorporated in the Government’s proposed review of telecommunications consumer safeguards (chapter 9).

The Commission acknowledges that the time taken to transition to, and implement, any reforms will be important in determining how quickly or slowly the wider community benefits. An important factor affecting the pace of reform is the current Telstra USO Performance (TUSOP) Agreement between the Australian Government and Telstra, which is due to conclude in 2032. Transition is considered in chapter 9.

7.1 General approaches to addressing universal service objectives

There are several general approaches to addressing universal service objectives:

- relying on markets but with some minimal safety net intervention
- publicly providing services
- imposing a universal service obligation (USO) on a service provider
- competitive tendering
- directly subsidising users of services.

Establishing a universal service fund is also a general approach to addressing universal service objectives. As noted later, the Commission considers a universal service fund as an administrative arrangement that can combine the above general approaches.

These approaches are not mutually exclusive, and some can operate together. Indeed, many countries including Australia apply a combination of approaches (appendix C). Some approaches tend to be more relevant than others for particular universal service objectives — for example, directly subsidising users may better address accessibility and affordability than availability. And there are different ways for governments to implement the approaches — through regulation, through contract or directly. They also can involve different tradeoffs, particularly in terms of the Commission’s guiding principles for designing a universal service policy (box 1.1).

A minimal safety net

An approach to addressing universal service objectives is to rely on markets and for governments to intervene as a last resort, and only where there is evidence of a gap or problem. The government intervention would be closely targeted to the particular problem. This approach can provide better incentives for the market to operate efficiently as long as the government intervention is not seen as automatic.

This general market-based approach was supported by some participants (DoCA, sub. 58; Optus, sub. 4). It has been applied to the provision of universal voice services in the Czech Republic, Estonia, Germany, the Slovak Republic and Sweden, and to the provision of universal broadband services in Denmark, Germany, Greece, Iceland, the Netherlands and Norway (appendix C). For example, in Germany, while there is no USO and the national regulator (the Bundesnetzagentur) is currently satisfied there is sufficient competition in the market, it has the ability to intervene to ensure universal service provision 12 months after the incumbent notifies it of its decision not to provide universal services.

This market-based approach does not require governments to anticipate or determine a market gap and, thus, can result in effective targeting of universal objectives and avoid the associated costs of determining where the gap may lie. However, the approach does require some degree of government intervention, such as ongoing credible market monitoring by a government agency tied to some trigger for government intervention. To allow for the market to operate efficiently, such government intervention should not be automatic, but occur following an assessment that it is actually warranted. The approach thus involves some level of government administrative cost and compliance burden for providers.

Public provision

The public provision approach to addressing universal service objectives can be implemented in different ways including through governments imposing on their public providers explicit universal service objectives or obligations, or entering into contracts with their public providers to deliver universal services. Indeed, as noted in chapter 6, the government business enterprise, nbn, is effectively a public provider of universal broadband services.

The cost-effectiveness of the public provision approach to addressing universal service objectives depends largely on how government business enterprises are internally structured. Drawing on the Commission's body of work in this area,⁷⁸ features that are likely to enhance cost-effectiveness include that:

- the public provider faces objectives that: are based on clearly specified and evidence-based rationales; are based on clear definitions of universal access and service; involve measurable outcomes; and are subject to regular review (box 1.1 and chapter 5)
- the public provider is in an arm's length commercial-type relationship with the government shareholder, which includes no ministerial or political interference in the provider's day-to-day operations

⁷⁸ The Commission has a long history of assessing government business enterprises commencing with the then Industries Assistance Commission's 1989 report on government (non-tax charges) (IAC 1989). Its most recent assessments in this area have been about the public ownership of electricity network businesses and public infrastructure (PC 2013b, 2014b), as well as in its annual reports on government services (for example, SCRGSP 2016b).

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- the government lends money at commercial rates (or provides an explicit capital contribution) to a public provider that is not financially viable, rather than require that provider to borrow from the financial markets⁷⁹
 - there is explicit funding of the public provider for the delivery of non-commercial services
 - the public provider is required to pay dividends on a commercial basis
 - there is competitive neutrality between the public provider and private providers.

Universal service obligation

A common approach to addressing universal service objectives is through mandating in regulation or imposing in contract an obligation on a provider (or providers) to deliver services (appendix C). This often involves designating a provider, whether publicly or privately owned, as a ‘provider of last resort’ or a ‘universal service provider’ and/or imposing on it a requirement to deliver services ‘upon request’. The provider may be designated without inviting expressions of interest from other providers or through competitive tendering. The USO may be accompanied by funding, but this is not always the case.

As noted in chapter 3, Australia’s telecommunications USO (TUSO) is imposed on Telstra as the ‘primary universal service provider’ under the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth) and the TUSOP Agreement. Telstra receives funding for the delivery of the TUSO. There was no competitive tender involved in designating Telstra as the primary USO provider, although as noted later, a USO contestability arrangement was piloted in 2001.

Placing an obligation on providers to deliver universal services gives users a high degree of confidence that services will be available even though they may be non-commercial. That said, there are some risks (such as ensuring service continuity to the community in the event of the insolvency of a private provider) that cannot be credibly transferred to the private sector. Governments should not only take care to avoid inadvertently paying the private sector for such risks, but also take active steps to ensure arrangements are put in place from the outset to deal with such eventualities (PC 2014b).

It also has the advantage of being market led in that, apart from the requirement for government to implement the USO, it removes any onus on government to identify where services should be provided. However, as evident in relation to Australia’s TUSO in chapter 3, there are costs associated with the USO approach depending on how it is designed. Indeed, how a universal service provider is selected can have implications for competition within the telecommunications sector, with the potential for the provider to

⁷⁹ If the public provider is not viable in its present form (revenues do not exceed costs over the long term) requiring it to borrow more from the financial market will not make it viable unless there are genuine investment opportunities that reduce costs or increase revenues in the long term.

receive a competitive advantage to the detriment of efficiency of the telecommunications sector more broadly.

Competitive tendering

Another market-based approach to addressing universal service objectives is for governments to harness competition within the market through competitive tendering.⁸⁰ Competitive tendering for universal service delivery was previously trialled unsuccessfully in 2001 (box 7.1). Participants offered a range of views on competitive tendering (box 7.2).

Box 7.1 **The Government's previous efforts to introduce contestability in universal service provision**

In 2000, the Australian Government decided to introduce contestability arrangements to enable telecommunications providers contributing to the universal service obligation (USO) subsidy to compete for USO customers and associated subsidies. The arrangements consisted of two parts.

An **extended zones tender** was applied to the most remote 80 per cent of Australia's landmass and involved \$150 million of government funding to a single provider to introduce untimed local calls. Significant carrier investment was required above the \$150 million offered as part of the tender. Telstra was the successful bidder.

A **USO contestability pilot program** was introduced in 2001 in selected regions to test the scope for competition in delivering universal *standard telephone services*, with Telstra declared as the primary universal service provider for all of Australia. The first pilot was located in south-western Victoria and south-eastern South Australia, and a second pilot was located in north-eastern New South Wales and south-eastern Queensland. The pilots were designed to allow the participation of multiple providers who were pre-qualified by the then Australian Communications Authority. Providers could nominate to be a universal service provider in a particular pilot area and would receive a set subsidy for each customer they supplied in that area. Providers were required to supply anyone requesting a service within the nominated area, which meant that potential competitors were required to have a network capable of supplying every individual within the area. The program finished in 2004 with no competing universal service provider registered for the pilot areas.

Sources: ACA (2001); ACCC (2007); DCITA (2004).

Competitive tendering could be applied to obtain services (procurement) or to select a provider (or providers) in order to impose a USO. Where the competitive tender is to determine a USO provider, there is scope to allow the successful bidder(s) to trade their USO with other viable providers.⁸¹ With a procurement approach, the government determines where and what service is delivered, whereas with a competitive tender to

⁸⁰ As with public provision, the Commission has commented extensively on competitive tendering and procurement, for example, most recently in its reports on public infrastructure and public safety mobile broadband (PC 2014b, 2015b).

⁸¹ The Commission did not find examples of USO trading.

impose a USO, the provider has this responsibility (by responding directly to customer requests for service). Austria, Hungary, Portugal and Slovenia are examples of Organisation for Economic Co-operation and Development (OECD) countries that use competitive tendering to determine a USO provider for voice services (appendix C). A procurement approach is typically used in many OECD countries for the delivery of broadband services, which may also involve some degree of co-funding by the provider (appendix C).

Both strategies have advantages and disadvantages, particularly with respect to administration costs for government. For example:

- competitive tendering to select a USO provider to provide retail services over an existing network may involve fewer administrative costs for government (as it does not have to identify disparate multiple service needs) than a procurement strategy
- a procurement strategy may give the provider greater clarity of the scope and costs of the service to be provided than a USO-based competitive tendering strategy.

If there is a sufficient number of potential providers, competitive tendering can create incentives for providers to keep their tender prices close to their best estimates of what would be the technically-efficient cost of delivering the service (chapter 8). If there are few providers capable of delivering the service, the success of the tender in revealing the technically-efficient cost is more questionable. That said, a market with few prospective providers may still be contestable provided that collusion can be prevented.

However, competitive tendering brings additional risks and costs. It may be difficult to motivate providers to act in the best interests of the community in the presence of asymmetric and incomplete information, and there are transaction costs associated with negotiating and contracting with tendering providers.

There may also be a risk of ‘supplier lock-in’ — when the government becomes dependent on the provider for a service and is unable to change the provider without incurring significant switching costs. Supplier lock-in can stem from a provider using non-standardised technology, or making significant and non-recoverable investments.

Competitive tendering may also not work in all situations, particularly where there is insufficient competition, or where the scope of the contract or USO is very broad. This appears to have been the case with respect to the unsuccessful trial of competitive tendering in the telecommunications sector for universal services in 2001 where no providers participated (box 7.1).

Box 7.2 Participants' views on competitive tendering

Competitive tendering was generally supported by several participants (ACCC, sub. 40; Cape York Digital Network, sub. 17; DoCA, sub. 58; Infrastructure Australia, sub. 51, attachment, rec. 6.1; McLaren, sub. 18; and Macquarie Telecom, sub. 27).

Indeed, a 'contestable USO arrangement' was endorsed by the Australian Competition and Consumer Commission with respect to the NBN fixed wireless and satellite footprint. While noting the failure of the previous USO contestability pilots in 2001, it considered that 'circumstances have changed significantly since this time, with greater infrastructure based competition and greater convergence of fixed and mobile services' (sub. 40, pp. 9-10).

Similarly, DoCA supported a 'contestable delivery model' and noted that the earlier pilots occurred at a time when Telstra owned the significant infrastructure required to deliver the then USO, making it difficult for other providers to compete (sub. 58, p. 4).

However, Telstra considered that, with respect to the provision of the current *standard telephone service* USO, it 'seems unlikely that any efficiency benefits from introducing contestability would outweigh the additional administrative complexity to establish arrangements that would be in place, at most, for just two years' (that is, until the expected rollout of NBN infrastructure is completed in 2020) (sub. 30, p. 22). Further, it noted that:

... while contestable arrangements in place for the delivery of infrastructure to new estates has led to better cost-recovery by infrastructure providers and timelier delivery of infrastructure, in some cases it has led to customers in those estates becoming confused as to who is responsible for offering them services over that third party infrastructure and their rights over that infrastructure. We anticipate similar issues would arise in an environment that resulted in multiple [universal service providers]. (sub. 30, p. 22)

Other participants (Broadband for the Bush Alliance, sub. 6; Ninti One, sub. 16) also expressed concerns about market based policy and procurement mechanisms. Broadband for the Bush Alliance noted:

Telstra remains the dominant supplier of a broad range of telecommunications services and is the monopoly supplier of last resort for the domestic transmission carriage service. While co-investment may potentially lead to greater choices available, the reality is that market-based policy and procurement mechanisms have failed in regional and remote areas where there are small, dispersed populations spread over vast distances. (sub. 6, p. 8)

Careful attention, therefore, will need to be given to the design of the competitive tender and resulting tender contract to maximise the potential for efficient outcomes for the wider community, including managing financial risks to government. For example:

- the tender could be split up — by geographic areas, technology, or service — to elicit more competitive bids. However, this needs to be balanced against administrative complexity and other costs with respect to working out how to split the tender and to how to assess the bids
- selection criteria against which tender bids are assessed, and the ranking of these criteria, should be clear and effective
- information on the underlying costings and costing methodologies of the tender bid should be available to the administering agency so that it can determine whether costings are sound

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- the tender contract should be made public as far as possible — to the extent that it does not refer to commercial data, intellectual property or other commercial assets held by the successful tenderer
 - specific performance, reporting and other requirements should be imposed on the successful bidder, which should enhance provider accountability with respect to the tender contract and make it easier for governments and the community to identify whether universal service objectives are being met. Financial risks to government could be managed through the withholding of payments until performance benchmarks are reached, or seeking financial payments for failing to deliver on agreed outcomes
 - the risk of supplier lock-in could be managed by: keeping customisation of equipment (and technology) to a minimum, or insisting on the use of technology that complies with international standards; government retaining ownership of some assets; or aligning the length of contracts with the economic life of assets
 - consideration should be given to the basis of the payment. Where the tender is for services that do not involve infrastructure provision, such as a retail service over an existing network, it may be appropriate for payment to be made to a successful bidder on an end-user basis. Where the tender involves infrastructure provision accompanied with retail services, there may be a need for a lump sum payment combined with an end-user payment; this would better reflect the fixed and variable cost of the tender
 - there should be effective governance surrounding the management of the tender process, the assessment of bids, and administration of the tender contracts. This means that the administering agency should have relevant capacity and expertise.

User subsidies

An approach to addressing universal service objectives, particularly accessibility and affordability, is to directly subsidise users of telecommunications services through welfare payments, vouchers, taxation concessions, price discounts or controls, grants to obtain desired services and the like. Examples of user subsidies relevant to telecommunications services are the Telephone Allowance, Telstra Pensioner Discount and Connected Seniors Program, and tax concessions available to primary producers and to persons living in remote or isolated areas (chapter 4).

User subsidies can enable users to more explicitly determine the amount and type of service they need according to their preferences. They can also encourage competition among providers to acquire users' custom thereby helping to promote innovation and lower costs. These advantages, however, are contingent on the subsidy being untied to particular service providers and technologies, and there being a choice of providers.

User subsidies are typically used to address accessibility and affordability — where services are already available — rather than universal service availability — where services are not yet available. User subsidies may not work so well in the case of universal service availability, as providers need to have a secure and sufficient source of financing to

reflect the relatively high costs of telecommunications services provision, which may be difficult if providers have to raise finance by negotiating with many individual users. That said, user subsidies to address universal service availability could be cost-effective if provided to very large users or a group of users, such as a school, hospital, local council or government agency, rather than to an individual person or household.

Universal service fund

A universal service fund is an arrangement used in other countries to fund universal telecommunications services (ITU 2013; appendix C; Ladcomm Corporation 2013). A notable example is the US Federal Communications Commission Universal Services Fund, which addresses the availability of infrastructure services to high cost (rural) areas as well as service affordability for low-income customers, and health providers, schools and libraries in rural areas (box 7.3).

The cost-effectiveness of a universal fund in addressing universal service objectives depends crucially on its design and critical mass including: its governance, whether it harnesses competitive tendering; and whether the instruments used within the fund are themselves cost-effective. For example, with respect to governance, ideally, the fund would be administered by an independent statutory agency with relevant expertise and a predictable source of funding.

7.2 Options to address universal availability

With these general approaches in mind, the Commission has identified a number of specific options to address universal availability using NBN infrastructure as leverage. Several participants and others (Gregory, sub. 9; Optus, sub. 4; Vodafone Australia, sub. 46) supported leveraging off the NBN, particularly given its current role and the substantial government investment in it. The Commission has also identified specific options relating to mobile services, as well as to payphones and other forms of community telecommunications. An overview of options to address availability, accessibility and affordability is given in figure 7.1 (at the end of this chapter).

Leveraging off the NBN

As universal service availability is being met by NBN infrastructure, any further government intervention should be targeted to particular market gaps and user needs. It should harness a market-driven approach, where possible, rather than the current TUSO approach. Government intervention should also reflect the complementary role of mobile services.

Box 7.3 **The US Universal Services Fund**

In 1996, the US Congress passed the Telecommunications Act, which mandated the creation of the Universal Service Fund. The Fund was established by US Federal Communications Commission (FCC) in 1997.

Under the Act, the Fund seeks to support universal service and promote delivery of telecommunications services to under-served rural and urban areas (section 714). The universal service principles set out in the Act include that: quality services should be available at just, reasonable and affordable rates; access to advanced telecommunications and information services should be provided to all regions; and consumers in all regions, including low-income consumers and those in rural, insular, and high cost areas, should have access to advanced telecommunications and information services that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas (section 254).

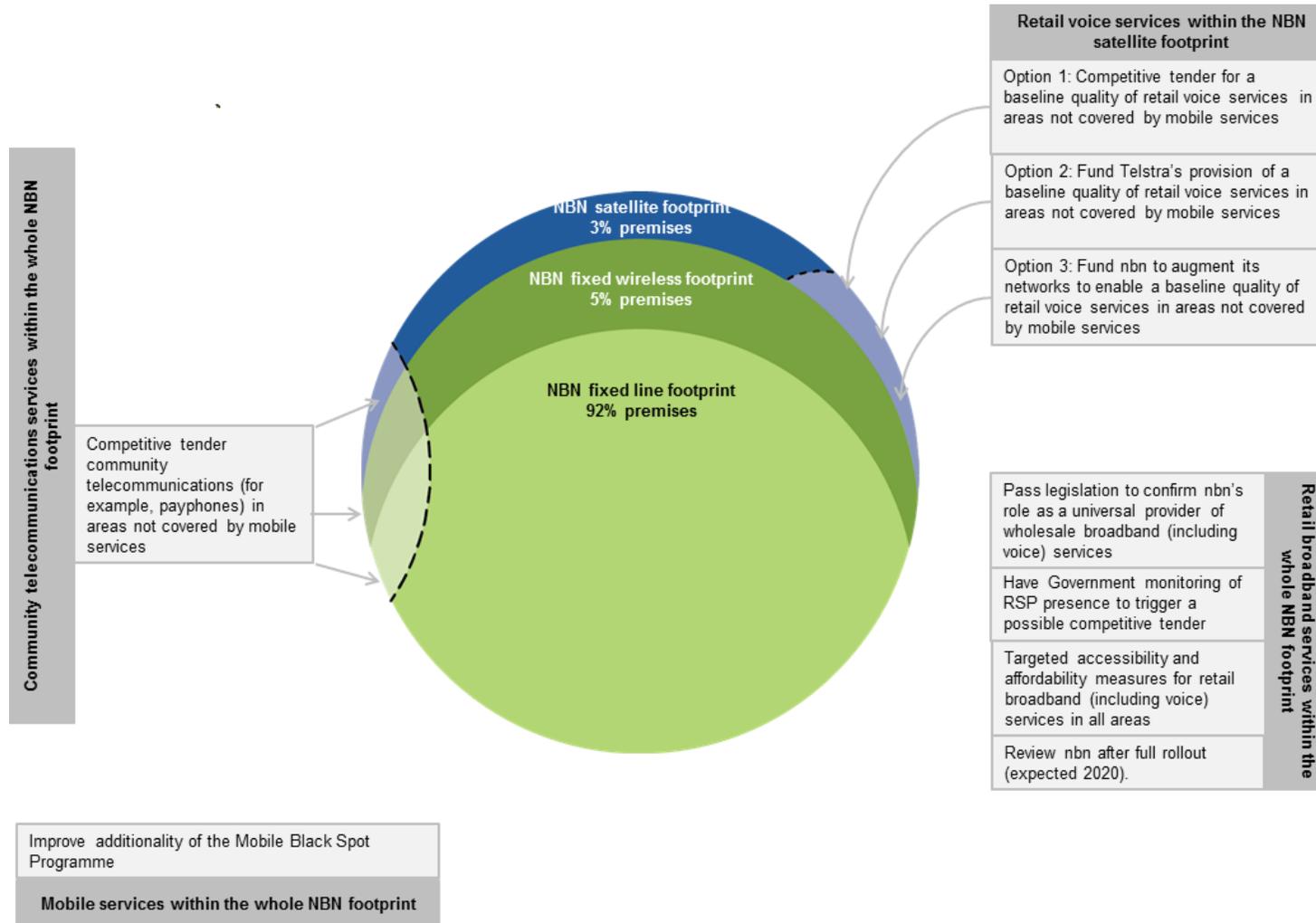
The Fund provides for universal services through four programs: a high cost support mechanism that provides support to certain qualifying telephone companies that serve high cost areas; a low-income support mechanism that assists low-income customers by helping to pay for monthly telephone charges as well as connection charges to initiate telephone service; a rural health care support mechanism that allows rural health care providers to pay rates for telecommunications services similar to those of their urban counterparts, making telehealth services affordable; and a school and library support mechanism (known as the E-Rate) that provides a range of telecommunications services to eligible schools and libraries.

The Fund is administered by the Universal Service Administrative Company. The functions of the Company include: administering each of the programs; billing contributors, collecting and disbursing universal service support; and reporting quarterly to the FCC on disbursements. The Company has a 19 member board of directors representing different interest groups affected and interested in universal services. Members are nominated by their respective interest group and approved by the FCC Chairman. The Company also has an executive team that manages the day-to-day operations of the Fund, formed by experienced professionals with expertise in business, administration, accounting and legal matters.

All providers of interstate and international telephone and voice over internet protocol services must contribute to the Fund. Contributions are based on projected quarterly earnings reported to the Company. However, providers are exempt where reported revenues are such that their calculated contribution is less than USD10 000.

Sources: Appendix C; Federal Communications Commission (2016); ITU (2013).

Figure 7.1 Options to address universal service availability, accessibility and affordability



Clarifying the universal service role of nbn

As noted in chapter 6, nbn is effectively a universal provider of wholesale broadband services, which includes wholesale voice services.

nbn's universal service role is currently enshrined in ministerial statements of expectations, Australian Government policy documents, and nbn documentation (such as nbn's *Corporate Plan 2017*). This means that there is scope for discretionary changes in objectives for nbn by Government and, with that, community uncertainty about nbn's future role.

While a degree of flexibility in Government directives (as a shareholder) to nbn as the NBN rolls out may be reasonable, the Commission considers that nbn's universal service role should be made more explicit in legislation, particularly following the full rollout and before any privatisation of nbn is considered. This would provide the community with confidence about the ongoing delivery of services, especially if nbn is privatised in future.

The Government's proposed statutory provider legislation is a good opportunity for this to occur. It is the Government's stated intention for nbn to be the statutory infrastructure provider of last resort and to introduce legislation to this end (appendix B). This legislation could also provide more formal (and certain) backing to the quality of service to be provided by nbn over its networks.

DRAFT RECOMMENDATION 7.1

The Australian Government should introduce legislation as soon as possible to make explicit the role of nbn as a universal service provider of wholesale broadband services. The legislation should be in place before any decision by the Australian Government to privatise nbn.

A minimal safety net for retail broadband services on the NBN

While it is unlikely that RSPs would not seek to connect to the NBN to offer retail services to Australian premises (chapter 6), there is merit in giving assurance to communities, particularly in regional and remote areas, that NBN infrastructure is designed to deliver universal access to broadband services. If the Australian Government considers it desirable to guarantee retail service provision on the NBN, this should be in a minimal form by linking the state of retail presence on the NBN to a trigger for possible further intervention. The intervention should not be automatic, but depend on an Government assessment of its relative cost-effectiveness, including its feasibility.

This minimal safety net could consist of the Australian Government monitoring retail service provision on NBN infrastructure and to step in to competitively tender for service delivery where it considers that this is absent. The Government could intervene by:

- putting to a competitive tender the delivery of a *baseline* retail service
- invoking a reserve power to require a provider to meet a USO to provide a *baseline* retail service, with the provider selected through an earlier competitive tender.

In assessing a competitive tender, the Government should be agnostic as to the technology used as long as the technology complies with *baseline* quality requirements. Any contracts negotiated should be carefully time-limited to allow for future developments and not impede the adoption of new technologies or the entry of new retailers.

This option allows the Government to intervene only after a problem becomes apparent, with the intervention harnessing market forces for service delivery. Of the two forms of government intervention, invoking a reserve power to require a provider to meet a USO may give greater certainty to customers that they will receive services within a reasonable time. The existence of a reserve power can also create an incentive on RSPs who are not designated to meet a USO to maintain a retail presence on the NBN. That said, as noted earlier, the Government should not expect that this form of intervention would allow it to abdicate all risks, such as in the likelihood of the provider becoming bankrupt.

DRAFT RECOMMENDATION 7.2

The Australian Government should ensure that any further intervention with respect to guaranteeing retail service provision over NBN infrastructure is minimal. This should involve monitoring by the Australian Government of retail presence on NBN infrastructure and, if necessary, contracting one or more retail service providers to service geographic areas lacking retail presence.

Addressing the provision of retail voice services within the NBN's satellite footprint

NBN infrastructure is expected to fully deliver on a *baseline* broadband (including voice) service within its fixed-line and fixed wireless footprints (chapter 6).

However, there is a question as to whether further government intervention may be warranted for the provision of retail voice services within the NBN's satellite footprint to the estimated small number of premises that are not able to receive an alternative voice service, such as a mobile service.

The Commission is seeking further feedback on whether nbn's satellite voice services meet an acceptable *baseline* standard, including information about alternatives to nbn's *Sky Muster* satellites for voice services, and their relative merits and costs.

Should this feedback demonstrate, to the Government's satisfaction, that nbn's satellite voice service does not meet an acceptable *baseline* standard, the Commission has identified three options. However, any government intervention should only be justified if there is a net benefit to the Australian community. These options target the provision of voice services to premises within the NBN satellite footprint that do not receive mobile coverage (acknowledging the complementary role of mobile services). The options could also be married to the provision of emergency voice calling services (chapter 6). Any further intervention targeting these premises would need to ensure that it does not crowd out further technological advances or mobile phone coverage expansion. The options assume technical standards underpinning the Commission's proposed functional definition of a *baseline* voice service will be determined under the relevant consumer safeguard framework (chapter 9).

Option 1. Introduce a competitive tender arrangement for the delivery of a baseline voice service to premises within the NBN satellite footprint where there is no mobile coverage

The Government could put to competitive tender the provision of a *baseline* voice service, or to select a provider to meet a USO to provide a *baseline* voice service to premises within the NBN satellite footprint that do not have any mobile coverage. Telstra, nbn, mobile operators, providers of low earth orbit satellites and other telecommunications providers could bid for these services. The tender could be broken up by geographic areas or communities.

Under this option, successful bids would be selected on their cost-effectiveness in addressing universal service availability regardless of the particular technology used. Technological solutions that could be considered include harnessing Telstra's existing radio, USOSat and copper networks, expanding mobile coverage, subsidising low earth orbit satellites, or expanding the nbn's fixed wireless network.

The design of the competitive tender could be led by the Australian Communications and Media Authority (ACMA) (given its technical expertise with respect to different technologies, and prior history in designing the USO contestability arrangement in 2001), in consultation with the Australian Competition and Consumer Commission (ACCC) (given its expertise in assessing competition in markets). The tender contract should be made public as far as possible.

Option 2. Fund Telstra's provision of a baseline voice service within the NBN satellite footprint where there is no mobile coverage

The Government could continue to designate Telstra as the primary universal service provider of voice services within the NBN satellite footprint using its networks (that is, its radio, USOSat and copper networks), but only in areas that receive no mobile phone coverage.

While this option provides a more targeted solution to the delivery of a *baseline* voice service than is currently available under the TUSO, it does not encourage competition for the delivery of voice services. It would still involve the funding of a ‘parallel network’ to that of the NBN, albeit one that provides better voice quality services than those provided over nbn’s satellite network.

Option 3. *Fund nbn to augment its networks to deliver a baseline voice service within the NBN satellite footprint where there is no mobile coverage*

This option recognises that the main costs of providing a *baseline* voice service relates to the provision and maintenance of infrastructure, rather than in the provision of retail services. For example, nbn could apply the funding to reduce the size of the NBN’s satellite footprint through more fixed wireless infrastructure, or it could invest in low cost satellite technology that offers low latency and/or better reliability. However, this option focuses any further solution on nbn, rather than soliciting competing technological alternatives or competing providers that may be more cost-effective.

Of these three options, the Commission’s preference is for the Government to proceed to a competitive tendering arrangement as set out in option 1 if it decides that the quality of voice service over nbn’s satellite network does not meet an acceptable *baseline* standard.

Future review of nbn

Given the key role that nbn is likely to play in the delivery of universal telecommunications services, its public ownership, and the regulatory and funding environment surrounding its operation have important implications for the efficiency and effectiveness of service delivery within the whole telecommunications sector. Some participants and others have raised concerns about nbn’s impact on competition within the telecommunications sector, its public ownership, wholesale price caps, and future funding — for example, the Australian Government Competitive Neutrality Complaints Office (AGCNCO 2011); Budde (2016a, 2016b); de Ridder (sub. 56); Fletcher (2015); Hackett (Potter and Mason 2016); the Technology Policy Institute (Sorensen and Medina 2016); and Tsang (2016a).

There is currently scope within nbn’s enabling legislation — the *National Broadband Network Companies Act 2011* (Cth) — for a Productivity Commission inquiry into nbn following the full rollout of NBN infrastructure as a precursor to its privatisation (box 7.4). The Commission considers that nbn should be reviewed regardless of whether or not privatisation is contemplated. The review should include the impact of the regulatory framework to which the nbn is subject on the economic efficiency of the telecommunications sector, including effects on competition in the wholesale broadband market, and wholesale and retail prices. The review should also consider those matters set out in legislation including the impact of any sale of the Australian Government’s equity in nbn on the Australian Government’s budget, the supply of affordable carriage services and

competition in telecommunications markets. This will require changes in nbn's enabling legislation to implement.

Box 7.4 Future Productivity Commission review of nbn

The *National Broadband Network Companies Act 2011* (Cth) (the Act) provides for the termination of Commonwealth ownership of nbn after a number of specific events occurs:

- the Communications Minister has declared that the NBN should be treated as built and fully operational
- a Productivity Commission inquiry report has been tabled in Parliament
- a Parliamentary Joint Committee has examined the Productivity Commission's report
- the Finance Minister has declared that conditions are suitable for entering into and carrying out of an nbn scale scheme (section 47).

Under the Act, the Productivity Commission inquiry is to cover the following matters, the:

- regulatory framework for the NBN
- impact on future annual Commonwealth budgets of a sale of the Commonwealth's equity in nbn on:
 - future annual Commonwealth budgets
 - the supply of affordable broadband carriage services and other carriage services
 - equity and social inclusion
 - competition in telecommunications markets (section 49 (2)).

In holding the inquiry, and in preparing its report, the Act requires the Productivity Commission to have regard to a number of specific matters, including:

- equity of access to broadband carriage services in metropolitan, regional, rural and remote areas
- competition in, and structural features of, telecommunications markets
- power in telecommunications markets, including whether an NBN corporation has a substantial degree of power in any telecommunications market
- ownership and control of NBN corporations, and of carriers or service providers by NBN corporations
- structural organisation of NBN corporations
- bundling of services supplied, or proposed to be supplied, by NBN corporations
- retail prices of services supplied using the NBN
- restriction of the investment activities of NBN corporations
- geographical coverage of the NBN
- technology used in connection with the NBN
- the need for maintenance, replacement and upgrading of technology used in connection with the national broadband network
- any other matters specified by the relevant minister (section 49(4)).

DRAFT RECOMMENDATION 7.3

The Australian Government should amend the *National Broadband Network Companies Act 2011* (Cth) (the Act) to ensure that the planned Productivity Commission review of nbn following the full rollout of NBN infrastructure occurs regardless of whether or not privatisation is being contemplated. The review should cover the impacts of nbn on the economic efficiency of the telecommunications sector as well as all the matters already specified in section 49 of the Act.

Enhancing customer information about the NBN

Some participants and others have raised concerns that customers are confused and lack information about the NBN, including how to connect to the NBN and who — whether nbn or the retail service provider (RSP) — has responsibility for faults. For example, the Association for Children with Disability (Tas) said that:

The Current Government National roll-out of the NBN and serious connectivity issues that have ensued are threatening [the Association's] ability to provide even the most basic telecommunications access to our consumers. (cited in Tasmanian Government, sub. 57, p. 3)

The Australian Communications Consumer Action Network (ACCAN) considered that:

As the NBN reaches scale, wholesale service standards will be more important as nbn is responsible for the performance of the underlying access network. Existing wholesale obligations do not adequately protect consumers. The Wholesale Broadband Agreement ... is an agreement between nbn and its retail customers (e.g. Telstra, Optus and TPG), and its focus is on network management rather than consumer demand. (sub. 48, p. 16)

Some participants suggested improvements including the introduction, or greater clarity, of legal responsibilities to customers for service quality on the NBN (ACCAN, sub. 48; Australian Small Business and Family Enterprise Ombudsman, sub. 39; National Farmers' Federation, sub. 31; Telecommunications Industry Ombudsman, sub. 52). For example, the National Farmers' Federation suggested that:

... transparent standards for a minimum service provision between wholesalers (nbn) and retailers, and between retailers and customers should be set. These should be independent of any contractual arrangements and they should be readily available and be written in plain English. There must be a body assigned the responsibility to monitor this and a body for customers to report arising issues. The PC should consider if a declaration of service by the Australian Competition and Consumer Commission is the appropriate means to achieve a service guarantee between telecommunication wholesalers, retailers and customers. (sub. 31, p. 17).

ACCAN suggested that, where relevant, obligations for fault rectification, connections and appointment keeping should be placed on the wholesale provider (that is, nbn) with these obligations including 'whole of network performance obligations, as well as remedies for individual consumers' (sub. 48, p. 16).

Some customer difficulties in relation to NBN infrastructure (box 7.5) are likely to be a transitory problem as the NBN rolls out. The Commission notes that nbn is undertaking a media campaign to advise consumers on where to seek information about connecting to the NBN. ACCAN also provides information to consumers through its website on various matters relating to the NBN and accessing a broadband service. For example, its *Get Connected* resource aims to give consumers general information about why they are unable to get a broadband service and tips on how to get a service (ACCAN 2016). The Facebook group, Better Internet for Rural, Regional and Remote Australia, also assists individual consumers with specific NBN-related questions.

As to the lack of consumer clarity and confusion about legal responsibilities for service quality on the NBN, the Commission considers that high service (high price) RSPs will be more diligent in assisting their customers and providing alternatives (for example, during outages). However, this is a matter that should be further investigated in the Government's planned review of consumer safeguards in the telecommunications sector (chapter 9).

**Box 7.5 Complaints to the Telecommunications Industry
Ombudsman about the NBN**

In its annual report for 2015-16, the Telecommunications Industry Ombudsman (TIO 2016) noted that consumer complaints about faults with the NBN rose by about 150 per cent from the previous year (2014-15), while general complaints about the NBN almost doubled to about 13 400.

The TIO considered that the increase in complaints is to be expected given the accelerating rollout of the NBN. It said that it is 'positive that the rate of growth in the number of active services on the NBN is greater than the growth in complaints about services delivered over the NBN' (2016, p. 15).

The main complaints raised about the NBN were: faults, including slow data speeds, unusable services and drop outs; and connections, including connection delays and missed appointments.

However, the TIO noted that some complaints were not related to the connection or performance of the NBN and may be about a bill or customer service. It also noted that it registered only few complaints against nbn with the majority of complaints were against retail service providers 'because these are the organisations that the consumer deals with to order the connection and report faults with the service' (2016, p. 15).

Mobile services

The mobile sector has developed largely on a market-driven basis (chapter 2). The three network operators — Telstra, Optus and Vodafone Australia — have continued to improve their service coverage, with 99.3 per cent of Australia's population now having access to at least one mobile voice service provider. Coverage, particularly into regional and remote areas, continues to expand through initiatives such as the Mobile Black Spot Programme.

Mobile services are seen by many participants and others as already having a role — or being an effective alternative to current TUSO services — in addressing universal service objective, with some arguing in favour of diverting current TUSO funding to expanding mobile services or the NBN footprint (Infrastructure Australia 2016b; National Farmers’ Federation, sub. 31; Victorian Farmers Federation, sub. 32).

Participants’ suggested options for mobile services in this inquiry have focused on the Mobile Black Spot Programme, making better use of the NBN for mobile service delivery, and encouraging inter-carrier roaming.

Mobile Black Spot Programme

The Mobile Black Spot Programme was widely supported by participants. For example, Optus considered that the program ‘offers a useful alternative form of targeted funding where gaps in service provision are identified’, but that the benefits and costs of its extension should be examined (sub. 4, pp. 26, 29). Vocus supported the co-funding aspect of the program as an ‘appropriate funding construct’ as it ‘better reflects the costs of provision and considers the need for achieving economic returns in a competitive environment’ (sub. 33, p. 4). And DoCA considered that the program was an example of targeted government intervention that was an ‘effective response’ to market failure, which provides an incentive to network owners to maximise coverage in areas that would not otherwise be commercially viable without negatively affecting competition in the mobile services market (sub. 58, p. 4).

However, some participants expressed concerns, or noted limitations, including whether the program simply allows Telstra to expand its mobile network, the workability of conditions intended to facilitate mobile infrastructure sharing, and whether it is effective in addressing coverage in remote communities. For example, Vodafone Australia (sub. 46) suggested that the program imposed more extensive obligations on successful tenderers in future funding rounds, which could involve more active forms of infrastructure sharing as well as be extended to subsidise operating expenses. McLaren noted that the program would require significant subsidies to continue to increase mobile coverage in regional and remote areas and will ‘never be able to cover all Australians. The geographical challenge is too great and the rollout of mobile networks impractical’ (sub. 18, p. 5). The National Farmers’ Federation considered that the program may have ‘inadvertently reinforced Telstra’s comparative advantage in the provision of mobile services across regional Australia’ (sub. 31, p. 11). And the Regional Australia Institute likened the program to ‘fixing potholes in the regional network’ (sub. 50, p. 10).

The Commission notes that, based on the current version of the program guidelines (DoCA 2016f), the program has a number of features that could contribute to its ‘additionality’ and cost-effectiveness in meeting program objectives.⁸²

⁸² The additionality of a government program is the extent to which it which to contributes to intended outcomes compared with what might otherwise have occurred in the absence of the program.

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- Applicants are required to make a ‘substantial’ financial contribution to the capital costs of building each funded base station, and are also ‘strongly’ encouraged to seek financial or in-kind co-contributions from state, territory and local governments, local communities and other third parties. This requirement should enable public funding to be directed only to areas where key beneficiaries have ‘skin in the game’ thereby resulting in a reasonable sharing of financial costs and risks.
 - Applicants must certify that any proposed base stations are not at any time part of their forward network expansion plans. This requirement should reduce the risk that public funding is not used to finance previous commercial investment decisions.
 - Weight is given to applications that result in expanding the mobile coverage footprint or benefiting more premises, major transport routes and passenger rail corridors with new mobile coverage. This feature should increase the scope for public funding to result in genuine additional mobile coverage benefits
 - Weight is given to applications that promote sharing, co-building and inter-carrier roaming. Successful applicants must give other mobile network operators the opportunity to co-locate and to participate in the detailed design phase using a specified process. Such infrastructure sharing provisions should increase the scope for public funding to enhance spillovers.

However, despite the potential for the program to address additionality, the Australian National Audit Office (ANAO) found ‘mixed results’ in this regard (2016, p. 9).⁸³ In its audit of the first round of the program the ANAO found that, while handheld coverage was expected to increase by 68 000 square kilometres into new areas under the program, up to 39 of the 499 selected base stations were built in the same or similar areas (according to applicants’ forward network expansion plans) without the need for public funding. Further, up to 89 base stations provided minimal new coverage of additional premises and kilometres of transport routes. The ANAO considered that the award of Australian Government and state and territory government funding of \$29 million (out of a total program funding of \$202 million) for these 89 base stations ‘undermined the value for money outcomes’ achieved from the program and that the extent to which competition is improved under the program through the use of infrastructure by multiple operators is ‘yet to be determined’ (2016, p. 9).

The criteria used by the department [DoCA] to assess the merits of each proposed base station did not sufficiently target funding toward the expansion of coverage where coverage had not previously existed As a consequence, public funding has resulted in substantial consolidation of existing coverage provided by grant applicants, as opposed to extending coverage in new areas — a key objective for the programme. (ANAO 2016, p. 8)

Despite the program having provisions that encourage infrastructure sharing, it is unclear whether these are actually effective. The ANAO noted that applicants in the first round of funding did not include any commitments from an additional operator to co-locate their equipment on proposed base stations, but most (86 per cent) were capable of supporting an

⁸³ The ANAO based their audit on the first version of the program guidelines, which is largely similar to the current version.

additional operator and some (14 per cent) were yet to offer network roaming. As at March 2016, negotiations on co-location between operators had not been finalised (ANAO 2016, p. 49). Requiring some form of infrastructure sharing is likely to improve the ‘additionality’ of the program.

The program also gives some weight to applications that cover locations ‘identified as a priority’ by a federal Member of Parliament representing an eligible electorate. The ANAO considered that, while the involvement of members of parliament in an assessment process for a Commonwealth grants program was ‘novel’, the program guidelines indicated that members of parliament ‘will have information regarding the specific local issues and the locations within their electorates that are in greatest need of mobile coverage’ (2016, p. 22). However, it concluded that the coverage of Member of Parliament priority nominations ‘was not a significant factor in the success’ of individual proposals (2016, p. 46). Despite the ANAO’s finding, the Commission is concerned that there is a risk that Australian Government funding is directed at expanding mobile coverage in locations for political reasons rather than to locations where overall community wellbeing might be better served. Other repositories of knowledge are local government and community groups who could also be effective alternatives to politicians.

A more fundamental concern about the Mobile Black Spot Programme is how it is not integrated or coordinated with other Australian Government telecommunications funding programs such as the current TUSO, the NBN, or telecommunications services in remote Indigenous communities. The lack of coordination between these programs is inimical to an outcome whereby government funding is directed to the most cost-effective communications alternative for particular locations.

The ANAO recommended that DoCA implement several measures to improve the effectiveness of the program — namely, that the department establish minimum scores for assessment criteria, implement a detailed assessment methodology tailored to the program’s objectives, and implement a performance measurement and evaluation framework for the program.

The Commission notes that DoCA has agreed to these recommendations. The Commission further considers that there is a need to strengthen the ‘additionality’ of the program before the Government proceeds to the third funding round through the following tailored measures:

- targeting the program only to areas where funding is highly likely to yield significant additional coverage — for example, highways, townships and popular tourist destinations
- introducing a requirement for some form of infrastructure sharing (whether co-location, roaming or other) rather than have this as a selection criterion
- replacing political input as to identifying priority areas with input from key local community groups such as local government authorities, regional development councils and Indigenous land councils.

DRAFT RECOMMENDATION 7.4

Before proceeding to the next round of funding under the Mobile Black Spot Programme, the Australian Government should implement the Australian National Audit Office's recommendations relating to that program. It should also: target the program only to areas where funding is highly likely to yield significant additional coverage; revise its infrastructure-sharing requirements to be consistent with the Australian Competition and Consumer Commission's findings in the ongoing Domestic Mobile Roaming Declaration Inquiry; and prioritise areas for funding based on community input — rather than nominations from Members of Parliament.

As noted later (section 7.4), this program and others could be rolled into a universal service fund to ensure that funding to address the availability of mobile services in rural and remote areas is considered alongside telecommunications services alternatives.

The use of nbn's networks by mobile operators

Some participants and others argued for more effective use of the NBN for the delivery of mobile services. For example, Vodafone Australia proposed that mobile coverage could be expanded by better leveraging off the NBN through: improving access to the NBN's transmission network and satellite capacity which could be used for backhaul for mobile base stations; nbn offering its infrastructure to provide services at an incremental cost; improving sharing of nbn's fixed wireless tower sharing; nbn delivering a wholesale mobile service via its fixed wireless towers; and sharing of nbn's 'gifted' spectrum allowance (sub. 46, pp. 21-2). The South Australian Government suggested that nbn develop a project plan to assist the industry expand competitive mobile services in regional Australia by providing access to NBN backhaul and by upgrading its fixed wireless towers to develop a wholesale 4G regional mobile network (sub. 60).

The Commission notes that:

- the *Telecommunications Act 1997* (Cth) (schedule 1, part 5, section 38) requires all carriers to share sites containing antenna supporting structures where technically feasible, when requested by another carrier
- nbn considered the scope for leveraging off the NBN fixed wireless network to extend mobile coverage in its 2014 fixed wireless and satellite review (nbn 2014b) and noted a high degree of overlap between the NBN and existing mobile networks. This suggests limited opportunities for co-location
- nbn is already examining the commercial viability of using its backhaul to connect mobile network operators to its cell towers through the NBN fibre network and has released an interim agreement for its cell site access services (Tsang 2016e, 2016c, 2016f)

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- the Mobile Black Spot Programme encourages consultation with nbn regarding the use of its fixed wireless network vis a vis mobile services with nbn establishing a contact point for applicants to discuss possible opportunities for co-location of equipment and possible joint participation in the program (DoCA 2016f). DoCA expected 50 proposed base stations to co-locate with the NBN, whereas the ANAO estimated that at least 32 were likely to be co-located due to their close proximity to nbn's current or proposed fixed wireless towers (2016)
 - nbn acquired its original 2.3 gigahertz (GHz) and 3.4GHz spectrum licences in 2011 for about \$121.3 million (nbn 2014b). It spent another \$22.6 million on the reissue of its 2.3GHz spectrum licence to July 2030. There is no evidence that nbn has been gifted, or otherwise favoured, with respect to spectrum.

The Commission considers that many of the suggestions about the use of nbn's networks for mobile service are matters for nbn to determine in accordance with its assessment of their commercial viability. It would be inappropriate for the Australian Government to interfere and require nbn to share its networks or to engage in enabling mobile services where it is not commercially viable for it to do so without due consideration being given to any additional costs or losses to nbn that this may involve. That said, any regulatory barriers to nbn exploiting its infrastructure for commercial advantage should be removed.

Inter-carrier roaming

Some participants and others raised the option of encouraging inter-carrier roaming such as through a declaration by the ACCC (for example, Infrastructure Australia, sub. 51; Remote Area Planning and Development Board, sub. 12 Victorian Farmers Federation, sub. 32; Vodafone Australia, sub. 46). They argued that this would enhance competition in the provision of mobile services, particularly in regional and remote areas; that the lack of competition has resulted in high prices, little consumer choice, little incentive for the principal carrier (Telstra) to respond promptly and sufficiently to consumer complaints; and that roaming is regulated and operates successfully in other countries such as the United States, Canada and New Zealand.

Optus and Telstra, however, argued that an ACCC declaration may risk undermining incentives for continued competitive investment in regional and remote areas (Long 2016; Warren 2016). Telstra considered that:

Where there is lack of choice for regional Australians, it is because our competitors have made the decision not to invest in those areas.

Regulating mobile roaming would take away our ability to offer customers a better experience and bigger mobile network than any of our competitors. Regulated roaming would mean there was virtually no reason for any mobile phone company to invest in new coverage or better technology. (Warren 2016)

The Commission notes that the ACCC commenced an inquiry in September 2016 into whether or not to 'declare' a wholesale domestic mobile roaming service (ACCC 2016a).

The inquiry will focus on such issues as how consumer demands for mobile services are evolving, and whether there are differences in regional areas and urban areas; the likely investment plans of each of the mobile network operators to extend coverage and upgrade technology, absent a declaration; whether there are any significant barriers to expanding the reach of mobile networks; and any lessons from similar experiences with domestic mobile roaming in other countries. The ACCC has previously considered mobile roaming in regional areas in inquiries held in 1998 and 2005. On both occasions, it decided not to regulate an access service as it was satisfied roaming agreements were being commercially negotiated.

Payphones and other forms of community telecommunications

Consistent with trends in OECD countries, payphones have declined in number in Australia over the past decade with the take up of mobile phones likely to have been an important influence (chapter 2 and appendix C).

About 50 per cent of OECD countries, including Canada, New Zealand and the United States, have no USO with respect to payphones (appendix C). Some countries rely on their markets to deliver payphone services. And other countries competitively tender for payphone services in certain circumstances. For example, Chile's Telecommunications Development Fund was initially established primarily to support the extension of a payphone network in rural areas through competitive tendering (CITEL 2000).

While the Commission has found that the TUSO with respect to payphones is not fit for purpose, there may be some limited circumstances in which some form of community telecommunications service — such as a payphone, community WiFi or phone charging station, or telecentre — may be more cost-effective than connecting to a *baseline* service on the NBN. For example:

- in remote Indigenous communities, where payphones and community WiFi can meet their cultural needs (Swinburne Institute for Social Research, sub. 45)
- in locations where there is no adequate voice service alternative such as a mobile service (ACCAN, sub. 48; South Australian Government, sub. 60; Tasmanian Government, sub. 57; Telstra, sub. 30)
- for people who are homeless, do not own a mobile phone, or are domestic tourists (Remote Area Planning and Development Board, sub. 12).

Some state, territory and local governments are already procuring or entering into partnerships with the private sector to provide community WiFi services (including, the Tasmanian Government, Northern Territory Government with respect to its remote libraries, and Brisbane City Council) that include free voice calling, broadband and charging services (chapter 4).

If the Australian Government considers that support for payphones and other forms of community telecommunications services is desirable, a specific funding program for community telecommunications services would seem advantageous. The program could operate as a procurement program (as with the Department of the Prime Minister and Cabinet’s current funding of remote community telecommunications services) or through competitively designating a provider with a USO.

Any such program should be designed to ensure that it:

- targets locations where premises do not currently have an alternative voice service such as a mobile service and/or it targets a particular need
- does not duplicate existing state, territory and local government investment in community telecommunications services
- is flexible as to the form of community telecommunications service to be provided
- reflects the preferences of local communities
- provides for a competitive tender process to allocate funding, with the tender designed to maximise the scope for efficient competition while keeping administration costs low — for example, rather than a single tender for the provision of payphones for the whole of Australia, there could be several tenders tied to service specific areas or communities
- allows a range of community telecommunications services to be assessed against each other (for example, the deployment of community WiFi instead of payphones).

The program could absorb the Department of the Prime Minister and Cabinet’s current funding of remote community telecommunications, which targets remote Indigenous communities (chapter 4). The option of an Indigenous-specific program is considered in the next section.

DRAFT RECOMMENDATION 7.5

The Australian Government should establish a funding program for a form of community telecommunications service (such as payphones) that targets locations where premises do not currently have a satisfactory alternative voice service, such as a mobile service. This program should target particular needs and be flexible for delivery to such communities. This program should involve a competitive tendering process to allocate funding.

7.3 Options to address the differing needs of particular groups

For some user groups within the Australian community, the options that address universal availability described above in section 7.2 may not be sufficient to meet their particular telecommunications needs in the absence of the current TUSO.

These groups include members of the community who governments have traditionally chosen to support on social equity grounds: people on low income; people with disability or life-threatening conditions, Indigenous people living in remote communities, some older people with limited digital literacy capacity, and people who do not have permanent premises (for example, homeless people and domestic tourists) (chapter 6). While the needs of these groups primarily concern service accessibility and/or affordability, they may also relate to service availability — for example, the relatively strong preference of some groups for mobile phones or community telecommunications services (such as payphones) over premises-based services because they do not have a permanent residence.

There is already a range of disparate government measures in place to target these differing needs (chapter 4). The Australian Government has also imposed measures on providers such as Telstra (outside of the current TUSO) and nbn to address the particular needs of some consumer groups (chapter 6).

A number of options to improve on these measures, or for new measures, were suggested by participants and others. These include the following suggestions.

- *Revision and update of the Telephone Allowance.* ACCAN considered that future affordability measures should be independent of RSPs to give consumers choice in their provider, which could be achieved by: providing financial assistance to consumers for services and devices through a revised Telephone Allowance; requiring all RSPs through their carrier licence conditions to offer low-income support and services; nbn providing eligible end users with a coupon or voucher for discounted services to be redeemed from their choice of RSPs, which could in turn claim from nbn (sub. 47).
- *Revision and expansion of National Relay Service.* ACCAN (sub. 48) suggested that the National Relay Service should be expanded to include services for deafblind and multilingual consumers, with all services offered 24 hours a day. Australian Communication Exchange (sub. 22) suggested the introduction of a portal to prevent providers from using proprietary products that do not ‘talk’ to each other could add value to the National Relay Service. It also considered that a registration process for National Relay Service users could be accepted by the hearing and speech impaired community if it meant retaining their equivalent communication services.
- *Measures to address the needs of Indigenous people living in remote and very remote communities.* Broadband for the Bush Alliance (sub. 6) and Ninti One (sub. 16) considered that, in order to address these needs, there should be pre-paid options (both for mobile and internet) in any new USO. The Swinburne Institute for Social Research (sub. 45) suggested mobile services or community WiFi are likely to result in higher levels of internet adoption in remote communities than satellite subscriptions and that there should be a full investigation of low-cost mobile infrastructure with consideration given to micro-cell technologies. Cape York Digital Network (sub. 17) considered that governments need to move away from a one-size-fits-all approach towards a flexible approach to addressing the needs of remote users, particularly in remote Indigenous communities. CAYLUS (sub. 25) considered it crucial to have Indigenous community input into the management of public WiFi availability and content filtering, such as to

automate the times the WiFi is available and levels of content filtering (moderate setting excludes searches for porn, hate and online gambling sites), and to apply a daily download limit.

- *The introduction of zero-rating of government websites (where users of government websites are not charged for accessing these sites).* ACCAN (sub. 48) considered that access to government telehealth, distance education, and government/public services could be facilitated by this approach. Broadband for the Bush Alliance (sub. 6) similarly recommended that the Government create universal unmetered (but not unlimited) online access to health, government services, education services and banking for remote residents and non-government organisations. The ACCC (sub. 40) considered that providing free or unmetered access to government services online is likely to help with *accessibility* and *affordability* issues faced by these consumers.
- *A disability equipment program for people who do not qualify for the National Disability Insurance Scheme.* ACCAN (sub. 48) considered that the current communications landscape requires a move away from a one-size-fits-all equipment program towards a program that best suits the individual needs of consumers with disability.
- *Digital literacy programs.* These would be targeted to Indigenous people and older Australians (Broadband for the Bush Alliance, sub. 6).

The Commission notes that a number of existing and proposed telecommunications accessibility and affordability measures will be considered by DoCA in its current review of communications accessibility, which covers the National Relay Service, and its planned review of telecommunications consumer safeguards (DoCA 2016a; sub. 58). However, the Commission's understanding is that these reviews are not intended to consider measures outside of DoCA's responsibility such as the Telephone Allowance, the role played by the National Disability Insurance Scheme, and the current consumer protection roles of the ACCC and the ACMA. The Commission considers that all accessibility and affordability measures pertaining to the telecommunications sector be examined in its recommended broad-ranging review of consumer safeguards (chapter 9).

That said, the Commission agrees with a number of participants (ACCC, sub. 40; nbn, sub. 47) that, as a general principle, cost-effective options to address accessibility, affordability and other particular needs of user groups should be targeted and flexible, facilitate informed consumer choice, be technologically neutral, and promote efficient competition and innovation. It also considers that, in relation to many accessibility and affordability concerns, direct user subsidies are likely to be more cost-effective than subsidies channelled through providers (chapter 8).

An Indigenous-specific program?

As noted above, some participants suggested targeted solutions for addressing the availability of telecommunications services to Indigenous people living in regional and remote areas.

A specific program could allow for the funding of a broad range of telecommunications services to be delivered to these Indigenous communities, including mobile services and community telecommunications services such as payphones.

An issue is whether the needs of these communities could also be met through generic funding programs of the kind recommended by the Commission (such as through a community telecommunications funding program).

INFORMATION REQUEST 7.1

Participants are invited to comment on the advantages and disadvantages of providing Indigenous communities in regional and remote areas with an Indigenous telecommunications program that addresses their particular needs, or whether their needs could be met through service-specific (that is, community-wide) programs.

7.4 Towards a universal service fund?

Many or all of the options considered in sections 7.2 and 7.3 can be implemented on a stand-alone basis or in combination. They could also be consolidated within the context of a universal service fund.

In its most recent review of regional telecommunications in Australia, RTIRC (2015a, pp. 52–54) recommended the establishment of a Consumer Communication Fund to support ‘necessary loss making regional infrastructure and services’. The Australian Government, however, considered that it was premature to support RTIRC’s recommendation (2016b, p. 10).

Some participants supported a universal service fund. Coutts Communications recommended a universal service fund to help fund ‘non-commercial but socially important telecommunications infrastructure’ (sub. 5, p. 2). Vodafone Australia considered that, if any ongoing universal service funding is retained, this be redirected to the fund as recommended by RTIRC (sub. 46). The South Australian Government considered that it should be used to improve mobile coverage and choice in regional Australia (sub. 60). However, DoCA questioned the benefits of establishing a Consumer Communication Fund solely for any new USO (sub. 58).

A universal service fund could be established to address the universal service objectives of availability, accessibility and affordability and consist of two parts.

The first part would address universal service availability. Funding would be allocated for the provision of telecommunications infrastructure and/or retail services where no *baseline* services are available. Proposals would be sought from providers, government agencies and communities, and assessed on a competitive basis according to their cost-effectiveness in addressing universal service availability regardless of the specific technology used.

This part of the fund could work together with any of the options reviewed above where they are relevant to universal availability, including any potential competitive tender for the provision of retail voice services to premises within the NBN satellite footprint. It could apply to the provision of community telecommunications services (such as payphones), mobile services and other relevant telecommunications technologies. It could also address the particular needs of particular groups within the community.

The second part of the universal service fund would address accessibility and affordability. Funding would be allocated to measures to support people on low income, people who are homeless, Indigenous people living in remote communities, people with a disability, and older people with respect to telecommunications services that are already available.

If universal availability is primarily addressed by the NBN (as well as the funding arrangement associated with that), a universal service fund could address remnant market gaps or problems. Indeed, it could consolidate existing disparate Australian Government programs that relate in part or in full to telecommunications services such as the Mobile Black Spot Programme, the National Stronger Regions Fund, the Department of the Prime Minister and Cabinet's funding of remote community telecommunications, the Telephone Allowance and the National Relay Service.

An important advantage of a universal service fund is it would enable the flexible assessment of a wide range of alternative telecommunications services to address universal service objectives — something that is currently absent from the TUSO and other programs relating to universal service.

However, as noted earlier, the cost-effectiveness of a universal service fund depends crucially on its design, particularly with respect to its governance. Ideally, the fund would be administered by an independent statutory authority with the necessary expertise — for example, to assess the cost-effectiveness of competing proposals and technologies. A possible candidate is the ACMA (with its expertise in communications technology). However, assigning the ACMA with this role would need to be consistent with the final outcomes of DoCA's current ACMA review. DoCA proposed in its draft report a full 'stack' approach to communications regulation, with the ACMA's remit to cover all layers of the communications market, including infrastructure, transport, devices, content and applications, rather than be tied to 'siloes' industry structures (2016l, p. 8). A future role for the ACMA with respect to a universal service fund could be in keeping with DoCA's draft proposal.

Other important design elements of the fund are that it involves competitive tendering for services provision, that the accessibility and affordability measures deployed are

themselves proven to be cost-effective, and that the fund has a predictable source of funding.

Although a universal service fund has conceptual appeal, the Commission considers that the administrative effort involved in its establishment and getting its governance right is likely to be problematic relative to the likely size of the fund. Assuming that NBN funding remains separate from a universal service fund, the size of the universal service fund is likely to be relatively small. It would be better for the Government to ensure that measures to address telecommunications services gaps are trialled and evaluated before any universal fund of significant breadth is established.

8 Funding

Key points

- Estimating the cost of providing a universal service arrangement can be fraught given the information asymmetries often at play.
 - Competitive tendering induces potential suppliers to reveal their best estimate of the efficient cost of service provision. However, for competitive tendering to work effectively, it needs to be supported by sufficient market depth and careful design.
 - Where the market is not contestable, an independent process with properly validated costing and performance benchmarks and reporting requirements can mitigate the risks of cost-padding by service providers.
- There are two broad funding options for universal service arrangements: general government revenue or an industry levy. These options are not mutually exclusive.
- The choice of funding approach is affected by the nature of the program to be funded (whether it is consumer- or provider-based, or targeted at an industry activity), the quantum of funding required, and the extent to which the industry is dynamic.
 - Consumer subsidies to address *affordability* and *accessibility* are best funded through general government revenue. This allows individual requirements to be considered in providing the support, including means-testing.
 - *Availability* gaps could be funded through either an industry levy or general government revenue. An industry levy can be used to fund programs to address availability gaps as services notionally benefit all users. Telecommunications services also have a wide user base, which reduces the per-unit burden of a levy. An industry levy can also increase scrutiny by informed industry players to reduce cost-padding by firms providing the universal service arrangement. However, a levy can be difficult to design well and costly to administer, and more so when the industry is undergoing rapid change. General government revenue also has a wide funding base of taxpayers and the opportunity for regular scrutiny, but avoids the inherent design risks of an industry levy and is easier to administer.
- The narrow scope of the Commission's proposed policies means that the distortionary impacts are likely to be modest irrespective of the funding model adopted. This means that issues of implementation and administrative costs should be considered more closely. Accordingly, the policies recommended in this inquiry should be funded principally through general government revenue.

The funding of any universal service policy can affect broader market efficiency through the incentives it creates, irrespective of whether the policy is targeting the demand-side or supply-side of the telecommunications market.

Universal service policies can be funded through general taxation, government or industry investments, industry levies, or user charges. Each funding approach can have different impacts on economic efficiency to the extent that they distort investment and consumption decisions. Different funding approaches can also have different levels of accountability and transparency.

This chapter considers funding options for the Commission's proposed policies to address universal telecommunications service objectives (chapters 5 and 7). It does not examine funding issues associated with National Broadband Network (NBN) infrastructure. It starts by briefly reviewing the scope of funding associated with universal service policies (section 8.1). It then presents some key guiding principles that should underpin funding approaches to incentivise efficient service provision (section 8.2). The pros and cons of different funding approaches for universal service policies are considered against the funding principles (section 8.3), and within the context of the Commission's proposed policies (section 8.4).

8.1 What is being funded?

A highly-targeted approach to universal service policies

In chapter 6 the Commission set out the case for targeting Australian Government intervention to meet the particular telecommunications needs of specific groups of users, rather than through the overarching universal service obligation approach that currently applies.

NBN infrastructure, complemented by mobile service coverage, is expected to address most *availability* issues for broadband (including voice) services. Nonetheless, additional funding may be required to address a narrow set of *accessibility* and *affordability* issues (chapters 6 and 7).

Availability gaps are best addressed by specific programs that fund providers to supply the missing service (chapter 7). Where possible, such programs should be commissioned through a competitive tender. This may include the provision of infrastructure for a *baseline* voice service within the NBN satellite footprint. Competitive tendering for these services could be broken up by geographic areas for communities within the NBN satellite network or in areas not covered by mobile services (chapter 7).

In contrast, programs that aim to address affordability (and some accessibility) objectives are better delivered through subsidies targeted at eligible users. Funding should be allocated to measures to support disadvantaged groups and should target the particular

needs of these users. This includes, for example, directing subsidies to support people on low income, people who are homeless, Indigenous people living in remote communities, people with disability, and older people with respect to telecommunications services that are already available. These programs should be flexible, facilitate choice, and promote competition (chapter 7).

Addressing these potential gaps in telecommunications availability, accessibility and affordability will likely cost less than the current funding envelope for the telecommunications universal service obligation (TUSO). For example, in terms of availability, the 90 000 premises estimated in NBN satellite areas that are outside of mobile service coverage is significantly smaller than the 810 000 copper-based fixed voice services that were estimated to be in commercially unviable areas (Paterson 2011) in the lead-up to the Telstra USO Performance (TUSOP) Agreement (chapter 3).

The Commission's assessment is that the size of any market gaps or particular user needs in telecommunications is likely to be small (draft finding 6.5). Correspondingly, the amount of funding in question for any additional policy intervention is likely to be smaller than that involved under the current funding arrangements for the broad-based TUSO.

DRAFT FINDING 8.1

The amount of funding required for universal service programs following the full rollout of NBN infrastructure is likely to be smaller than the current funding amount for the telecommunications universal service obligation.

8.2 Some key principles

At a broad level, a number of guiding principles should apply to the funding of all government programs, including programs that target universal telecommunications service objectives. Funding mechanisms should be cost-effective, efficient and transparent to stakeholders and to the public.⁸⁴ Funding should also be simple to administer, minimise compliance burdens, and be responsive to technological, market and policy developments (box 8.1).

⁸⁴ Cost effectiveness is a measure of the extent to which the cost of resources used to deliver a program has been minimised. A program is cost-effective if it has the lowest cost of all the ways of producing the same service (PC 2013d). Efficiency is attained when people maximise their utility given the available resources. It is a measure of the increase in net benefits that covers how well resources are produced and allocated to meet current and future preferences (PC 2013d).

Box 8.1 Principles for funding programs with universal service objectives

The funding of a universal service policy should:

- seek to reflect the **efficient costs** of service provision
- **minimise distortions** to investment and consumption choices
- be **transparent**
- have regard to **administrative simplicity** and **compliance burdens**
- be **flexible** to respond to future changes and be appropriately **time-limited** while providing enough **certainty** for investment decisions.

Determining the cost of policies

Determining the cost of policies is an important step in ensuring that taxpayers and/or consumers receive value for money. An accurate assessment of costs is needed for assessing net benefit and for reducing the scope for cost-padding.

However, estimating costs accurately can be difficult. A provider generally has much better information on the cost of the services it delivers than government or a third party. But future costs are largely unknown and providers themselves can only estimate these costs.

Government can help to reveal the efficient costs of service provision in two ways, by:

- requesting the market to provide a price, which, if the market is competitive, should indicate the efficient cost
- applying a methodology to accurately estimate the cost.

Harnessing competition can reveal efficient costs

Competitive tenders can be used to discover a ‘market’ price for universal service policies. Competition provides an incentive for providers to keep their tender prices close to their best estimate of the technically-efficient cost of delivering the service. If there are few providers capable of delivering the service, the success of the tender in revealing the technically-efficient cost is more questionable. That said, a market with few prospective providers may still yield a competitive tender process if collusion between providers can be prevented.

However, a competitive tender process by itself does not necessarily lead to a cost-effective service. Careful design of the tender is important to ensure that the program provides value for money and that financial risks are properly managed (chapter 7). In particular, a tender bid’s underlying cost information should be made available for review. Program risks can also be mitigated by regular monitoring once contracts are in place.

In the absence of a contestable market, cost estimates should be validated

A lack of contestability in the market can lead to cost-padding, although a good costing methodology should help to identify where this might occur. Such activity may also be identified through exposure to industry review, especially where an industry levy is used as the funding arrangement. However, scrutiny can be limited by opaque funding agreements (Bougheas and Worrall 2012; PC 2013c). Ultimately, this exposes government or consumers to higher costs. It can also lead to inefficient investment if funding is directed to unnecessary features — such as the ‘gold-plating’ of infrastructure or services — which distorts investment decisions.

In the absence of market contestability, a process led by an independent assessor can be used to benchmark costs. Benchmarking processes draw on comparisons of similar projects, or comparisons between providers or other entities to measure inefficiency. Benchmarking exercises can promote efficient conduct as providers do not want to be identified as behind the leaders (PC 2013c). It can help to identify best practice processes, set targets for improvement, and measure progress against objectives (PC 2008).

There are two main types of benchmarking:

- performance benchmarking — measuring and comparing indicators of performance across programs, and over time, without reference to any specific standards
- standards benchmarking — comparing performance against best practice standards or policy targets.

The Commission has previously found benchmarking of network or infrastructure costs to be ‘a useful but inexact tool’ (PC 2013c, p. 144). Defining cost benchmarks, such as the capital and operational expenditures of supplying services, typically requires bringing together top-down and bottom-up costing methodologies. This requires regular and in-depth data, which may be difficult to obtain, particularly for services that are not routinely provided. Supplying cost data can be burdensome for providers who cannot easily estimate their costs. These costs can vary and may not be straightforward to compare across the services delivered for different geographic areas and consumers. Furthermore, benchmarks should be forward-looking to anticipate changes in service costs (for example, shifts in technology and consumer needs), which can be challenging for industries undergoing rapid change.

Cost data should be made transparent to an independent assessor (such as a contractor or regulator). Such information could be treated as commercial-in-confidence in cases where providers are reluctant to publicly disclose costs that could put them at a competitive disadvantage.

An assessor also requires specific skills and knowledge of the industry to properly benchmark costs. Such skills may not be available outside of the industry supplying the service, and so there can be challenges in selecting an independent assessor that is accepted by industry and by the community.

The optimal scope of benchmarking should therefore weigh up the costs involved to supply and validate cost data with its expected benefits in transparency and accountability that promote efficient conduct.

Assessing the costs of programs with universal service objectives

Ideally, any cost assessment should be designed to limit the incentives for the universal service provider to:

- cross-subsidise other non-universal service activities
- underprovide infrastructure maintenance and replacement passing on poor quality infrastructure at the conclusion of the contract (run down the capital stock)
- use the contract to reduce competition by other providers
- cost-pad or gold-plate — provide services beyond what the Government has contracted
- crowd out the private provision of services, noting that as technology changes, what can be considered commercial and non-commercial can also change.

In the first instance, the government should test the market through an open tender to identify the costs of service provision. This approach was supported by some participants (box 8.2). In the absence of sufficient competition, the government can invite a potential provider to submit their price for delivering the service. The provider should supply a cost basis for this price to an independent assessor who can scrutinise its accuracy. The use of cost benchmarking and transparent reporting can also minimise the provider's incentive to cost-pad and ensure that public funds are used efficiently.

Box 8.2 Participants' views on calculating the costs of universal services

Providing greater transparency through increased financial performance reporting would allow the government to identify efficiencies, and provide incentives for innovation in delivering services that better meet the needs of users. Increased transparency could help to provide assurance to taxpayers and industry of the fairness and efficiency of the [TUSO] as a means of safeguarding telecommunications service quality for all Australians. (Infrastructure Australia, sub. 51, p. 3)

Where required, the [TUSO] should be cost-based and this must be substantiated before receipt of payments to the [universal service provider]. The [Australian Competition and Consumer Commission], as an expert independent body, would be best placed to assess any such costs. (Optus, sub. 4, p. 44)

... funding of the delivery of universal services should ideally reflect the true underlying net costs of provision. While that principle is clear, determining this amount is rarely a straightforward exercise. Experience suggests that the optimal funding amounts are unlikely to be discovered through competitive tendering exercises, and estimates of net costs are beset by information asymmetries between the cost estimator and the firm supplying the service. (Vodafone Australia, sub. 46, p. 30)

DRAFT RECOMMENDATION 8.1

The Australian Government should use competitive tendering wherever feasible to deliver telecommunications universal service programs. As a first step, the Government should test the depth of relevant market segments.

Where there is no market depth and a competitive tendering process is not feasible, the Government should, at a minimum, subject all proposed program costings to an independent and transparent validation process. Where relevant performance comparators are available across programs, these should be used as a basis for benchmarking.

Choosing the best cost methodology is a fraught issue, particularly in a non-contestable environment

A key challenge in determining the costs of any universal service policy is choosing the most appropriate cost methodology. Even in a contestable market, selecting a cost methodology is important as it helps government to understand the scope of services to be funded and how costs should be allocated.

The Department of Communications, Information Technology and the Arts stated in its 2004 Review of the TUSO:

... since 1991 there has been no consensus on the approach and methodology for estimating the costs of the [TUSO], and decisions on subsidy amounts have been based on a variety of approaches, including through consultation between major participating carriers. (2004, p. 83)

Broadly there are four cost methodologies, with each leading to different cost estimates (box 8.3).

The cost measurement approach applied to a universal service policy will affect the quantum of costs to be funded by government or industry (and ultimately, taxpayers and consumers) and the incentives driving the provider of universal services. This is influenced to a large extent by the allocation of common or joint costs across non-commercial and commercial services.

In principle, a *marginal cost* methodology provides the basis for estimating the additional cost to the provider of providing the universal service (SCNPMGTE 1994). In practice, however, this is difficult to measure as the cost of a universal service tends to be ‘lumpy’ — service provision involves an array of variable costs and fixed costs, as well as costs shared between services, not all of which are used to deliver the universal service.

The *avoidable cost* approach has been the Australian Government’s preferred method of measuring universal service policy net costs in non-commercial areas, and is the approach largely favoured by industry (BCR 2015; infoDev and ITU 2016; SCNPMGTE 1994). The Commission has also previously recommended using the avoidable costs methodology as it

reduces incentives to include common costs from other functions within a provider (for example, overhead costs) (IC 1997; SCNPMGTE 1994).

Box 8.3 **Methodologies for calculating the cost of universal service programs**

Broadly, there are four methodologies for calculating and then allocating the costs of services that aim to meet universal service objectives — that is, the costs to provide non-commercial telecommunications services. The different methodologies can lead to very different calculations of costs.

The **fully-distributed cost** methodology includes the total costs to an enterprise of all the different activities it undertakes, including those not directly attributable to the universal service. This methodology does not provide a direct measure of the cost responsibility of the particular universal service, or how much costs change when output of the service changes.

The **marginal cost** methodology accounts for the cost of producing one more unit of a service, although it can equally account for the cost that would be saved by producing one less unit. There are difficulties in easily defining and measuring the marginal cost of universal services and so this methodology tends not to be used in practice.

The **avoidable cost** methodology calculates all costs (including capital costs) which would have otherwise been ‘avoided’ had the service not been provided. This is essentially a practical measurement of marginal cost as well as additional capacity costs, while retaining the causality between increases in output and the related costs. Avoidable cost will usually be the preferred approach to measuring the costs of a universal service policy, although there can be problems in identifying the precise level of costs that are avoidable and can require significant judgment.

The **standalone cost** methodology calculates the costs associated with the provision of a service in isolation. The reduction in costs available from economies of scale is not captured in the standalone cost, and so it tends to overestimate the cost of providing the service.

Sources: (BCR 2015; CCNCO 1998; IC 1997; SCNPMGTE 1994).

8.3 **Who should pay?**

The principle of ‘those who benefit should pay’ that applies to cost recovery in situations such as fisheries management or financial services regulation does not hold for universal service policies. The logic of this principle is that if the beneficiaries also face the cost they will impose discipline on the providers to deliver a cost-effective service (PC 2001). However, universal service policies benefit at least some who government has assessed cannot or should not pay. This presents a challenge in developing a funding model that is seen to be fair, and that provides the discipline required to prevent cost-padding and gold-plating by service providers.

The Commission has considered two broad funding options for programs to address gaps in the provision of universal telecommunications services. These are funding through:

- general government revenue, the cost burden of which taxpayers bear

-
- industry levies, allocated to industry players but some proportion of which is ultimately passed on to telecommunications consumers.

Some combination of the two is also possible (as in the present TUSO). Also notable is that many countries provide no compensation to universal service providers to provide mandated services (appendix C).

Programs that address universal service objectives are typically funded through these two options, and there are arguments for and against each. The framework outlined earlier, including considerations of efficiency, transparency, flexibility and simplicity, is used to develop the decision tree outlined in figure 8.1.

Minimising distortions through discipline

All funding models impose some level of distortion

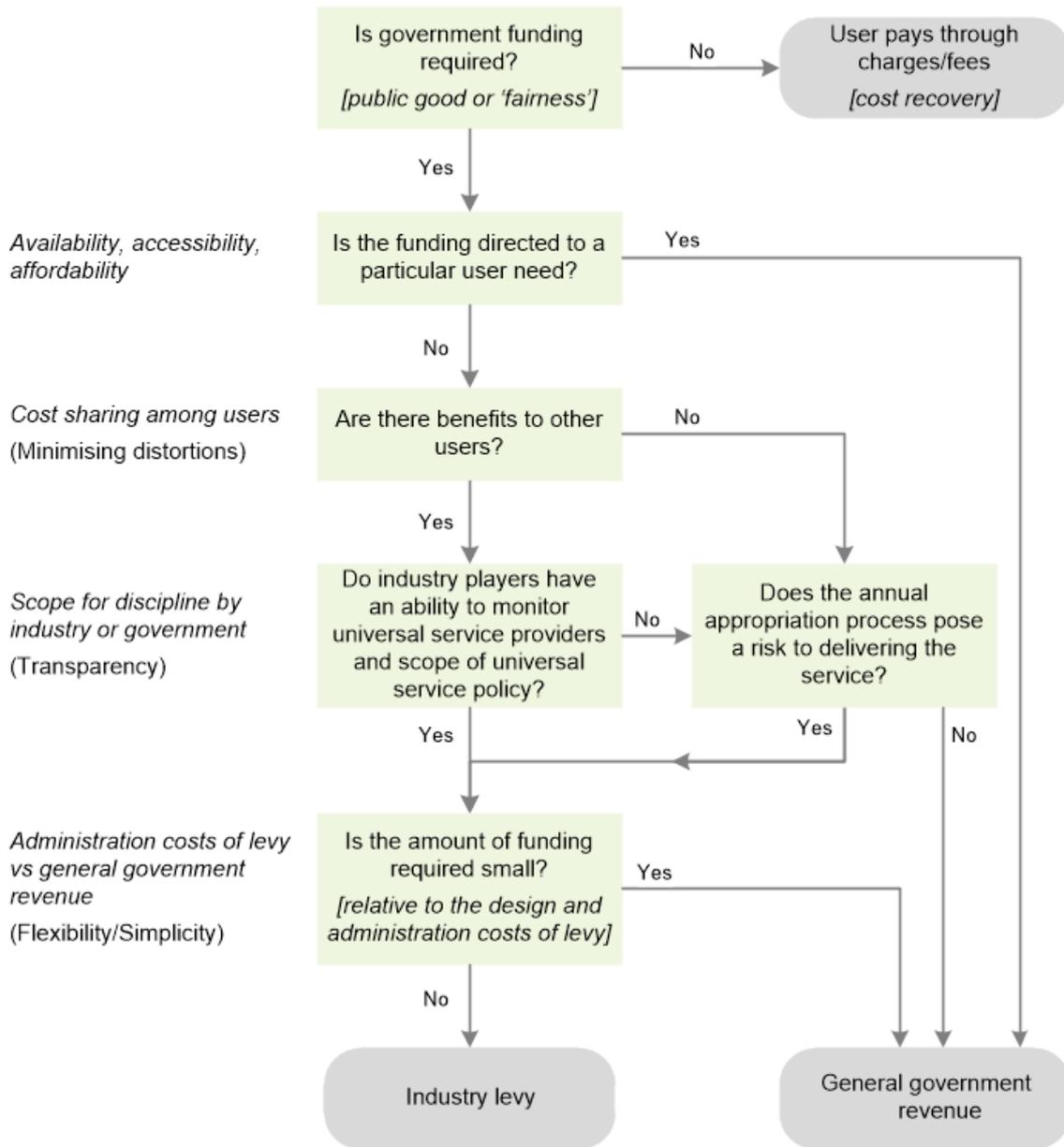
All funding models for universal service policies impose some level of distortion — that is, they can alter investment and/or consumption behaviour and prevent resources from being put to their most valued use. For telecommunications, the main concerns are incentives to:

- cost-pad or gold-plate the services — where the funding model does not impose discipline on the provider to be cost-effective
- distort the use of the telecommunications services by consumers — if they face a price that is higher or lower than it would have been in the absence of the funding arrangements.

Cost-sharing with taxpayers versus users

Distortions at the industry level are the main risks that must be managed in designing an industry levy. However, placing increasing pressure on funding through general government revenue can also create broader adverse impacts on efficiency (box 8.4). Given this, funding through general government revenue is only justified when the overall costs of an industry levy are greater than those associated with raising revenue. These costs include any adverse efficiency impacts and the costs of administering the levy.

Figure 8.1 A framework for selecting funding options



Box 8.4 The efficiency of general taxation

Most taxes result in some loss of economic efficiency. For example, a tax may reduce incentives for people to work or invest or induce them to alter their consumption patterns. This leads to losses in consumer welfare, which can be expressed relative to the amount of revenue raised. An efficient tax system involves taxes that result in relatively low losses in consumer welfare per dollar of revenue raised (Henry et al. 2010).

General government revenue is largely sourced from direct taxes (taxes imposed on individuals rather than any particular transaction). Direct taxes are typically raised from a broad base. But challenges are emerging for the direct tax base due to demographic changes. A projected increase in the population and the higher proportion of older Australians bring rising costs of new economic and social infrastructure, health and aged care (PC 2013a).

The proportion of Australians in work or looking for work is projected to decline by the middle of this century, increasing Australia's age-dependency ratio (the ratio of those who do not pay income tax to those who do). Most recently, Australia's age-dependency ratio increased from 19 per cent in June 2005 to around 22 per cent a decade later (ABS 2016a). Similarly, while the Australian population grew by almost 18 per cent in the decade since June 2004, the number of people with taxable income increased by only three per cent to 9.7 million in the same period (ABS 2016a; ATO 2016). These pressures exacerbate the loss of economic efficiency associated with income (and other) taxes. The higher the tax rate, and the narrower the tax base, the higher the reduction in economic efficiency.

Increasing pressure on the direct tax base is likely to result in higher income tax rates (Henry et al. 2010; PC 2013a). This can distort people's choices between work and leisure, a distortion that is not necessarily insignificant (Abelson 2012; Robson 2004; Triest 1990).

A number of studies have estimated the efficiency costs (or 'marginal excess burden') of general taxation in both Australia and overseas (Cao et al. 2015; KPMG and Econtech 2010; Murphy 2016; SCNPMGTE 1994; Triest 1990). These estimates typically show that the marginal excess burden associated with raising tax ranges from a minimum of ten cents to well in excess of one dollar for each additional dollar of revenue raised through a variety of taxes.

Focusing on income tax, in its 2011 Disability Services inquiry the Commission estimated that, for an extra dollar of income tax revenue in Australia, 24 cents is lost through inefficiency (PC 2011). The 2010 Henry Tax Review had a similar estimate (KPMG and Econtech 2010). Internationally, raising an extra dollar in OECD countries has been estimated to cost the wider economy between \$1.20 and \$1.30 (Robson 2004). Estimates of the efficiency costs of income tax in the US have included estimates of 40 per cent and as high as 78 per cent (Feldstein 1999; Vedder and Gallaway 1999). At the lower end of the spectrum, a study of New Zealand taxes found that the marginal excess burden of labour taxes in the early 1990s increased from 5 cents to 18 cents per additional dollar of revenue raised (Diewert and Lawrence 1994).

Some participants — particularly carriers who contribute to the current telecommunications industry levy (TIL) — argued that universal service programs should be funded from general government revenue. They appeal to the public finance argument that 'public good' investments are best funded through a broad-based taxation arrangement (box 8.5). However, from one perspective, a broad-based industry levy could share the cost of meeting the universal service arrangement across more people than funding through general government taxation. Australia's 'telecommunications consumer tax' base is

potentially broader than Australia's income tax base.⁸⁵ For instance, there are now more mobile voice services than people in Australia, while demand for data over fixed-line broadband services also continues to increase (chapter 2).

Some participants also supported an industry levy, but with differing views on how this levy should be collected (box 8.5).

Box 8.5 Participants' views on who should fund the delivery of universal services

Some favoured Australian Government funding

Optus' preferred option would have [nbn] to continue to cross subsidise the provision of services to net-cost areas through its uniform access prices. There would be no need for a separate [TUSO] funding arrangement. (Optus, sub. 4, p. 44)

When it comes to the imposition of taxes or levies to support government policies, the least distortionary and hence most efficient approach is to recover from as broad a base as possible. For that reason we recommend that the [TUSO] move to a fully funded obligation on the budget rather than a tax on telecommunication carriers and end-users. This would remove distortions and reduce administration costs for government and the telecommunications industry. (Telstra, sub. 30, p. 5)

If the [TUSO] is scaled back as suggested, it is likely that the cost of [the TUSO] will correspondingly reduce, perhaps to such an extent that ascertaining a funding arrangement is not required. For example, the [National Relay Service] should be funded from general government revenues. (TPG Telecom, sub. 38, p. 3)

Since the scope of the services requiring subsidies necessarily reduces over time as [nbn] delivers universal access, it is entirely possible that the residual universal service funding can be covered by the government's \$100m contribution and no industry levy is required. Since virtually all Australians pay telecommunications carriers, the use of an industry levy is likely to be a more regressive form of taxation than the use of general Treasury funds. (Vodafone Australia, sub. 46, p. 30)

Others favoured an industry levy

The existing [TUSO] funding is well established and has worked reasonably well. We consider that it should remain in place. With regards to the industry contribution, it should apply as broadly as possible across the industry and include all carriers and carriage service providers with revenues above a set minimum annual threshold of recurring revenue of telecommunications business, which we believe should [remain] at \$25 million per year. [TUSO] funding should not be restricted to fixed-line providers and [nbn] should have access to the funding to assist it in providing services in non-commercial areas. (OptiComm, sub. 13, p. 5)

... there is potential to broaden the [National Relay Service] funding base by, for example, empowering [nbn], as the broadband wholesaler, to collect a universal levy from all retailers and not limiting the levy to traditional providers of voice phone services. (Australian Communication Exchange, sub. 22, p. 13)

Any impact on consumers in terms of higher costs for the delivery of telecommunications services should be transparent in the design of the funding model. Given wider Commonwealth Budget pressures we do not consider that increased Budget funding of any new universal service obligation is a viable option. (DoCA, sub. 58, p. 5)

⁸⁵ The telecommunications consumer tax base is not as broad as the consumer tax base for *all* goods and services.

These comments point to the complexity of the issues, and suggest that a one-size-fits-all approach to funding universal service arrangements may not be the best approach. This is particularly the case given that the overarching policy objective of universal service provision can be divided into different elements addressing availability, accessibility and affordability (chapter 5). What is clear is that funding arrangements should be designed to minimise distortions (for consumers and providers of the services) and impose the lowest possible administrative costs.

DRAFT FINDING 8.2

Whether funded from general government revenue, an industry levy or a combination of both, all funding models can distort investment and consumption decisions and involve administrative costs. An 'optimal' funding model should seek to minimise these costs, which will vary with the nature and size of the program to be funded, as well as broader market dynamics.

Industry levies can affect consumer behaviour

The incidence of any industry levy in the telecommunications sector can be expected to be (at least partially) passed onto the broader telecommunications consumer base through higher prices. How much of the levy firms absorb through lower profits depends mainly on market conditions.⁸⁶

The evidence suggests that consumers may not be particularly sensitive to changes in the price of telecommunications services, at least for basic access to these services (box 8.6). However, although price changes might not affect a person's decision to purchase access to telecommunications services, both price and income changes tend to affect the volume of telecommunications services people consume. A small change in price can be expected to have a less distortionary effect than a large one, so on this basis a wide base for the levy (levied across more consumers and across more related services) is preferred to a narrow base.

A levy should also be broad-based in a competitive sector with substitutable products. As technologies in the telecommunications market converge and new alternatives continue to emerge, consumers will be able to substitute technologies more easily. A narrow-based levy (such as one imposed mainly on premium services) risks affecting overall market competitiveness (Laffont and Tirole 2001). By disproportionately affecting prices, a narrow-based levy could discourage providers from further investing in or entering the segments of the market where the levy applies. For example, higher prices for fixed-line

⁸⁶ The proportion of the levy that is passed onto consumers depends on price elasticity (box 8.6). If demand for the service is 'perfectly price-inelastic' (did not respond to a price change), then the levy will be entirely passed through to consumers. On the other hand, if 'perfectly price-elastic', none of the levy would be passed through to consumers.

broadband services may encourage people to opt for mobile, possibly undercutting the return on the original investment in broadband infrastructure.

Box 8.6 How sensitive are telecommunications consumers to price changes?

The proportion of the levy that is passed onto consumers depends on price elasticity — the responsiveness of consumers to a change in price (price elasticity of demand) and providers to a change in price in terms of selling the service (price elasticity of supply); and ultimately how these interact.

Some evidence suggests that consumer demand for basic access to telecommunications services appears to be relatively insensitive to changes in price (demand inelastic) (Abelson 2012; OECD 2003; Vertigan Panel 2014). A 2003 New Zealand review of literature on demand elasticities found that demand for basic telecommunications access was relatively inelastic (Vodafone New Zealand 2003). Similarly, a 1998 study found that demand elasticity for basic access to telecommunications services in the United States was extremely low (Hausman 1998).

The extent to which substitutable services are available in a sector determines whether a levy base should be broad or narrow. It becomes more important to ensure a levy is broad-based in a competitive sector with substitutable products. If services are highly substitutable, customers can tradeoff one service for another. Alternatively, if services are complementary, then an increase in price will reduce demand for both services.

Some evidence also suggests that mobile and fixed-line technologies are complementary to a degree. While mobiles are generally preferred for voice services and accessing the internet, fixed-line broadband networks are preferred when downloading bandwidth-intensive content, like video (ACCC 2016b).

However, other evidence points to these technologies being increasingly substitutable, with complementarity depending on income.

- The Bureau of Communications Research (BCR) concluded that, at present, mobile and fixed-line services are only partial substitutes due to their differences in mobility, price and download volumes, noting that substitutability could increase as technologies converge (BCR 2015).
- Evidence from the European Union has found that fixed-to-mobile substitution is significant (Barth and Heimeshoff 2014a, 2014b; Grzybowski 2014; Vertigan Panel 2014).
- The Vertigan Panel (2014) also described the demand for high-speed broadband services, especially top speed tiers, as relatively sensitive to changes in both price and income.

While demand for fixed-line broadband services varies more with changes in price than mobile broadband services, those with higher incomes have a steadier demand for fixed-line broadband connections and consume more data (chapter 2).

Providers can charge different prices to minimise consumer distortion

Providers could charge different prices to minimise the distortionary effects of a levy ('price discriminate'). One option is through a 'two-part tariff', where telecommunications

providers charge different prices for access and ongoing use of telecommunications services. Traditionally, access charges are fixed while use charges vary by volume. So, given the relatively high willingness to pay for access, passing on the levy through an access fee is unlikely to change most people's decisions to access telecommunications services (providing the price increase is not prohibitive).

Alternatively, higher prices could be charged on premium services if consumers who generally consume more data and premium broadband services are less price sensitive. Either approach could go some way towards reducing distortions of consumption decisions (Abelson 2012; Bellinger 2015; Laffont and Tirole 2001).

Where industry levies are used to fund the delivery of a universal service policy objective it is usually left to providers to determine how they want to pass on the cost to their customers, as happens now with the TIL (chapter 3). While the government could potentially regulate to restrict behaviour in this regard, service providers are in the best position to set prices and decide on infrastructure investments in a competitive environment, based on their expected demand and costs.

On balance, an industry levy could potentially be less distortionary for each dollar raised given its broader base and the ability for telecommunications service providers to set prices that capture both willingness and ability to pay. Industry levies are also favoured internationally for funding telecommunications universal service programs that largely target availability (appendix C).

However, the narrow scope of the Commission's proposals is likely to impose minimal distortions whether funded through an industry levy or general government revenue. The administrative costs and design challenges are instead likely to make up a larger share of the costs of funding, so these factors need to also be considered.

Scope for discipline from government versus industry

Transparency about the cost of meeting a universal service policy can impose a discipline on government and providers, regardless of the funding approach adopted.

The annual budget process provides the opportunity for regular scrutiny of funding — whether it is within the current funding envelope or through raising taxes (Chan et al. 2009; Henry et al. 2010; PC 2013c). The public can access information on changes in funding of universal service policies and compare this against other budget priorities (such as funding hospitals). The transparency that comes from the contest in the annual budget process can impose a discipline on government spending, which is sharpened when there are limited fiscal resources. However, it is not enough to rely on fiscal pressures alone to drive efficiencies. While the budget process should give government an incentive to contract for services at the efficient cost, it does not assist them in determining whether they have achieved this. Moreover, given the large number of programs funded by

government, the funding of universal services is unlikely to come under close scrutiny and may also be sensitive to political influences (Mueller 2003).

Funding universal services through general government revenue means that government, and ultimately taxpayers, bears the entire cost of service provision. Industry would not directly bear any costs, and so the universal service provider is less likely to be scrutinised by industry. This also increases the risks that arise from the telecommunications sector knowing more about the cost to deliver the service than government (information asymmetry).

In contrast, an industry levy is likely to be closely scrutinised by the industry that pays for it. This is particularly the case where providers in the industry must bear at least some of the levy incidence. Competing providers in the telecommunications market can, to some extent, hold the universal service provider to account for levy costs. This discipline does not replace a robust costing process and contractual arrangements, but it adds an additional layer of scrutiny.

However, industry levies can be susceptible to political pressure. Different groups of stakeholders could seek to increase the effective cross-subsidisation of their services if governments view this as a costless exercise. Ensuring consumers understand how an industry levy affects their prices is an important means to provide countervailing pressure.⁸⁷

Flexibility and simplicity

Funding models need to be low-cost to administer and adapt to future changes

Funding from general government revenue is inherently low-cost to administer as it is achieved through a budget allocation. It generally does not impose significant compliance and administration costs, although the size of these costs are not well known.⁸⁸ An industry levy faces collection costs, which vary with the design of the levy. For example, as providers are obliged to report the information required to calculate their share of the levy, their compliance costs increase, as do regulators' costs of ensuring this information is accurate.

Funding from general government revenue can offer flexibility in the amount and length of time a program is funded. The existing architecture for collecting income tax allows funds to be deployed and withdrawn relatively quickly. However, fiscal and political dynamics

⁸⁷ Transparency can also be improved by publishing the cause of price changes in consumer invoices. However, submissions to the BCR's NBN non-commercial services levy argued that this would be of little benefit to consumers, instead confusing them and increasing administrative burden in order to explain possibly only a small increase in prices (BCR 2015).

⁸⁸ Compliance costs cover a range of both monetary and non-monetary costs that taxpayers incur in order to fulfil and adjust to their tax obligations. Administration costs cover the costs of implementing tax policy, and revenue collection.

can undermine the certainty of general government revenue as a source of ongoing funding, as a program could be replaced by other budgetary priorities.

A levy can give more certainty about the availability of funding for universal service objectives over time. Industry's scrutiny can also curb incentives government might have to maintain the levy even once the need for funding has weakened. But a levy needs to be sufficiently flexible to adapt to changing circumstances — for example if the costs of providing the service change, or the need for a service is relieved by market developments. As a basic principle, governments should not continue to collect a levy if they are no longer facing a cost of providing a service. Nor should they be able to require industry to substantially raise the levy if they decide to expand the services provided under a universal service arrangement without substantial consultation and agreement.

Simple levy design matters for efficiency

Two important factors in designing an industry levy are:

- the base to which it applies
- the point in the value chain at which it applies.

Choosing the base for the levy

A user-pays levy base should ideally capture all those who benefit from the services that it funds. Where these beneficiaries are difficult to identify or by definition are not required to pay, as broad a base of potential beneficiaries as possible should be captured. Where there is convergence in the services provided across sectors, a narrow-based levy risks granting a competitive advantage to one sector over another and distorting the market. Consumers in the paying sector (who ultimately bear at least some of these levy costs through higher prices) would adjust their demand for services and buy substitute services that do not attract the levy. To minimise distortions, the base should include all providers in the levy that supply services that are close substitutes, particularly where there is evidence of convergence in telecommunications services.

However, as the telecommunications sector continues to rapidly evolve, there are new challenges in defining a broad levy base and maintaining its stability.

The broader the base, the higher the costs to administer and enforce the levy. For example, the telecommunications network operators have frequently raised that Over-the-Top (OTT) providers are not subject to the same regulatory, taxation and levy regimes as traditional network operators (Telstra, sub. 30; Vocus, sub. 33; nbn, sub. 47; de Ridder, sub. 56). OTT providers tend to have different, often global, business models compared with traditional telecommunications services despite delivering similar services (Godlovitch et al. 2015).

As a general rule, providers of substitutable services should face similar obligations. But developing equivalent regulation for OTT providers, let alone including them in an

industry levy base, presents further practical challenges. These new services can disrupt the market but can also benefit consumers and apply competitive pressure on existing market players. They can also increase the demand for some services (for example, data) delivered by these existing providers. The practical challenges include whether existing licensing regimes can be feasibly extended to these new entrants, or whether this would be too administratively difficult and may even be bypassed.

There is also a risk that extending existing regulatory arrangements to OTT providers may discourage efficiency among incumbent (as well as new) market players. Rather than extending existing regulations, governments should use such disruption as an opportunity to reassess risk and adjust regulation accordingly (PC 2016b). Simply extending regulation without an assessment of its consequences and differences in risk between traditional and new business models could quash innovative new approaches, reducing choice and resulting in consumers paying higher prices than they otherwise would (PC 2016b).

Choosing the value base: wholesale or retail?

Determining where to apply the levy so that it does not distort investment or incentives to reduce costs raises a number of complex issues. A levy can be applied at the infrastructure or retail level. However, it should be on one or the other as having both wholesalers and retail service providers pay the levy could risk taxing some ‘factors of production’ twice (SCNPMGTE 1994; nbn, sub. 47).

Similarly, passing a levy through different levels in the value chain in which some firms have significant market power risks increasing mark-ups at each level and imposing significant inefficiencies (‘double marginalisation’) (Landsburg 1998; nbn, sub. 47). As a result, the market could see some firms vertically integrate to avoid paying higher levies.

In principle, a levy could apply to where the service gap is — a levy at the wholesale level where there is an infrastructure gap, or a levy at the retail level where there is a retail service gap. However:

- applying the levy at the wholesale/infrastructure level means that all retail service providers are captured in the pass-through, but a decision about how to allocate the cost of the levy to the wholesaler is still required. A wholesaler that holds a significant market share can compound the issue of double marginalisation.⁸⁹
- applying the levy at the retail level could avoid the issue of double marginalisation, particularly where the retail sector is competitive. But it could be at odds with the current licencing arrangements, which focuses on carriers.

⁸⁹ This could be less of an issue where a wholesaler is subject to price regulation.

Choosing the value base: a fixed fee, or a share of revenue or profit

A further consideration for the design of the levy is whether it should be issued as a fixed fee for services in operation, or as a share of each provider's revenues or profits.

A fixed fee can be based on the number of services in operation — a possible measure of market share. While a fixed fee can be simple to administer for the regulator, it is regressive as it charges the same fee regardless of the level of revenue of the firm, so smaller firms pay a higher share of their revenue as a levy. Moreover, it can penalise more efficient firms charging lower prices. These firms would bear a disproportionately higher burden of the levy than those charging higher prices for the same level of output.

Some participants suggested that industry levies be issued on profits, stating it is fair and avoids double-taxing 'factors of production' (TPG Telecom, sub. 38; Vodafone Australia, sub. 46; nbn, sub. 47). For example, where a levy is applied to revenue at the retail level, the provider would be paying a levy on revenue received to also cover their infrastructure costs. However, profits can be a poor measure of market share — providers in a competitive market with some profits may be efficient and not necessarily the largest market players. As a result, levies based on profit can penalise more efficient providers.⁹⁰ Profits can also be more easily written down to reduce the final levy amount paid.

Deductions from revenue to provide an 'eligible revenue' measure may go some way to reduce factors of production from being levied. The current TIL is applied on 'eligible revenue', which includes some deductions for infrastructure and customer equipment revenue. Robust reporting requirements can ensure that industry provides accurate information on revenue, but this can increase enforcement costs.

Setting minimum eligibility thresholds to qualify for levy payments can reduce the administrative burden of compliance and collection on smaller carriers. The current TIL only applies to 'participating persons' with eligible revenue greater than \$25 million (chapter 3). The threshold was first implemented for the 2010-11 eligible revenue assessment, after being announced in 2009 as a red tape reduction measure. At that time, it was assessed that telecommunications providers that fell below the threshold accounted for less than 1 per cent of total eligible revenue in the industry (ACMA, pers. comm., 2 November 2016).

The gains in administrative efficiency from such thresholds need to be balanced against the costs of forgoing revenue and maintaining competitive neutrality.

When these thresholds interact with 'eligible revenue' definitions, providers can inadvertently be exempted from paying the levy. For example, a number of fixed-line broadband operators currently do not contribute to the levy. The wholesale nature of the broadband services allows these operators to deduct a significant proportion of their revenues. The downstream retail service provider's revenue (with these wholesale costs

⁹⁰ In a non-competitive market segment, profits represent their received rents, which should be taxed.

captured) is instead accounted for as part of the eligible revenue base (ACMA, pers. comm., 2 November 2016).

It is not always clear whether such complexities in definitions support or undermine competitive neutrality or inhibit providers' incentives to grow. This again emphasises the need to revisit definitions and thresholds on a regular basis, which in turn increases complexity and enforcement costs.

Even where the architecture for administering an industry levy already exists and some costs have already been sunk, there is no guarantee that an existing levy design is efficient. For example, even though any new levy could take advantage of the existing telecommunications industry levy arrangements, these may still need to be changed. Furthermore, if any new levies are introduced, it will be important to consider how these levies interact. For example, if both a broad-based universal service levy and a narrow-based NBN non-commercial services levy are introduced — the latter of which is currently proposed (appendix B) — the subsequent interactions, distortions and complexities these impose will need careful consideration.

On the whole, a continuously evolving telecommunications industry is likely to exacerbate the design challenges discussed and, in turn, the costs of administering the levy. Getting the design right is not easy, and getting it wrong can risk both higher market distortions and a weakened discipline on service providers.

Funding consumer subsidies

The existing income support system, funded through general government revenue, provides the administrative simplicity, flexibility and transparency required for funding subsidies targeted at eligible users.

The income support system has the advantage of administrative simplicity and minimising distortions. Where specific measures aim to address accessibility and affordability, the same targeted eligibility criteria and/or means-testing mechanisms as the broader income support system can be used, an authority which telecommunications providers have neither the mandate nor information to exercise (PC 2011, 2013c). By means-testing consumer subsidies and aligning them with existing income support payments, governments can monitor changes in effective marginal tax rates and people's choices between work and leisure. Despite the political difficulties, the existing income support system also provides scope to withdraw subsidies (or erode their value) as choice in the market grows and telecommunications services continue to become more and more affordable (chapters 2 and 6).

Industry levies are better suited to funding specific industry activities, such as market failures that lead to availability gaps, which can potentially benefit all users. Funding direct income transfers through an industry levy, on the other hand, would potentially distort price signals and may not achieve affordability.

8.4 Summing up: putting funding options into context

The funding approaches considered in this chapter have both advantages and disadvantages in terms of efficiency, transparency, flexibility and simplicity. But these approaches are not necessarily mutually exclusive.

Programs that target universal service objectives are currently funded through both general taxation and industry levies. For example, the Australian Government currently funds the Telephone Allowance from general government revenue, while the TUSO is largely (but not exclusively) funded through an industry levy.

Different funding models may be better suited to different types of programs given their relative strengths. A mixed approach to funding could be optimal when considering the nature of the program objectives — consumer-based programs to address affordability and accessibility and provider-based programs to address availability (and some aspects of accessibility) — and its overall size within the broader context of the dynamics of the telecommunications sector.

There are arguments in favour of funding gaps in universal service provision from a levy. A telecommunications levy has a broad base of consumers that can minimise distortions. As long as consumers are not too price-sensitive, telecommunications industry levies could arguably impose fewer distortions than general government revenue. Industry levies can also provide incentives for providers to monitor costs, which can further improve cost-effectiveness. But industry levies can be difficult to design well and costly to administer in a sector like telecommunications where the players (and hence the levy base) are constantly changing.

On the other hand, funding through general government revenue is likely to provide the necessary flexibility and administrative simplicity for policies to respond to possibly diverse and evolving expectations of universal service. Moreover, applied to programs that have a re-distributional objective (such as affordability measures), funding from general government revenue means that the same targeted eligibility criteria used for many other distributional policies can be applied to telecommunications.

The narrow scope of the Commission's proposed government interventions means that distortions are likely to be minimal whether funded through an industry levy or general government revenue. This takes the assessment of the relative merits of the two funding approaches largely to issues of administrative cost and design challenges, tipping the balance in favour of funding through general government revenue. This would also imply the ultimate removal of the current TIL.

Some level of fiscal and political risk associated with budget-funded measures will remain in funding through general government revenue. However, as with an industry levy, such risks, as well as the risks of cost-padding and gold-plating, should be managed either through competitive tendering or through independent and transparent costing processes and regular reviews.

DRAFT FINDING 8.3

Small programs do not justify the design and administrative costs associated with a broad-based industry levy. Funding these through general government revenue is likely to be simpler and less costly to administer.

This would imply the ultimate removal of the Telecommunications Industry Levy.

DRAFT RECOMMENDATION 8.2

The Australian Government should fund targeted measures to meet telecommunications universal service objectives principally through general government revenue rather than an industry levy. The Australian Government should seek to minimise the risks of cost-padding and gold-plating through contestable and transparent processes.

9 Transitional arrangements

Key points

- The Telstra USO Performance (TUSOP) Agreement locks the Government and Telstra into long-term, inflexible and opaque arrangements for the provision of voice services under the telecommunications universal service obligation (TUSO) until 2032. The total cost of the Agreement is \$3 billion (in net present value terms over twenty years).
- While the Agreement has some scope for these contractual arrangements to be reviewed, the review provisions are restricted and mostly centre around the identification of cost-saving opportunities for Telstra (which can only be passed on to the Government under certain conditions). It is unlikely that the Commission's proposed reforms can be achieved within the scope of the current Agreement.
- To achieve the Commission's proposed reforms, the Government and Telstra should work outside the confines of those narrow review provisions and renegotiate the scope, payment and term of the modules of the TUSOP Agreement relating to the *standard telephone service* USO (module B) and the payphones USO (module C).
- While the terms of any contract renegotiation is ultimately a matter for the Government and Telstra, there are some key considerations that should underpin the formulation of a transition strategy. From a community-wide perspective, these should aim to balance the costs of contract renegotiation against the benefits of timely reform. There are likely to be mutually beneficial gains for both parties from a renegotiation of the Agreement.
- In renegotiating provisions for the *standard telephone service* USO, the transition strategy could be staged in parallel with the rollout of the National Broadband Network (NBN). This might allow the Government to immediately realise some cost savings. However, there would be complexities from stakeholder management, legislative and contractual perspectives. Delaying the transition until the NBN is fully rolled out is likely to be simpler but it would see the continuation of annual *standard telephone service* payments over the final years of the NBN infrastructure rollout.
- The case for winding back the existing payphones USO immediately is clearer. The Government and Telstra should commence negotiations for either an immediate termination of the payphones USO, or limit the payphones USO to areas without mobile coverage.
- The Commission's proposed reforms to the TUSO must be supported by reforms to the broader telecommunications consumer safeguards policy and regulatory framework. These reforms should be undertaken from a whole-of-government perspective. To this end, the Government's planned review of telecommunications consumer safeguards should be expedited and expanded in scope.

Recent years have seen technology and communications usage shift dramatically, in directions which have been guided in shared parts by changing technology, market developments and government interventions (chapter 2). The consumer requirements for universal telecommunications service arrangements in Australia have shifted accordingly, and just as rapidly. Against this rapidly evolving backdrop, it is unfortunate that the current universal service arrangements were locked into an inflexible twenty-year contract (until 2032). The Commission's assessment is that the telecommunications universal service obligation (TUSO), as it stands, is ineffective and unnecessary and, hence, should be phased out as soon as practicable (draft recommendation 3.1). In the few years since 2012, market conditions, technological developments and consumption patterns have moved in a direction which is clearly not supported by the current contractual arrangements, as set out in the Telstra USO Performance (TUSOP) Agreement.

Submissions to this inquiry, and to past reviews (for example, RTIRC 2015b) have overwhelmingly acknowledged that the contractual arrangements are untenable in the long term; and should not remain in place until 2032. The current arrangements also lie in strong contrast to those proposed in chapters 5 and 7. In addition, the design of the current arrangement creates a number of distortions with adverse impacts on the efficiency of the telecommunications sector more broadly (chapter 3).

On this basis and in response to the terms of reference, this chapter examines what avenues are available to the Australian Government to plan a path forward from the current arrangements, to a more effective, sustainable and appropriately-funded model for universal services (sections 9.1 to 9.4). This chapter also examines the timing of transition paths for the *standard telephone service* Universal Service Obligation (USO) (module B) and payphones USO (module C) within the TUSOP Agreement separately, noting that the two obligations have unique considerations, which would affect the timing and scale of transition. The chapter closes by investigating a range of other considerations for the Government, which are not included within the current TUSO, but are complementary to the TUSO arrangements and will therefore also require reform (section 9.5).

9.1 The TUSOP Agreement

The TUSOP Agreement, negotiated between the Australian Government and Telstra in 2011 and commencing in 2012, provides the basis upon which Telstra receives payment for performing its regulated obligation as Australia's TUSO provider. The Agreement is one of a series of separate, yet interrelated, agreements signed by the Government, Telstra and NBN Co Limited (nbn) to enable the construction and operation of National Broadband Network (NBN) infrastructure.

Under the Universal Service Regime set out in the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth) (the TCPSS Act), Telstra has a regulated obligation to ensure that *standard telephone services* and payphones are accessible to all people in Australia.

The TUSOP Agreement reflects this obligation, but outlines the terms against which Telstra would receive payment from the Government for fulfilling the TUSO until 2032,⁹¹ being \$253 million and \$44 million per year (including GST) for the supply of the *standard telephone service* and payphones USOs, respectively. Under the Agreement, Telstra is specifically contracted to:

- supply the *standard telephone service* USO in accordance with the TCPSS Act — that is, to ensure that *standard telephone services* are reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business
- supply, install and maintain USO payphones in accordance with the TCPSS Act
- maintain ‘copper continuity’ in areas outside the NBN fixed-line footprint (known as the ‘copper continuity obligation’, or CCO).

The TUSOP Agreement, with its twenty-year term and limited scope for amendment (box 9.1) presents a significant hurdle to the Australian Government and policy-makers in implementing a new framework for universal service arrangements. If the Agreement were to run its full course, with no reduction in payments, it would ultimately cost \$3 billion for the delivery of the *standard telephone service* and payphones USOs over the full term, with the taxpayer contributing \$1.9 billion of that cost and industry (and ultimately consumers of telecommunications services) contributing the remainder. Telstra itself would be liable for a significant contribution towards the Telecommunications Industry Levy (TIL) under the terms of the Agreement; however its contribution towards the TIL will fall over the coming years as nbn’s contribution grows.

Some elements of the TUSOP Agreement are out of scope in this inquiry

There are some elements of the TUSOP Agreement that are not discussed in this chapter. These include modules relating to the provision of the emergency call service, and provisions relating to the migration of public interest services to NBN infrastructure. As with the TUSO, Telstra receives funding for these other services from the TIL — including up to \$20 million annually for the emergency call service (module E).

The terms of reference for this inquiry do not extend the Commission’s consideration towards the non-TUSO elements of the Agreement. Additionally, the review and cost-saving clauses in the TUSOP Agreement (discussed below) are limited in application to the modules of the Agreement relating to the TUSO, indicating a lesser degree of flexibility of these other arrangements generally. However, as discussed in section 9.5, the Commission is of the view that the Government’s planned review of telecommunications consumer safeguards should be conducted as a matter of priority — and notes that these other elements of the TUSOP Agreement should be captured within that exercise.

⁹¹ As discussed in chapter 3, this payment is funded from a combination of general government revenue and the telecommunications industry levy.

The TUSOP Agreement lacks critical flexibility

Analysis in this draft inquiry report (chapters 3 to 5) suggests that the Australian Government should move to new arrangements for universal services as soon as possible, with the recommended approaches in chapters 7 and 8 being starkly different to the current structure set by the TUSOP Agreement.

Existing mechanisms for negotiating changes within the TUSOP Agreement are restricted to just a few clauses, which are also limited in scope (box 9.1). They provide for limited options for review, and mostly centre around finding cost savings for Telstra.

For example, while there is a cost-saving proposal mechanism in **clause 6** of the Agreement, it states that Telstra would retain none of any costs saved while its current levy contribution factor is more than 50 per cent. (Telstra's contribution to the TIL in 2014–15 was above 60 per cent (ACMA 2015d)). This suggests that, under current conditions, there is little incentive for Telstra to propose, or agree to, the implementation of cost-saving proposals under this mechanism. However, any reduction in contract payment amounts would also reduce the amount of the TIL that industry, including Telstra, would be required to pay each year.

There is also a review mechanism under **clause 5**, which provides for an independent review in 2021 (anticipated to occur after the completion of the NBN rollout). Similarly, this review is restricted to identifying a net reduction in Telstra's costs, by identifying alternative technologies and systems for delivery of the TUSO. It is highly restrictive and the outcomes depend heavily on the findings of the independent reviewer, which would form the parameters for subsequent contract changes.

The remaining key contractual mechanism, **subclause 7.2 — adjustment of payment amounts for change in scope of services**, provides an opportunity for the Government to achieve significant cost revisions, in accordance with any legislative scope changes to the *standard telephone service* and payphones USOs under the TCPSS Act. However, amending the scope of the TUSO without first reaching an express agreement by the parties concerned may be contentious. This option is discussed further in section 9.4.

Given the limited scope within these clauses to introduce substantive changes to the current TUSO model, the TUSOP Agreement is a fundamental roadblock to implementation of policy reforms.

In light of this, the Commission considers the only reasonable option remaining is for parties to the TUSOP Agreement to negotiate material changes to modules B and C of the TUSOP Agreement, without the constraints imposed by the existing review and payment adjustment clauses in the Agreement. This would allow the Government to ensure that negotiations are based upon the introduction of new arrangements, which are policy-based (instead of cost-saving based) and meet the wider range of social and economic policy outcomes that the arrangements seek to fulfil.

Box 9.1 Summary of key clauses in the TUSOP Agreement

Relevant clauses within the Telstra USO Performance (TUSOP) Agreement for the issue of transition include:

- **Clause 5 — Review.** This clause provides that a review of the technologies and systems for delivery of the USO (*standard telephone service* and payphones) must commence in July 2021 and be conducted by an independent third party. The review must examine the availability of alternative technologies or systems that could deliver the services at a net reduction in Telstra's costs, and subsequently a reduction in the contract payments. The review would also examine how the terms of the Agreement would need to be varied to accommodate the use of alternative technologies or systems.
- **Clause 6 — Cost-saving proposals.** This clause allows either party to the Agreement to present proposals for a reduction of Telstra's costs incurred in delivering the USO as per the terms of the Agreement. The extent to which savings found under this clause are passed on to the Australian Government are determined by the percentage of Telstra's Telecommunications Industry Levy (TIL) contribution factor. As Telstra currently contributes over 50 per cent of the annual TIL, the Agreement states that Telstra would retain 0 per cent of savings found under this clause (unless otherwise negotiated by parties). Cost-saving proposals can be put forward by either party at any time.
- **Clause 7.2 — Adjustment of payment amounts for change in scope of service.** The payment for the TUSO modules of the Agreement can be adjusted in the event of a change of the scope of the TUSO. The scope of the TUSO is set by reference to the obligation(s) in the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth) (TCPSS Act).
- **Clause 9 — Termination.** Either party may terminate the TUSOP Agreement if a Permanent Cessation of the NBN rollout occurs, and on the date of that permanent cessation, the NBN rollout has passed less than 20 per cent of premises.^a Additional circumstances are available for the Government to terminate the Agreement if Telstra has committed a material breach of the Agreement.
- **Module B — Standard Telephone Service.** Under this module, Telstra is required to fulfil the *standard telephone service* USO as per the the TCPSS Act. Of particular note:
 - **subclause 25.3** provides for the parties to agree to a variation to the TUSOP Agreement, in the event of a scope change to the relevant legislation
 - **clause 26** sets out the Copper Continuity Obligation (chapter 3).
- **Module C — Payphones.** Under this module Telstra is required to fulfil the payphones USO as per the TCPSS Act. Of particular note:
 - **subclause 28.3** provides for the parties to agree to a variation to the TUSOP Agreement in the event of a scope change to the relevant legislation.
 - **clause 33.2 — Five year review of payphones removals** provides for a 5-yearly review of the payphones payment amount (next due in 2017),^b however, reviews will only be triggered if overall payphone numbers increase or decrease by at least 2000 units in the preceding 5 years.

^a In September 2016, nbn announced that it has passed 3.2 million premises, which exceeds 20 per cent of the overall target. ^b Recent payphone reporting numbers indicate that the scheduled 2017 payphones payment review is unlikely to be triggered.

Source: Unpublished information provided by the Department of Communications and the Arts, 2016.

DRAFT FINDING 9.1

The Commission's proposed changes to universal service arrangements are incompatible with the current Telstra USO Performance Agreement.

The contract's review and payment mechanisms offer limited capacity for the parties to amend the contract in a way that aligns with an improved policy approach. A significant renegotiation of the terms of the Agreement is likely to provide the most effective transition path to a fully overhauled universal service regime.

There are risks, such as financial penalty, for the Government in attempting to renegotiate or terminate the TUSOP Agreement before 2032. Even though the commerciality of *standard telephone services* and payphones is unclear, an allowance of compensation to Telstra would be justified, as the TUSOP Agreement would have guided a range of long-term investment decisions, particularly in relation to maintenance of Telstra's copper network.

Another consideration revolves around the legislative processes that the Government would need to undertake to ensure that the outcomes of contractual negotiations are reflected in adjustments to Telstra's regulated responsibilities under legislation. The renegotiation of the TUSOP Agreement would need to be conditional on passage of amending legislation to keep the contractual and legislative frameworks consistent. This involves an additional layer of implementation complexity. The Government must also factor into its considerations the risk that the necessary legislation may face opposition in the Australian Parliament.

However, the Government should balance these risks and complexities and possible costs against the opportunities that arise from reforms. A cancelled or renegotiated contract might need to compensate Telstra for lost future earnings, but would also reduce the Government's costs for the continued supply of outdated services and other distortionary impacts of the telecommunications sector and the wider economy. For instance, an effective renegotiation of the Agreement could achieve a range of benefits such as:

- a shortened contract term that would better leverage off the NBN infrastructure rollout
- an amended scope that more accurately targets particular user needs
- a funding level that reflects the efficient costs of supplying universal services
- the introduction of more effective governance and reporting obligations under any new contract
- an opportunity to relinquish the payphones obligation immediately, allowing both the Government and telecommunications providers to better invest those funds into more targeted universal service initiatives (such as public WiFi networks in targeted locations).

DRAFT RECOMMENDATION 9.1

The Australian Government should immediately commence negotiations with Telstra to amend, and ultimately abolish, module B (Standard Telephone Service USO) and module C (Payphones USO) of the Telstra USO Performance Agreement (in line with draft recommendation 3.1).

9.2 Transition principles

While the terms of any contract renegotiation is ultimately a matter for the Australian Government and Telstra, a range of considerations should be factored into devising an effective transition strategy. Some key principles should apply.

As noted earlier, at a broad level, the Government should balance the risks, complexities and possible costs of reform against the opportunities that arise from reforms. Considerations that must be taken into account include:

- the ability for parties to the TUSOP Agreement to mutually agree upon contract changes and a revised course
- the risks to the Government of incurring any financial penalty for changes to the contract, including shortening its term (from 2032) and changing its scope
- any other identified legal implications for an early conclusion of the TUSOP Agreement
- the feasibility of any necessary legislative amendments being introduced into Parliament to support the reforms.

Of critical importance is determining an appropriate timing for the transition, particularly given that the telecommunications landscape is already undergoing significant transformation as NBN infrastructure is rolled out. By ensuring that transition is sufficiently transparent, subject to clear timeframes and supported by effective stakeholder and community engagement strategies, the Government can help industry and the wider community adjust. This should aim to give stakeholders a clear understanding of the new industry landscape, and their changed roles in that landscape.

Regardless of the transition path chosen, the community should also receive clear communication about their rights and relevant safeguards, and would benefit from a transition that is carefully designed to mitigate the risks of loss of access to critical telecommunications services.

These considerations have led the Commission to adopt the following set of guiding principles in implementing any new universal service policy. The transition to any new universal service policy should:

-
- aim to achieve an appropriate **balance** between the forgone **opportunities** from delaying reform against the **costs** associated with shifting to a new arrangement
 - be sufficiently **transparent** and subject to **clear timeframes** to enable effective business decision making
 - incorporate effective stakeholder and **community engagement** strategies
 - be carefully managed to **mitigate** the **risks** of loss of access to **critical services**.

9.3 The payphones USO

For payphones, the case for winding back Telstra’s contractual obligations immediately is relatively clear. Chapter 3 established the case for removal of the payphones USO. This was supported by evidence of almost full saturation of consumer uptake of mobile phones, coupled with mobile coverage of over 99 per cent of the population and mobile carrier competition for over 98 per cent of the population. While Telstra regularly reports on USO payphone numbers (connections and disconnections, repairs and locations) it does not report to the Government on the profitability of its payphones network. Regardless, the combination of declining payphone usage and the ubiquity of mobile phones provides a strong case for overhaul of the payphones USO.

In terms of contractual review mechanisms, the TUSOP Agreement provides for a review of the payphones payment amount if Telstra reports a decline in the overall number of payphones of more than 2000 units over a five-year period. The current five-year period concludes in mid-2017. Reporting to date (ACMA 2015b) indicates that while there has been a steady decline in USO payphone numbers, the current rate of decline will most likely not trigger a review of the payphones payment in mid-2017, with the next scheduled review date in mid-2022. Therefore, the restrictions and infrequency of payment adjustment opportunities make the value of this particular review mechanism minimal.

Irrespective of the rate of decline in payphone numbers, the Commission considers the available evidence on the decline in payphone usage to be sufficiently persuasive of the need for more targeted solutions for community-based telecommunications services. Telstra acknowledged in its submission the declining use of payphones and the impact of mobile services, conceding that ‘the government may wish to consider whether maintaining the payphone obligation is delivering value to Australian consumers’ (sub. 30). It followed on with an acknowledgment of the consumer shift towards mobile:

We are also conscious of the feedback we are receiving from our regional customers and stakeholders on the value they place in our existing regional investment and their calls for ongoing investment in mobile infrastructure and ADSL. If removal of the obligation leads to a reduction in industry funding liabilities it may enable all contributors to invest in expanding or upgrading their regional infrastructure. (p. 19)

Given this concession, the Commission recommends that the Government immediately commence negotiations with Telstra for an early termination of the payphones USO

component of the TUSOP Agreement. Termination of the contractual obligation to supply payphones would allow the Government to implement the Commission’s proposals for a highly targeted policy approach, as discussed in chapter 7.

The Commission also recognises the benefits of an early termination of the payphones USO to Telstra. In addition to reduced TIL liabilities and regulatory impost, Telstra would gain the opportunity to re-purpose its national payphones network with a more commercial focus, unconstrained by statutory and contractual obligations. The recent launch of Telstra Air — Telstra’s WiFi network — gives an early indication of the commercial possibilities available in this sphere. This opportunity should bear weight in any negotiations between the parties regarding penalty or lost earnings for early termination of the payphones USO.

DRAFT RECOMMENDATION 9.2

In negotiating changes to the Telstra USO Performance Agreement (draft recommendation 9.1), the Australian Government should seek an early termination of module C (Payphones USO) of the Agreement. These negotiations should be complemented by the required legislative amendments to also remove Telstra’s statutory requirements in relation to the payphones universal service obligation.

9.4 The *standard telephone service* USO

The case for transitioning away from the current *standard telephone service* USO, while equally strong, is likely to be more complex.

Participants put forward a range of options and perspectives regarding the transition away from the current universal service arrangements. A number of factors are relevant to this consideration, most significantly the timing of the rollout of NBN infrastructure, but also the time required to settle various contractual and legislative amendments (both direct and consequential) that are needed for transition to occur.

Timing options for transition are also dependent on an assessment of the adequacy of the various technologies for delivering a *baseline* voice service. While the Commission is confident in the capability of nbn’s fixed-line and fixed wireless connections to deliver voice services of a high quality and equivalent to the standard offered under the TUSO (draft finding 6.2), the adequacy of NBN satellite technology for delivering a *baseline* voice service is less certain at this stage and subject to an information request (chapter 6). For the purposes of the options discussed below, however, it is assumed that all NBN networks will provide a *baseline* voice service.

Option 1: Change the legislative scope of the *standard telephone service* obligation

As noted above, the interaction of clauses 7.2 and 25.3 of the TUSOP Agreement with part 2 of the TCPSS Act appears to provide the Australian Government with the most direct route to achieving significant changes and payment reductions for the *standard telephone service* USO under the TUSOP Agreement.

Part 2 of the TCPSS Act, which sets out the Universal Service Regime, defines the *standard telephone service* and payphones USOs, which Telstra is contracted to fulfil. It also sets the scope of these obligations, including defining who must receive these services in order for the obligation to be fulfilled.

Clause 25 of the TUSOP Agreement outlines the scope of the *standard telephone service* USO by reference to the relevant provisions of the TCPSS Act, and acknowledges that a change in scope under legislation should be followed by complementary variation of the TUSOP Agreement.

As detailed in box 9.1, a change in the scope of the *standard telephone service* USO under clause 25 would also trigger a renegotiation of the Agreement's payment amounts, under clause 7.2.

On the face of it, the confluence of these legislative and contractual clauses would give the Government the ability to force a payment reduction for the *standard telephone service* USO module of the TUSOP Agreement. This could be achieved through the passage of legislative amendments to the TCPSS Act to reduce scope of the *standard telephone service* USO. Given that chapters 5 to 7 of this draft report effectively recommend the removal of the *standard telephone service* USO for all premises within the NBN footprint, the legislative provisions for the scope of the *standard telephone service* could arguably be amended to align with this position (for example, reflecting a 'zero per cent scope' once the rollout of NBN infrastructure is complete). If the legislative parameters of the scope of the *standard telephone service* USO were amended, parties to the TUSOP Agreement would be required to renegotiate Telstra's requirements and payments to reflect that amendment.

This route offers the Government the most direct method for setting the scope for the *standard telephone service* USO in accordance with a new, re-evaluated policy framework and terms. Aside from the potential challenges of passing the necessary legislation through the Australian Parliament, it offers a relatively simple avenue to abolishing the *standard telephone service* USO and the accompanying payments.

However, while this approach offers an opportunity to compel significant changes to the TUSOP Agreement, it has contractual and regulatory complexities and risks that may set an undesirable precedent for future contractual arrangements between the Government and the private sector. Additionally, it heightens the risk of damaging relationships between the parties, particularly given both parties have expressed a readiness to negotiate on the

standard telephone service issue. The Government should therefore carefully consider this option in light of its long-term relationship with Telstra, and Telstra's integral role in the NBN rollout.

Option 2: Wait until the NBN rollout is complete

Another option is for the Australian Government to wait until NBN infrastructure has been fully rolled out to all premises (estimated to occur in 2020) before removing the *standard telephone service* USO. An amended TUSOP Agreement could provide for the immediate cessation of the *standard telephone service* USO to occur once the rollout of the entire network is concluded.

Both parties to the TUSOP Agreement indicated in their submissions their preference to wait for the completion of the NBN rollout before moving to a new model.

If this option were adopted, the Commission considers that parties should immediately commence negotiating and establishing the necessary contractual and legislative changes required for a new framework, with a view to transitioning in 2020 (or thereabouts). The NBN rollout need not be completed before consideration of changes to TUSO arrangements can occur, as per Telstra's suggestion (sub. 30, p. 14). There is already sufficient evidentiary basis to justify a commitment to the removal of the *standard telephone service* USO.

Accordingly, the Commission does not consider that parties should rely on the independent technology review (due to commence in 2021 under clause 5 of the TUSOP Agreement) to determine the future course of the TUSOP Agreement. To do so would unnecessarily delay the introduction of reforms. Additionally, the parameters of the independent review are likely to be too restrictive to lead to a full-scale policy overhaul of the TUSO, of the nature recommended in this draft report.

In order to achieve this option, negotiations between the parties would need to be supported by relevant legislative arrangements, including:

- legislation establishing nbn as the statutory infrastructure provider (SIP) (as proposed in draft recommendation 7.1)
- amendments to the TCPSS Act to provide for the repeal of Telstra's regulatory obligations for the *standard telephone service* USO when the contractual obligations cease
- a consequential restructure of the wider telecommunications consumer safeguards framework to ensure appropriate adjustments are made (section 9.5).

This option would also end the CCO in all areas once NBN infrastructure is rolled out, potentially requiring the Government to have established suitable arrangements to underpin services in the NBN satellite footprint, if deemed necessary.

Advantages to this approach include a clean, simple transition as the *standard telephone service* USO would cease across the country at a particular date. The contract term for module B would be halved — resulting in a potentially significant cost saving to the Government and industry — and, importantly, a cessation of payments for a service that appears to have a low value. It would also allow the implementation of a new framework for universal services to be introduced earlier and coincide neatly with the completion of NBN infrastructure deployment.

A possible disadvantage of this option is that it would see the continuation of annual *standard telephone service* payments for the final years of the NBN infrastructure rollout — resulting in a further \$1 billion of payments for the *standard telephone service* USO (or more, in the event that the NBN rollout takes longer than expected, and is not completed by 2020).

Option 3: Wind back the *standard telephone service* USO gradually

A variant of option 2 is one where the Government stages the winding back of the *standard telephone service* USO to align with the progressive rollout of NBN infrastructure. That would mean that once an area is connected to NBN infrastructure, Telstra's *standard telephone service* obligation would be removed for that area. If NBN infrastructure is fully rolled out by 2020 as planned, this option would take place between the immediate future (pending contract renegotiations) and 2020.

A range of participants noted that a USO, in whatever form, should no longer be needed in areas served by NBN fixed-line networks because the NBN infrastructure effectively provides access to voice and broadband services on a universal basis. The Department of Communications and the Arts (DoCA, sub. 58) has indicated its intention to introduce legislation into Parliament in the near future that would give nbn the statutory role of infrastructure provider of last resort, offering an additional layer of statutory protection. These arguments strengthen the case that the *standard telephone service* USO could be removed immediately for NBN-connected areas.

The Australian Government and Telstra, in renegotiating the TUSOP Agreement, could consider as an option, a strategy that has the effect of:

- enabling the *standard telephone service* USO to continue to apply in areas not yet connected to NBN infrastructure
- winding back the *standard telephone service* USO for all NBN-connected areas as soon as practicable
- each year, assessing how many areas have been newly connected to NBN infrastructure in the previous 12 months, and subsequently wind back Telstra's *standard telephone service* USO for those areas (and reduce the payments to Telstra to reflect the reduced scope of the obligation).

Under this strategy, the Government could commence winding back the USO as soon as possible (pending any contractual and legislative arrangements), in all fixed-line areas that have been migrated to NBN infrastructure and disconnected from Telstra's local access networks. nbn's satellite-based customers would not be regarded as 'connected' to NBN infrastructure until they are receiving services over the Long-Term Satellite Service, *Sky Muster* or *Sky Muster II*. NBN fixed wireless customers could have their *standard telephone service* USO wound back as soon as nbn services become available in their area. The *standard telephone service* USO would therefore only continue to be enforced in non-nbn served areas (or nbn customers on the Interim Satellite Service), with the scope of those areas re-evaluated on an annual basis.

This option is consistent with Vodafone Australia's (sub. 46) suggestion that:

Transition to new arrangements should occur (and Telstra's current obligations should be removed) whenever the following conditions are met:

- Services are available on the NBN; and
- The incremental costs of [nbn] or other (e.g. mobile) suppliers of providing universal voice services are less than the costs Telstra could avoid from no longer being obligated to supply universal voice services. (p. 32)

Similarly, nbn (sub. 47) suggested that changes to USOs could be tied to the gradual rollout process:

In nbn's view there needs to be a new baseline voice service defined in a way that is technology agnostic ... If this is done, and the role of nbn appropriately recognised, the need to designate a universal service provider of last resort could be significantly wound back. This would occur over time as the nbn™ network is deployed, rather than at the completion of the nbn™ network rollout. (p. 8)

Under this strategy, the *standard telephone service* component of the TUSOP Agreement would gradually be scaled back, then terminated following the completion of the NBN infrastructure rollout, allowing the Government to then implement a replacement universal service framework to address any gaps it identifies in the *availability* of services (chapter 7).

The major benefit of this approach is the ability to realise some cost savings earlier, particularly for the Government as it continues its \$29.5 billion investment into NBN infrastructure. The other clear benefit to this approach is its focus on service availability, rather than network completion — resulting in a more efficient approach to where universal telecommunication service interventions are needed. An empirical basis for scaling payment reductions would be needed — whether against nbn connection numbers or number of 'premises passed', or Telstra's own data based on services migrated off its legacy network, or by data from an Australian Government source. While these various options each have advantages and disadvantages, a more detailed understanding of the relative transparency and reliability of these datasets would be required to determine the best basis for payment reductions, as well as the overall feasibility of this option.

However, the efficiency of that approach must be balanced against (and may be ultimately outweighed by) the associated administrative requirements. The Commission acknowledges that running multiple concurrent transition plans (that is, a TUSO transition as well as an NBN infrastructure transition) is complex and may be difficult (but not impossible) to execute, from both a legislative and contractual viewpoint. For instance, this option requires complex amendments to the TCPSS Act to ensure that the legislative and contractual obligations continue to ‘mirror’ each other through the winding-back process, thus adding a layer of timing complexity and risk to account for the passage of amending legislation. Further, execution of this strategy might exacerbate the complexity of stakeholder and community engagement strategies, and add to existing consumer confusion about the NBN infrastructure rollout.

Additional considerations: the Copper Continuity Obligation

Parties to the TUSOP Agreement should also consider the implications of changes to the CCO, which currently requires Telstra to maintain its local access copper network telephone service within nbn’s fixed wireless and satellite footprints.

Under transition options 2 and 3 outlined above, the CCO would be treated in line with the *standard telephone service* USO in an area — whether the obligation is maintained until 2020 (option 2) or gradually scaled back in line with the NBN infrastructure rollout (option 3), the CCO would only apply where the *standard telephone service* USO continued to apply.

Another option in relation to the CCO is to immediately cease the CCO in its entirety (regardless of whether the *standard telephone service* USO is still in operation in an area). This option might be worth considering if NBN satellite services are found to deliver an acceptable *baseline* voice service.

If nbn’s satellite network is ultimately deemed capable of delivering an acceptable *baseline* voice service, the Australian Government will be in a position to reassess the continuing need for the CCO. An holistic view of the Australian telecommunications market, which takes into account the contribution of mobile voice services, might arguably conclude that the majority of CCO areas are sufficiently underpinned by a range of alternative voice services to render the CCO unnecessary.

This assessment of services against a *baseline* standard must nonetheless be viewed in the context of the unique circumstances of people living in much of nbn’s satellite footprint, with some living in the most remote areas of Australia. Anecdotally, the quality and availability of voice services in remote areas are more at risk, even despite the operation of current safeguards such as the Customer Service Guarantee (CSG) and the National Reliability Framework. While mobile services add a layer of security, they are also not regulated in terms of quality and availability. A pragmatic assessment of the CCO must balance the risks of early degradation of the copper networks, against the likely quality and availability of replacement voice services (such as VoIP and mobile) in those areas.

The advantage of an early termination of the CCO is in the potential cost savings — contract price adjustments could be negotiated to recognise the cost savings to Telstra for no longer needing to maintain copper services under the CCO.

INFORMATION REQUEST 9.1

Participants are invited to comment on the relative merits of the following (or other feasible) transition options for the standard telephone service USO module of the Telstra USO Performance (TUSOP) Agreement.

- Option 1: Amend the Telecommunications (Consumer Protection and Service Standards) Act 1999 (Cth) to change the scope of the current standard telephone service USO, thereby forcing the parties to negotiate a payment adjustment under the Agreement.*
 - Option 2: Remove the standard telephone service USO in all areas once the NBN rollout is complete.*
 - Option 3: Commence a staged wind-back of the standard telephone service USO in NBN-connected areas as soon as practicable.*
-

9.5 Complementary reform considerations

Sitting alongside the TUSO (and the TUSOP Agreement) is a set of broader policy considerations for the Australian Government. The Commission’s proposed repositioning of universal telecommunications service policy to a highly targeted approach implies that many existing policies and measures designed to supplement the availability, accessibility and affordability of universal services outside of the TUSO will also require reform. To enable a coherent and efficient transition, these reforms need to be undertaken from a whole-of-government perspective in tandem with reforms to the TUSO and the TUSOP Agreement. One vehicle for pursuing these wide-ranging reforms is the Government’s planned review of the telecommunications consumer safeguards framework.

Expanding the scope of the intended consumer safeguards review

In its submission to this inquiry, the DoCA (sub. 58) outlined the Australian Government’s intention to conduct a telecommunications consumer safeguards framework review (in parallel with this inquiry) focusing on affordability, accessibility and other consumer safeguards that sit outside the TUSO.

The Commission underscores the importance of expediting this review, given the strong integration of the existing TUSO with other consumer safeguard mechanisms. For example, telecommunications accessibility for people with disability may be affected by

the removal of the *standard telephone service* USO from Telstra — which has required Telstra to also supply specialised customer equipment for people with disability.

In making recommendations regarding the future of the TUSO, the Commission is recommending that the Government’s planned review of telecommunications consumer safeguards reassess the future of the full suite of government interventions in this policy area, whether or not they are consequentially affected by changes to the TUSO and the TUSOP Agreement.

Key areas emerging from this inquiry, which the Government’s proposed review should examine, include:

- the future of the CSG, which sets standards and benchmarks for connection, repair and appointment keeping times
- Telstra’s carrier licence conditions, including Priority Assistance arrangements and low income measures
- other affordability and accessibility measures
- the consumer protection roles of various relevant bodies
- the delineation of responsibilities for service quality over NBN infrastructure.

These expanded elements for the review are wide in scope, and capture a number of portfolio areas both within and beyond DoCA’s portfolio. This is particularly relevant to the Department of Social Services, which has a strong policy alignment to both accessibility and affordability issues, and should have some input into the effectiveness of both affordability and accessibility measures. It also relates to existing policies and programs targeting Indigenous communities administered by the Department of the Prime Minister and Cabinet.

The wide scope of this review suggests that it may be best undertaken from a whole-of-government perspective. Some of the issues for review are urgent and would require resolution prior to the Australian Government renegotiating the TUSOP Agreement with Telstra.

The Customer Service Guarantee

Of key importance to the Government’s proposed consumer safeguard review is the future of the CSG. The CSG currently provides the primary means against which the provision of *standard telephone services* is measured.

The gradual evolution of the telecommunications market over the past decade, as well as the NBN infrastructure rollout, have reduced the CSG’s effectiveness as a safeguard. Its effectiveness will be reduced even further should the reforms recommended in this draft inquiry report be accepted by the Australian Government. Therefore, in proceeding with its planned consumer safeguard framework review, the Government should pay primary attention to the CSG, noting that the elements of reliability and repair times are crucial

factors in any overarching assessment of the quality of a service, and should be carried over to a reformed framework, where relevant.

The CSG is mandatory for *standard telephone services* provided by Telstra but can be waived by other retail service providers. Therefore, irrespective of the changes caused by the NBN infrastructure rollout, the CSG is not a comprehensive safeguard with consistent application across fixed-line voice services.

Additionally, the CSG applies to voice services only. Given the shift to NBN infrastructure and broadband, the voice-specific nature of the CSG makes this safeguard increasingly redundant. As more consumers shift from the *standard telephone service* to alternative voice services, the number of CSG-protected connections will fall accordingly.

As it was initially envisaged that the TUSOP Agreement would preserve copper voice services within the NBN fixed wireless and satellite footprints, Australian Government consumer safeguard policy would likely have, until now, sought to preserve the CSG for application to those legacy services. However, if the TUSO is abolished and the CCO removed accordingly, the Government is in a clear position to replace the CSG framework with a renewed perspective — ideally one that is aligned with the Commission’s proposed reforms.

Issues with applying the CSG to nbn’s fixed wireless and satellite networks

Currently Telstra is prevented from using nbn’s fixed wireless and satellite networks to deliver the *standard telephone service* USO, through the combined forces of multiple mechanisms:

- the statutory framework for the CSG, with section 120 of the TCPSS Act expressly preventing waiver of the CSG in relation to the supply of *standard telephone services*
- section 19 of the *Carrier Licence Conditions (Telstra Corporation Limited) Declaration 1997*, which requires Telstra to offer Priority Assistance arrangements to customers with life-threatening medical conditions
- section 10.3 of nbn’s Wholesale Broadband Agreement (WBA), which restricts retail service providers from using their fixed wireless and satellite networks to supply end-users with a CSG or Priority Assistance voice service (nbn 2016k)

The provision of voice services over nbn’s fixed wireless networks has been rolled out to around 117 500 premises (as at June 2016) in a number of areas across Australia, and early reports indicate that the technology is providing acceptable voice services, which are comparable to those provided over Telstra’s fixed copper networks. Telstra (sub. 30) said:

Telstra already provides voice services as part of a bundle to customers over NBN [fixed wireless] infrastructure. The actual service delivered is no different to other services offered in fulfilment of the [TUSO]. To date we have not received a complaint in relation to voice quality or voice service availability over NBN [fixed wireless] ... The current restriction results in unnecessary complexity in design ... if this restriction was removed from the WBA, we would

not need to offer both a voice service over copper and broadband service over the NBN [fixed wireless]. (p. 15)

Telstra's view is contrary to nbn's statement that its fixed wireless network is not optimised for the provision of voice services (sub. 47, p. 15).

This debate, while singling out the WBA and the CSG as culprits of inefficiency, highlights a more significant issue at play — that being the lack of clarity around measuring the 'adequacy' of services. To this end — despite nbn's claims that its fixed wireless network has not been optimised for voice provision and as discussed in chapter 6 — the Commission considers voice services offered to premises over nbn's fixed-line and fixed wireless networks to be of a high quality and equivalent to the standard offered under the current TUSO (draft finding 6.2). In the event that NBN satellites are also found to deliver a *baseline* voice service (chapter 6), the prohibitions against allowing nbn's fixed wireless and satellite networks to deliver CSG and Priority Assistance would be unnecessary.

However, the Commission does not necessarily accept that the primary solution is to make changes to the WBA to remove these impediments. As stated by nbn, the WBA reflects planning, design and deployment decisions, which have cost implications. The WBA has also formed the basis for business planning by all retail service providers, not just Telstra, and to change it under these circumstances may be a disproportionate response to the issue at hand. In addition, it is undesirable for the governments to interfere with the commercial decisions and operations of a government business enterprise, such as nbn.

A more effective solution may be for the Government, in conducting its review of consumer safeguards, to address these anomalies and inefficiencies through reform of the safeguards framework. Considering that these consumer safeguards are to be reviewed irrespectively — particularly the CSG, which is intrinsically linked to the TUSO and could soon become obsolete — it is timely to review these safeguards, not just in respect to how they relate to the TUSO, but also to ensure other unintentional or unnecessary impediments to use of NBN infrastructure are removed.

The proposed Statutory Infrastructure Provider legislation

Both Telstra and nbn have argued that regulating service levels across the country is detrimental to competition. For example, nbn (sub. 47) argued that imposing service levels across Australia may limit the provision of services on alternative infrastructure and hence suggested that service levels should be mandated only in areas where there is no competition in the telecommunications sector. Further, nbn (sub. 47) also stated that in areas where competition exists, competitive forces should ensure that service levels are set at appropriate levels.

While markets generally play an important role in meeting consumer needs, specifying and requiring a set of outcomes (and associated technical standards) for the provision of a

universal service is not inimical to competition in and of itself. Problems can arise when technical standards are set too high or impose an undue compliance burden. Accordingly, when setting technical standards, either at the wholesale or retail level, consultation with a range of stakeholders will be required to take into account the benefits and costs of the proposed standards, particularly to ensure that they do not impose an undue compliance burden on providers, with costs to the community more broadly.

The Australian Government's proposed Statutory Infrastructure Provider (SIP) regime (DoCA, sub. 58) for nbn offers an opportunity for setting standards, rules and benchmarks covering a range of technology-specific service quality measures. This could, for example, include connection and fault rectification time frames. The proposed SIP regime should also outline the monitoring arrangements and associated penalties for breaches of service quality.

The Government's proposed review of consumer safeguards framework should therefore consider the way in which the SIP regime and a reformed CSG framework would operate concurrently. A streamlined framework of standards, rules and benchmarks for services at both the wholesale and retail level should be determined early, so that negotiations between the Government and Telstra regarding the TUSOP Agreement are clearly contextualised.

Telstra's carrier licence conditions and other accessibility and affordability measures

As discussed in earlier chapters, there is a range of other safeguard measures relevant to the accessibility and affordability of telecommunications services, including:

- Telstra's carrier licence conditions including a low-income measures strategy and Priority Assistance services
- the Australian Government's Telephone Allowance and other affordability measures
- the National Relay Service for the deaf and hearing impaired, and specialised equipment for people with disability
- other groups that may require targeted accessibility programs, including homeless people, and people living in remote communities.

Most of these consumer safeguard measures have yet to be reviewed and amended to apply with the context of NBN infrastructure deployment. Although a full examination of these measures is beyond the scope of this inquiry, these measures would benefit from a whole-of-government reassessment.

Clarifying responsibilities for service quality and oversight

The planned review of the consumer safeguards framework, and the introduction of the SIP regime, will not only allow the Government to introduce a comprehensive new safeguard

framework, but also provides an opportunity to clarify responsibilities for service quality and oversight of services over NBN infrastructure. This is particularly timely, given the difficulties with NBN services being reported by a range of users, stemming partly from the lack of consumer understanding about legal responsibilities for service quality (chapter 7). Indeed, this may also be indicative of industry confusion as well. Whilst a certain level of confusion can be expected at this stage of the rollout, it will be important to clear up community and industry misunderstandings over this issue in order to support a successful and positive transition to NBN infrastructure over the coming years.

In addition, the proposed expanded review could also provide an opportunity for the Government to clarify the various roles of government agencies and bodies relating to consumer protection and telecommunications services generally. The roles of the Australian Competition and Consumer Commission, the Australian Communications and Media Authority, and the Telecommunications Industry Ombudsman should be reassessed as part of the review, and a clear statement of their roles and responsibilities released, for the benefit of both consumers and industry throughout the NBN transition.

DRAFT FINDING 9.2

A transition path away from the current telecommunications universal service obligation will need to be supported by necessary adjustments to the surrounding regulatory framework. Such adjustments include changes to consumer safeguards, Telstra's carrier licence conditions, and other existing policy measures. This will ensure that consumer rights are adequately considered, while removing inefficiencies and outdated mechanisms.

DRAFT RECOMMENDATION 9.3

The Australian Government should proceed with its intended review of the telecommunications consumer safeguards framework as a matter of priority. The review should include an assessment of:

- what, if any, future safeguards are necessary
- what changes should be made to Telstra's carrier licence conditions
- the future role of accessibility and affordability measures, including the Telephone Allowance, the National Relay Service and relevant elements of the National Disability Insurance Scheme
- the consumer protection roles of various bodies including: the Australian Competition and Consumer Commission; the Australian Communications and Media Authority; and the Telecommunications Industry Ombudsman
- the delineation of responsibilities for service quality (including fault repair) on the NBN.

A Inquiry conduct and participants

This appendix describes the stakeholder consultation process undertaken for the inquiry and lists the organisations and individuals that have participated.

Following receipt of the terms of reference on 28 April 2016, an initial circular advertising the inquiry was distributed to industry organisations and individuals and the inquiry was advertised in a national newspaper.

The Commission released an Issues Paper on 7 June 2016 to assist interested participants in preparing their submissions. There were 60 public submissions received by the Commission prior to the release of this draft (table A.1).

The Commission met with a number of government agencies, business groups, community organisations and academics in Australia (table A.2). It also held roundtables in regional and remote communities (table A.3).

Participants are invited to send any additional submissions in response to this draft to the Commission by Friday 20 January 2017. Additionally, the Commission will hold public hearings on the draft report in Cairns, Dubbo, Sydney, Port Augusta, Launceston and Melbourne in late January and early February 2017. Further details on registering for hearings and making submissions can be found on the inquiry website.

The Commission will provide its final report to the Australian Government by 28 April 2017.

Table A.1 Public submissions received

<i>Participant</i>	<i>Submission No.</i>
MacDonnell Regional Council	1
Great Northern Telecommunications Pty Ltd	2
Tennant Creek Regional Economic Development Committee	3
Optus	4
Coutts Communications	5
Broadband for the Bush Alliance	6
Western Downs ICPA Branch	7
Peter Slattery	8
Mark Gregory (Dr)	9
Regional Development Australia Northern Territory	10
Isolated Children's Parents' Association of Australia	11
Remote Area Planning and Development Board	12
OptiComm	13
Isolated Children's Parents' Association (Qld) Inc	14
Printacall Communications Technology	15
Ninti One	16
Cape York Digital Network Pty Ltd	17
Gary McLaren	18
Yaraka Isisford Branch Isolated Children's Parents' Association	19
Microsoft	20
Northern Territory Isolated Children's Parents' Association of Australia	21
Australian Communication Exchange	22
Regional Development Australia – Townsville and North West Qld	23
Limestone Coast Local Government Association	24
Central Australian Youth Link Up Service	25
Isaac Regional Council	26
Macquarie Telecom	27
Lucy Craddock (Dr)	28
The Flinders Ranges Council	29
Telstra	30
National Farmers' Federation	31
Victorian Farmers Federation	32
Vocus Communications	33
Northern Regional Development Australia Alliance	34
South Burnett Regional Council	35
Arthur Marsh	36
Central Highlands Regional Council	37
TPG Telecom Ltd	38
Australian Small Business and Family Enterprise Ombudsman	39
Australian Competition and Consumer Commission	40

(continued next page)

Table A.1 (continued)

<i>Participant</i>	<i>Submission No.</i>
Barcoo Shire Council	41
Regional Development Australia Central West	42
Internet Australia	43
Roy Wittert	44
Swinburne Institute for Social Research	45
Vodafone Australia	46
nbn co	47
Australian Communications Consumer Action Network	48
Australian Communications and Media Authority	49
Regional Australia Institute	50
Infrastructure Australia	51
Telecommunications Industry Ombudsman	52
Malcolm Moore	53
BAL Consulting Pty Ltd	54
Regional Development Australia Wheatbelt Inc	55
John de Ridder	56
Tasmanian Government	57
Department of Communications and the Arts	58
Northern Territory Government	59
South Australian Government	60

Table A.2 Consultations

Individual or organisation

ACN Pacific
Activ8me
AgForce Queensland
Australian Communications and Media Authority
Australian Communications Consumer Action Network
Australian Competition and Consumer Commission
Australian Council of Social Service
Australian Government Department of Communications and the Arts
Australian Government Department of Infrastructure and Regional Development
Australian Government Department of Social Services
Australian Mobile Telecommunications Association
Australian Small Business and Family Enterprise Ombudsman
Broadband for the Bush Alliance
Bureau of Communications Research
Cleary, Jen
Communications Alliance
Coutts Communications
de Ridder, John
EasyWeb Digital
Eckermann, Robin
Enex TestLab
Ergas, Henry
Ericsson Australia
Gregory, Mark
Infrastructure Australia
Internet Australia
Isolated Children's Parents' Association
James, Robert
Lateral Economics
Macquarie Telecom Competitive Carriers' Coalition
Microsoft
National Farmers Federation
NBN Co Limited
NSW Department of Industry
Optus
Outback Communities Authority
Queensland Government Department of State Development
Regional Australia Institute
Royal Flying Doctor Service
South Australian Department of State Development
Swinburne Institute of Social Research

(continued next page)

Table A.2 (continued)

Individual or organisation

Telecommunications Industry Ombudsman

Telstra

TPG Telecom Ltd

Victorian Farmers Federation

Vodafone Australia

Table A.3 Roundtable details and participants

5 July 2016 – Marree

June Andrews – Marree Health Services
Cindy Mitchell – Muloorinna Station
Phil Turner – Marree Hotel
Anne Morphett – Callanna Station
Peter Litchfield – Mundowdna Station
Lizzie Kahn – Marree Progress Association
Jan Whyte – Arabunna Centre
Reg Dodd – Arabunna Centre
Irene Zada – Local resident
Lyall Oldfield – Marree Post office; General Store and Café owner

5 July 2016 – Blinman

Sally Henery – Blinman Progress Association
Warren and Barbara Fargher – Wirrealpa Station
Karen Cains – Blinman Post Office
Carmel and Brendan Reynolds – Willow Springs Station
Martin and Lyn Phillips – Blinman Progress Association
Tony Smith – Rawnsley Park Station
Kym Geue – Rawnsley Park Station
Susan Pearl – Blinman Heritage Mine
Mary Fisher – Blinman Heritage Mine
Maureen Cutri – Blinman Hotel
Lesley Slade – Moolooloo Station
Lisa McIntosh – Gum Creek Station

6 July 2016 – Alice Springs – Indigenous Organisations

Andrew Crouch – Centre for Appropriate Technology
Blair McFarland – Centre Australian Youth Link Up Services (CAYLUS)
Jennifer McFarland – Centre Australian Youth Link Up Services (CAYLUS)
Fran Kilgariff – Ninti One and CRC for Remote Economic Participation
Daniel Featherstone – Indigenous Remote Communities Association

6 July 2016 – Alice Springs – Other

Scott Lovell – Department of the Chief Minister
Tiani Cook – Isolated Children's Parents' Association (NT)
Ron Saint – Regional Manager Shared Services
Anjali Palmer – Mental Health Association of Central Australia
Jennes Walker – Industry Capability Network

7 July 2016 – Alice Springs – Business / Development / Government

John Gaynor – Central Desert Regional Council
Stephen Schwer – Tourism Central Australia
Robin Gregory – Regional Development Australia
Ruth Elvin – Desert Knowledge Precinct
Chris Kendrick – MacDonnell Regional Council
Vin Lange – Centafarm

B The National Broadband Network

The National Broadband Network (NBN) is a high-speed broadband network that, when complete, will be capable of supplying wholesale broadband internet access to all premises across Australia. The NBN operates on the following bases:

- *open access* — access to the network is provided to all access seekers on a non-discriminatory basis
- *wholesale-only* — NBN Co Limited (nbn) does not supply retail services to end users.

In April 2009, the Australian Government established nbn, a government business enterprise, to build and operate NBN infrastructure. Deployment commenced in 2010 and completion is expected in 2020, with around 2.9 million premises declared ‘ready for service’ at 30 June 2016. The Government’s expectation is that the network will be able to:

... provide peak wholesale download data rates (and proportionate upload rates) of at least 25 megabits per second to all premises, and at least 50 megabits per second to 90 per cent of fixed line premises ... (Fifield and Cormann 2016b, p. 1)

This appendix details the physical and business structure of the NBN and associated rollout and transitional arrangements.

Since the commencement of the rollout, the design of the NBN has evolved due to changes to policy, technology, costs and forecast take-up rates. This appendix focusses on the current network design.

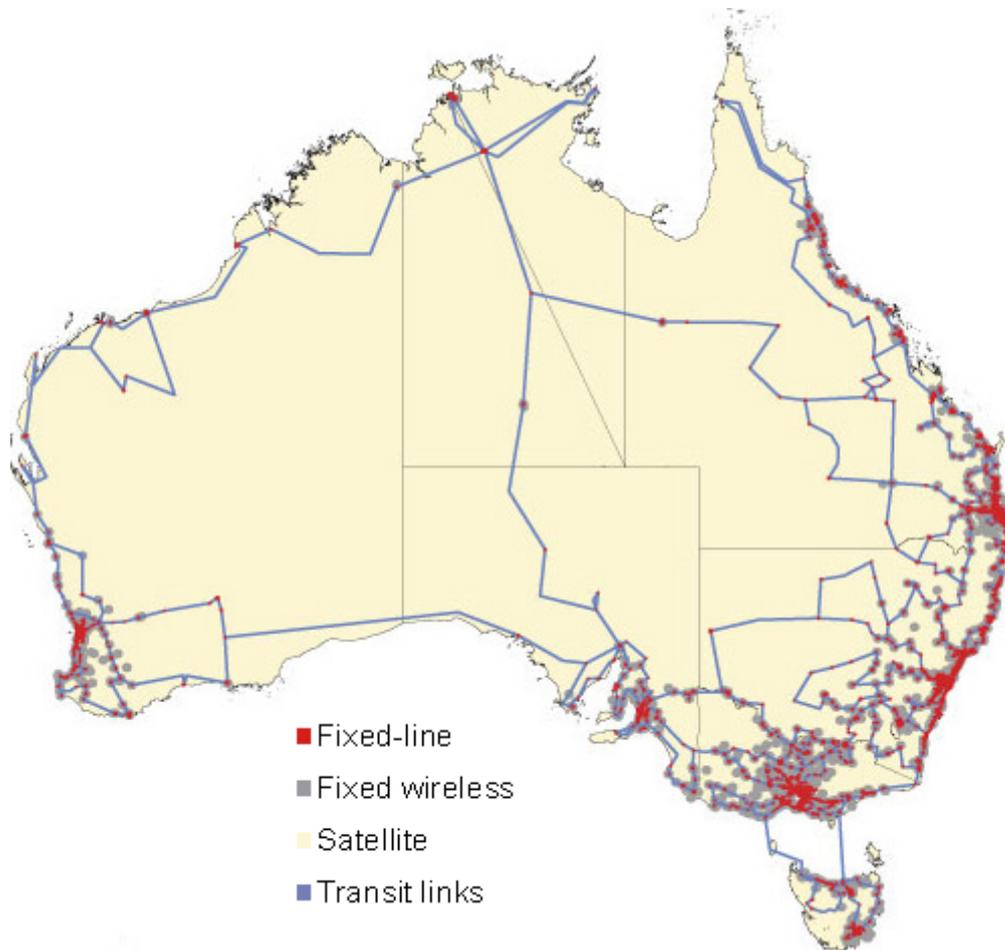
B.1 Structure of the National Broadband Network

nbn’s core product, supplied to access seekers, is an ‘Ethernet bitstream service’ — a service which carries traffic between a ‘user network interface’ (a premises) and a point of interconnect (POI) (nbn 2016k).⁹² There are 121 POIs located in Telstra exchanges around Australia (figure B.1), with each connected to premises in the surrounding area.⁹³ To allow the supply of a retail broadband service, access seekers connect their core networks (typically located in capital cities) to each POI they wish to reach. They may then provide their own retail services as a retail service provider (RSP) or resell access (such as Optus’ ‘Residential Broadband over NBN’ product).

⁹² nbn also supplies two other services, a ‘facilities access service’ and an ‘nbn platform interfacing service’ which allow retail service providers to connect to the NBN.

⁹³ All nbn satellite services are supplied from a single POI located in Sydney.

Figure B.1 The three NBN footprints



Source: Australian Government (2011).

The NBN is divided into three footprints — fixed-line, fixed wireless and satellite (figure B.1; table B.1). The fixed-line footprint (92 per cent of premises) is composed of a ‘multi-technology mix’ — fibre to the premises (FTTP), fibre to the node (FTTN), fibre to the building (FTTB) fibre to the distribution point (FTTdp) and hybrid fibre coaxial (HFC) cable — while a single access technology is used in the fixed wireless and satellite footprints. The three footprints are not contiguously demarcated, with some premises in regional and remote areas served by fixed-line technologies and some fringe metropolitan areas served by fixed wireless and satellite technologies. For example, there are areas where some premises will be served by FTTP and others by satellite (nbn 2014b).

Table B.1 NBN technological mix
Forecasts, at completion of network

<i>Footprint</i>	<i>Technology</i>	<i>Proportion of premises covered</i>	<i>Premises covered</i>
		per cent	million
Fixed-line	FTTP	17–21	2.0–5.5
	FTTN/B/dp	43–54	5.1–6.5
	HFC	21–27	2.5–3.2
Fixed-wireless	Fixed wireless	5	0.6
Satellite	Satellite	3	0.4
Total		100	11.9

Sources: nbn (2015a, 2016a).

Subject to meeting network performance requirements, technology choice is determined on an area-by-area basis, with the aim to minimise peak funding, optimise economic returns and enhance nbn’s viability (Turnbull and Cormann 2014). Factors such as geography, population density and the location and condition of existing networks determine the most appropriate technology choice. This is especially the case within the fixed-line footprint, where nbn has purchased existing network assets for reconditioning and upgrade. nbn forecasts per-premises deployment to vary by over three-fold between technologies, with FTTP greenfields the least expensive and satellite the most expensive (figure B.2).⁹⁴

Fixed line multi-technology mix

Covering 92 per cent of premises, the fixed-line footprint comprises the bulk of the NBN, and will also deliver the fastest connection speeds.

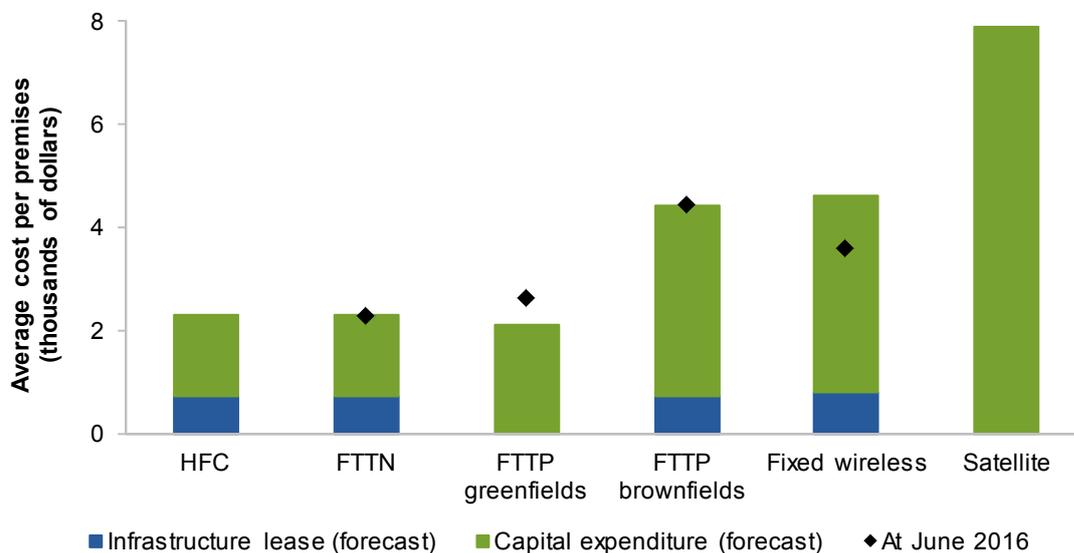
The fixed-line footprint is an upgrade of existing network assets. Under commercial agreements with Optus and Telstra, the ownership of Telstra and Optus’ HFC networks and Telstra’s copper network is progressively being transferred to nbn as NBN infrastructure is rolled out (section B.2).⁹⁵ Accordingly, Telstra is using nbn infrastructure to deliver on its obligations under the telecommunications universal service obligation (TUSO) within the NBN fixed-line footprint.

⁹⁴ These costs are only reflective in areas where the technology has been, or will be, chosen for deployment. For example, nbn is only using HFC in areas with existing HFC networks, so these costs represent the cost of upgrading the existing HFC network rather than the cost of laying a new HFC network.

⁹⁵ In September 2016, nbn (2016f) announced that it would not be using Optus’ HFC network.

Figure B.2 **NBN technologies — construction costs per premises^a**

Forecast at network completion and to date figures



^a Current figures for HFC and satellite are not available because at June 2016 no HFC premises were ready for service and deployment of the *Sky Muster* satellite service was not complete.

Sources: nbn (2015a, 2016a).

Fibre to the x

FTTP, FTTN, FTTdp and FTTB (collectively known as FTTx) networks involve, to varying degrees, replacing the existing copper network with fibre.

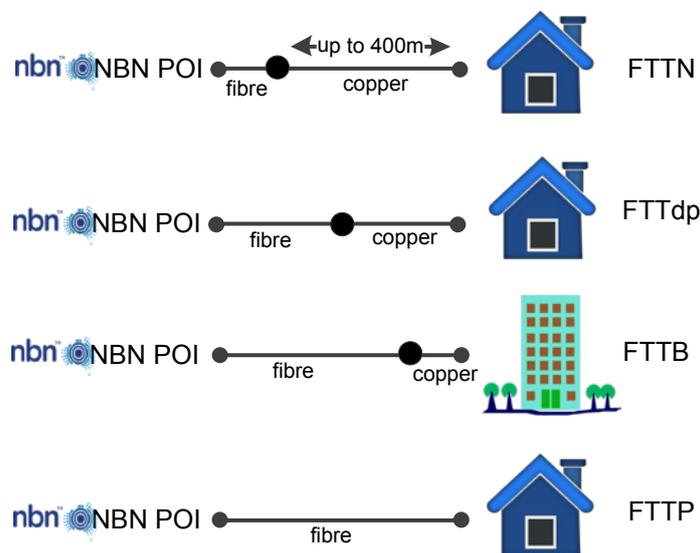
For a FTTP connection (sometimes just known as a ‘fibre’ connection), all copper is replaced so that the premises and the POI are connected entirely by fibre. In brownfields areas, this technology is the most expensive to implement because it involves significant civil works, while greenfields installations cost around half as much (figure B.2).

All other FTTx networks involve retaining a portion of the existing copper lines. For FTTN, fibre connects the POI to a node (street cabinet or micro-node), beyond which the existing copper network connects the node to the premises (a copper run of up to 400m (Simpson 2016) (figure B.3). FTTdp, which nbn (2016f) officially added to the multi-technology mix in September 2016, takes the fibre further — to the individual junction box in the street outside each premises (Simpson 2016).

FTTB is used when connecting a multi-dwelling building, such as an apartment block. A fibre connection is provided to the building communications room, after which existing technology (typically copper) is used to connect each dwelling. In effect, FTTB is an FTTN connection with the node located in the building.

Figure B.3 Fibre to the x networks

A stylised depiction



The data speed achievable over FTTx technologies decreases with the amount of copper present in the network, with copper-free FTTP networks providing the fastest potential speeds.⁹⁶ Two factors apply here. First, shorter copper runs allow the use of faster data transmission technologies over the copper. At present, nbn is using ‘Very-high-bit-rate Digital Subscriber Line 2’ (VDSL2) technology over all copper runs. However, nbn is running trials of G.fast and XG.FAST technologies, which have been shown to deliver faster speeds over progressively shorter copper runs. G.fast delivered speeds in excess of 600 Mbps over a 100m copper run (Wilton 2016a), while XG.FAST delivered 8 Gbps over a 30m run (Wilton 2016b). Second, the speed that can be achieved over each technology falls as the length of the copper run increases.

NBN services are sold by wholesale speed tier (table B.2), although the maximum available speed is dictated by the limits of the network technology. FTTP is offered in seven speed tiers of up to 1000/400 Mbps, while nbn (2016c) claims that around 90 per cent of FTTN users can receive speeds of up to 50 Mbps download and the ‘majority’ can receive 100 Mbps download. All FTTN and FTTB users are offered speeds of 25/5 Mbps, with higher speeds requiring the RSP to rate the line and to provide an indication of the speed that can be achieved (Pearce 2015). A maximum of six speed tiers are currently offered for FTTN and FTTB. nbn has not yet indicated the speeds that will be available to FTTdp premises.

⁹⁶ nbn offers FTTP at speeds of up to 1000/400 Mbps, but faster speeds are possible over fibre.

Hybrid Fibre Coaxial

To deliver HFC services, nbn is upgrading Telstra's existing HFC network, originally deployed in the early 1990s to supply cable television but upgraded to supply broadband in 1996 (and again in 2009) (Vertigan Panel 2014). Prior to the NBN infrastructure rollout, Telstra's network was capable of serving approximately 2.5 million premises in Sydney, Brisbane, the Gold Coast, Adelaide and Perth.

As part of the HFC rollout, nbn will upgrade the network again with Data Over Cable Service Interface Specification (DOCSIS) 3.1 technology. This will allow the supply of wholesale speeds in five tiers of up to 100/40 Mbps.

Fixed wireless

nbn's fixed wireless footprint will encompass five per cent of premises (nbn 2016b). Fixed wireless networks use the same cellular technology as mobile networks, but can deliver a more consistent service as the number of users within a cell does not vary (nbn 2015b), and antennas can be optimally positioned. Microwave hops are used to transmit aggregated data from base stations to 'hub sites', after which it is carried to the by way of fibre.

To enable the operation of its wireless access networks, nbn holds a combination of spectrum licenced and apparatus licenced (chapter 2, box 2.6) spectrum rights. nbn's spectrum licences include up to 98MHz in the 2.3GHz band and 100MHz in the 3.4GHz band (nbn 2014b), and it was issued apparatus licences for the 3.5GHz band at the direction of the Minister for Communications under the *Radiocommunications Act 1992* (Cth) following the identification of spectrum 'gaps' by the 2014 Fixed Wireless and Satellite Review.

Where possible, nbn fixed wireless uses existing mobile infrastructure (nbn 2015b), and all access networks use 4G wireless technology (in line with the current generation of mobile infrastructure). Fixed wireless is offered at three speed tiers, reaching up to 25-50/5-20 Mbps.

Satellite

nbn offers satellite broadband to the remaining three per cent of Australian premises not covered by the fixed-line or fixed wireless footprints. The satellite service features interim and long-term measures.

- Interim services have been offered through nbn's Interim Satellite Service and NBN Co Satellite Support Scheme (often known as the ISS and NSS, respectively). The Interim Satellite Service (supplied by Optus and IPSTAR satellites) reached capacity in June 2013 after 44 000 services had been supplied (BCR 2015). This prompted the commencement of the Satellite Support Scheme (supplied by IPSTAR) in July 2014 to

provide a further 9000 premises with an interim connection (nbn 2014c). Interim services were reserved for users who could not access a commercial broadband service or another subsidised satellite broadband service (supplied under the Interim Satellite Service or the Australian Broadband Guarantee, which was in operation from 2007 to 2011). nbn has announced that the ISS will be shut down on 28 February 2017.

- nbn's Long-term Satellite Service (known hereafter as the *Sky Muster* satellite service) commenced in 2016 following the launch of the *Sky Muster* satellite in October 2015. A second satellite, *Sky Muster II*, was launched in October 2016. Collectively, these satellites provide capacity of 135 Gbps (107 Gbps for downloads and 28 Gbps for uploads), and speeds of up to 25/5 Mbps. Although the *Sky Muster* satellite service provides coverage to all of Australia, only users outside of the fixed-line and fixed wireless footprints are permitted to receive the service.

Satellite customers face nbn-mandated usage caps to prevent the congestion of the service. Each service features a rolling 150 gigabyte (GB) download per month cap (at the wholesale level), with further and variable caps on download volumes during peak times. Caps also apply to the average upload and download volumes *across* RSPs' consumers, which further limit the data allowances on offer. Premises are limited to one service, with the exception of those with eligible distance education students that are entitled to purchase a second service with a 50GB per student monthly download limit, up to a maximum of 150GB per household.

Pricing

nbn currently operates with a capped wholesale price model, with the caps set uniformly across the network. Wholesale access to the NBN infrastructure involves three charges: the Access Virtual Circuit and User Network Interface (AVC) charge, the Connectivity Virtual Circuit (CVC) charge and the Network to Network Interface (NNI) charge.

Access Virtual Circuit and User Network Interface charge

Levied on a per-end user basis, the AVC charge is a monthly access charge. The charge increases with the chosen speed tier (table B.2), and includes a 0.15 Mbps symmetrical prioritised channel which can be used for supplying a managed VoIP service. For premises served by FTTB, FTTN and fixed wireless, the charge may only guarantee a peak wholesale speed in a range due to the variable nature of the connection offered by these technologies.

Table B.2 Activity Virtual Circuit and User Network Interface charges
Monthly rates

<i>Peak wholesale speed</i>	<i>Availability</i>	<i>Charge</i>
12/1 Mbps	FTTP, FTTN, FTTB, HFC, fixed–wireless, LTSS	\$24.00
25/5 Mbps	FTTP, FTTN, FTTB, HFC, fixed–wireless, LTSS	\$27.00
25/5-10 Mbps	FTTB, FTTN	\$30.00
25/10 Mbps	FTTP, HFC	\$30.00
25-50/5-20 Mbps	FTTB, FTTN, fixed–wireless	\$34.00
50/20 Mbps	FTTP, HFC	\$34.00
25-100/5-40 Mbps	FTTB, FTTN	\$38.00
100/40 Mbps	FTTP, HFC	\$38.00
250/100 Mbps	FTTP	\$70.00
500/200 Mbps	FTTP	\$100.00
1 000/400 Mbps	FTTP	\$150.00

Source: nbn (2016i).

Connectivity Virtual Circuit

The CVC charge is an aggregate bandwidth consumption charge. Effectively, in paying the CVC charge RSPs are purchasing the right to transmit over NBN infrastructure a specified quantity of data per second over a monthly period. This bandwidth is then allocated between end users at the RSP’s discretion, and, hence, a degree of product differentiation can be generated at this level.

Although the CVC charge is priced uniformly for all RSPs with no quantity discounts, larger RSPs will typically have to purchase less bandwidth per customer to generate an equivalent quality of service because of the smoothing impact on demand of having a larger pool of consumers (ACCC, pers. comm., 9 September 2016).

Under the ‘dimension-based discount’ scheme introduced in June 2016, CVC has a base price of \$17.50 per Mbps but a discount of up to \$6 per Mbps applies based on the industry-wide quantity of bandwidth purchased per user. This led to the provision of an immediate \$1.75 per Mbps discount when the scheme was introduced. nbn has indicated that it is seeking to move toward a RSP-specific discount model (Reichert 2016a), which would strengthen the incentive for RSPs to purchase greater bandwidth.

Network to Network Interface charge

The NNI charge is levied for each POI reached by an RSP, and covers interconnection costs. The charge is small as a proportion of other wholesale costs — for example, modelling by Tsang (2016d) assumes a monthly per-user NNI cost of \$0.20.

These three charges generated an average revenue per end user of \$43 for nbn during 2015-16 (box B.1).

Box B.1 **Costs of supplying a retail service over the NBN**

NBN wholesale charges

- During 2015-16, the proportion of users on each speed tier was approximately: 33 per cent 12/1 Mbps, 45 per cent 25/5 Mbps, 6 per cent 50/20 Mbps, and 16 per cent 100/40 Mbps. Weighting these tiers by their charge (table B.2) yields an average monthly AVC charge of approximately **\$28 per end user** (Tsang 2016d).
- During the same period, Tsang (2016) estimates that an average of 0.835 Kbps of CVC was provisioned per end user, at a monthly cost of around **\$15 per end user**
- Combining these two figures yields nbn's **average revenue per end user of \$43**. This is the average NBN wholesale charge for that period.

Transmission charges

- For RSPs that own transmission infrastructure, these costs are not explicit and are likely to be variable.
- For RSPs that purchase wholesale transmissions, the ACCC's regulated domestic transmission capacity service prices can be used to approximate transmission costs. Analysis by Ockerby and Wongsosaputro for nbn (sub. 47, attachment, p. 20) used this methodology and found that monthly prices would range between **\$0.13 and \$0.71 per end user** under a variety of different assumptions.

Funding

nbn is currently funded through Australian Government equity up to a limit of \$29.5 billion. After this, it will receive a loan of \$19.5 billion from the Australian Government, with the expectation that this loan will be re-financed on external markets in 2020-21 (Fifield and Cormann 2016a). The company is set to receive its final \$9.2 billion tranche of equity during the current financial year, and plans to begin issuing debt during 2017-18 (table B.3). Peak funding is expected to be reached early in the 2021-22 financial year, and nbn (2016a) forecasts it will be in the range of \$46 billion to \$54 billion, with \$49 billion as the base case.

Table B.3 nbn funding forecasts
nbn estimates, 2016-17 to 2019-20

<i>Financial year</i>	<i>Equity funding</i>	<i>Debt funding</i>	<i>Total funding</i>
	billions	billions	billions
2015-16 ^a	\$20.3	\$0	\$20.3
2016-17	\$29.5	\$0	\$29.5
2017-18	\$29.5	\$10	\$39.5
2018-19	\$29.5	\$16.6	\$46.1
2019-20	\$29.5	\$19.1	\$48.6
Peak (expected 2021-22)	\$29.5	\$19.5	\$49

^a Actual figure.

Source: nbn (2016a).

The funding of nbn’s non-commercial services is expected to shift from an internal cross-subsidy to an explicit levy and accompanying subsidy. nbn currently operates with a uniform wholesale price model,⁹⁷ where profits from commercial services (primarily fixed-line) cross-subsidise the provision of non-commercial services (primarily fixed wireless and satellite) (BCR 2015). In its response to the 2014 Vertigan Review, the Australian Government (2014) indicated it would grant nbn the flexibility to adjust prices on a non-uniform basis subject to existing price caps. The Government also requested that the Bureau of Communications Research (BCR) design an explicit industry contribution-based funding model. In late 2015 the BCR released a final consultation paper which recommended the introduction of a narrowly-based levy on nbn fixed line and ‘nbn-equivalent’ services (BCR 2015). This process is ongoing.⁹⁸

Risks and economic viability

Short-term risks to nbn’s commercial viability have been mitigated by the recent decision of the Australian Government to offer a commercial loan to nbn.

In the longer term, risks to economic viability centre on competitive pressures exerted by substitutable services. The industry levy proposed by the BCR (2015) in its final consultation paper should shield nbn from inefficient⁹⁹ fixed-line infrastructure competition in commercial areas, but competition from mobile and rival fixed wireless providers is likely to intensify in coming years. In particular, the introduction of

⁹⁷ The BCR (2015) found that while localised cost differences may render some fixed-line services non-commercial, the fixed-line footprint taken collectively is commercial whereas the fixed-wireless and satellite footprints are non-commercial.

⁹⁸ The BCR’s final report is yet to be released.

⁹⁹ Under an unsubsidised uniform wholesale price model, infrastructure providers with higher costs than nbn may be able to undercut its prices in commercial areas because they lack an obligation to supply non-commercial services. Competition of this type is inefficient (Vertigan Panel 2014).

5G technology (expected around 2020) will bring the technical capabilities of wireless technologies closer to fixed-line technologies.

nbn's (2010) long-term estimate is that around 15.6 per cent of households will be mobile-only by 2020 (up from around 8 per cent in 2010). Critiquing this estimate, de Ridder (2015b, p. 1) said:

I took a bet in January 2011 with two local experts that 20% would be breached by 2020. I think I shall be collecting soon! The BCR tells me that the ABS figure is now 15.9%. On ACMA data it is higher with the BCR stating above figure 21 in its latest paper that 'the 21 per cent of households that do not have a fixed line service would not contribute to the funding of non-commercial services'.

Overall, continued technological innovation will provide increased competitive pressure on nbn. This, along with other matters, will need to be considered in the forthcoming Productivity Commission review of the NBN (chapter 7, box 7.4 and draft recommendation 7.3).

B.2 Rollout and transition arrangements

Early in its life, the rollout of the NBN infrastructure was hampered by delays and ran significantly behind schedule (figure B.4). However, since 2014 rollout plans (while less ambitious) have been exceeded — although more rapid deployment targets loom in coming years.

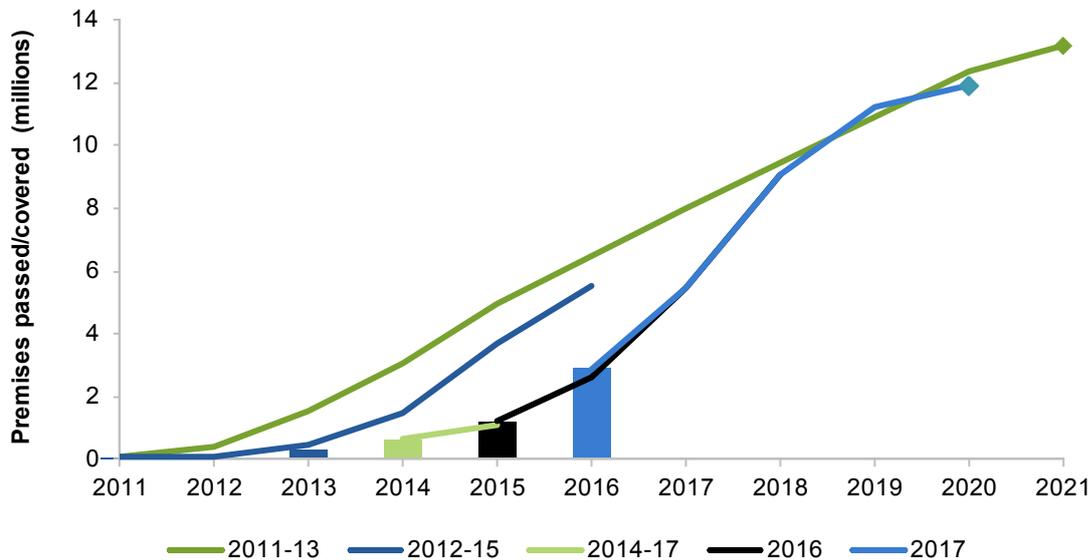
The fixed-line footprint underwent significant redesign following the election of a new Government in 2013, transitioning away from an all-FTTP model toward the multi-technology mix. While this timing coincides with nbn's improvement in meeting targets, this has been due in large part to progress in the delivery of technologies in prospect prior to the redesign — FTTP, fixed wireless and satellite (table B.4). Continued meeting of targets will require the delivery of FTTN and HFC services on a large scale. In principle, the use of FTTN and HFC services should allow a more rapid rollout as nbn does not need to replace as much infrastructure in the fixed-line footprint. However, there will be remediation required in some areas due to the degradation of copper lines.

Regarding the rollout of the NBN, the current shareholder Statement of Expectations (Fifield and Cormann 2016b, p. 1) states:

When planning the rollout, nbn should prioritise locations that are poorly served, to the extent commercially and operationally feasible. During the rollout, nbn should be guided by the following goals: service quality and continuity for consumers; certainty for retail service providers and construction partners; and achievement of rollout objectives as cost-effectively and seamlessly as possible. nbn should apply the Government's new developments policy.

Figure B.4 Recent rollout targets are being met, but more rapid deployment is required in coming years^{a,b}

Actual premises passed/covered (bars) and nbn Corporate Plan rollout targets (lines)



^a 2011–13 forecast revised downward to reflect updated interim satellite service premises covered accounting methodology. ^b Markers indicate forecast rollout completion.

Sources: Productivity Commission estimates based on nbn (2010, 2012, 2014a, 2015a, 2016a).

Table B.4 The NBN rollout to date^a

As at 30 September 2016

Technology	Premises 'ready for service'	Expected proportion of premises ready for service at network completion
		per cent
FTTP brownfields	1 116 432	93
FTTP greenfields	304 020	38
FTTN	926 624	15
HFC	27 506	<1
Fixed wireless	441 289	74
Satellite	415 518	100
Total	3 231 389	27

^aFTTP brownfields calculated as total FTTP premises ready for service less total greenfields installations.

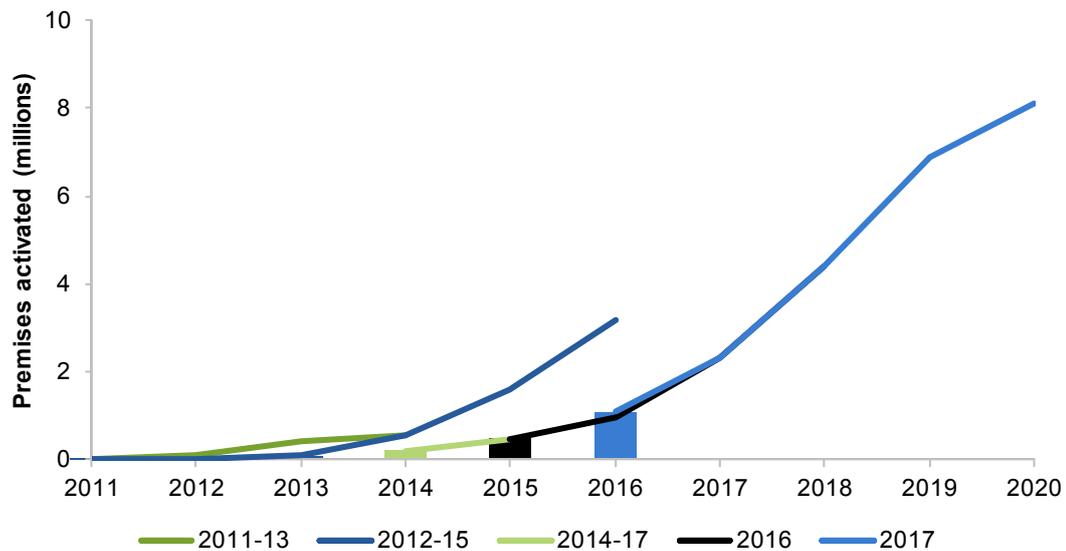
Sources: Productivity Commission estimates based on nbn (2016a, 2016o) and Rue (2016).

Take up of nbn services

Aggregate take-up rates of nbn services are forecast at around 70 per cent at the completion of the network in 2020 (nbn 2016a). However, this figure masks cross-technology differences. Take-up rates are forecast to be significantly lower in the fixed wireless and satellite footprints, at 40 to 55 per cent and 50 to 65 per cent respectively (nbn 2014b). This may be a result of the slower connection speeds offered by nbn (relative to the fixed-line footprint), the expectation that Telstra's existing networks will be maintained and copper continuity obligation in both footprints,¹⁰⁰ and the usage caps that apply to satellite services. nbn (2014b) estimates that two to four per cent of premises in the satellite footprint and eight to 17 per cent of premises in the fixed wireless footprint will be able to receive a DSL broadband connection over copper.

At a aggregate level, the take up of nbn services has matched forecasts since around 2014 (figure B.5).

Figure B.5 Take up rates have followed forecasts in recent years
Actual premises activated (bars) and nbn Corporate Plan targets (lines)



Sources: nbn (2010, 2012, 2014a, 2015a, 2016a).

¹⁰⁰ The copper continuity obligation refers to Telstra's obligation under the TUSOP Agreement to continue to maintain and operate its existing copper network in nbn's fixed wireless and satellite footprint for the provision of voice services until 2032.

Migration within the fixed-line footprint

The Department of Communications and the Arts' (2016c) Migration Assurance Policy Framework governs the migration process within the fixed-line footprint. Once an area is declared 'ready for service', consumers accessing services delivered over the existing copper access network have 18 months to migrate to the NBN before the copper network is decommissioned.¹⁰¹ During this migration period, responsibilities are shared between nbn, Telstra RSPs and end users. At the wholesale level, nbn is responsible for notifying end users of the declaration and the need to migrate from the copper network, and Telstra must maintain the existing copper connection until migration has taken place and is not permitted to connect new copper services. RSPs (including Telstra) supplying copper services are responsible for informing end users of the impact of the migration on their existing service and of available alternative products. The RSP selected to supply an NBN service is responsible for arranging any installation or wiring upgrades or arranging this with a third-party provider. Finally, end users are responsible for ordering a service with their preferred RSP as early in the migration process as possible.

Outside of the fixed-line footprint

For Australians residing outside of the fixed-line footprint, existing services are not decommissioned as part of the NBN rollout. Premises may either qualify for the copper continuity obligation, so that the copper connection must be maintained (until 2032) unless agreed otherwise or, elsewhere, Telstra is obliged under the TUSO to supply a *standard telephone service* over non-NBN infrastructure on request.

Transfer of Telstra and Optus' networks to nbn

Under commercial agreements, ownership of Telstra's copper and HFC and Optus' HFC networks will progressively transfer to nbn as the NBN is rolled out.¹⁰² The transfer occurs on a region-by-region basis as the network is rolled out. After nbn has determined the technology for use a particular region, it triggers the transfer of the relevant copper or HFC assets and associated infrastructure — meaning that nbn will own those assets by the time of the 'ready for service' declaration. Meanwhile, some required infrastructure such as dark (unused) fibre, exchange rack space, ducts and pits will continue to be owned by Telstra, with access leased for an average of 30 years (Telstra 2014b).

¹⁰¹ The fixed-line NBN is rolled out in parallel with the existing copper access network to allow a migration period.

¹⁰² Although nbn (2016f) announced in September 2016 that it would not be using Optus' HFC network as part of the nbn rollout, ownership of the network will still transfer to nbn.

New developments policy

The Australian Government's (2015b) Telecommunications Infrastructure in New Developments policy (specifically referenced the current shareholder Statement of Expectations) details arrangements for the connection of new premises to the NBN or alternative local network.

Competition for the provision of high-speed broadband infrastructure is encouraged in new developments, with developers given choice over whether to contract nbn or an alternative provider to install infrastructure. If nbn is chosen, developers pay a fixed per-premises cost, a contribution to the costs associated with connecting to nbn's transit network and any pit and pipe costs.

In the event that a developer is not able to source a broadband infrastructure provider through a competitive process, infrastructure provider of last resort obligations fall on either nbn or Telstra (which can also levy charges for infrastructure). nbn is the infrastructure provider of last resort for fixed broadband and voice infrastructure in:

- new developments, irrespective of size or type, in those areas of its fixed-line footprint declared 'ready for service'
- new developments of 100 or more lots/premises in those parts of the NBN fixed-line footprint not yet declared 'ready for service'
- new developments in its fixed line footprint where nbn has publicly identified an area as a fixed line rollout region — on the basis rollout regions are announced 12 months prior to the ready for service date.

As part of its obligations under the TUSO, Telstra is the infrastructure provider of last resort for the provision of voice services in:

- new developments which received planning approval before 1 January 2011 other than developments which are now being serviced by nbn or which were 'landbanked' — that is, developments that had been approved before 1 January 2011 but which have not proceeded by that date
- new developments, whether broadacre or infill, of fewer than 100 lots/premises in the NBN fixed line footprint not yet declared 'ready for service'
- new developments in the NBN the fixed-wireless and satellite footprints.

More recently, the Australian Government (2016b) has announced that it is developing legislation to introduce a statutory infrastructure provider of last resort regime. Under this regime, nbn (or in certain areas, potentially other infrastructure providers) will be required to connect premises to its network — meaning that consumers will have a guarantee of a broadband infrastructure connection.

C Approaches to universal telecommunications service in the OECD

This appendix outlines universal telecommunications service¹⁰³ policies in different countries with a particular focus on approaches adopted by the Organisation for Economic Cooperation and Development (OECD) countries.

The governments of all OECD countries have policy objectives geared towards the provision of telecommunications services on a universal basis.¹⁰⁴ These objectives are reflected in their legal and regulatory frameworks, national plans or other policy documents. The pursuit of these objectives through such diverse instruments reflects, to some extent, differences in the objectives themselves, but also differences in their respective markets and broader policy settings.

Most countries have longstanding universal service policies focused on voice-based telecommunication services. These policies address the availability, accessibility and affordability of voice-based telecommunication services. However, for broadband services, most OECD countries tend to focus their efforts largely on ensuring universal availability. To the extent that some countries include broadband within their universal service obligation (USO), they also enable broadband to be affordable — generally achieved through uniform pricing.

Comparisons across countries at a comparable stage of development can provide insights into policy design and their relative effectiveness. Nonetheless, country-specific factors can limit their usefulness. For example, Australia has a large landmass and a relatively small and highly urbanised population. These characteristics present particular challenges to universal service provision that do not necessarily apply to smaller and more densely populated countries. As such, approaches adopted in such countries may not be directly transferable to the Australian context.

Section C.1 of this appendix outlines the main objectives of universal telecommunications service policies across different OECD countries. Section C.2 discusses the scope of these policies in different countries and how they have changed in recent years. Section C.3

¹⁰³ As explained in chapter 1, this appendix uses the term ‘universal service’ to encompass both ‘universal service’ and ‘universal access’ concepts, unless otherwise noted.

¹⁰⁴ Two OECD countries (Mexico and Chile) have objectives to provide at least ‘universal access’ (that is, availability on a shared basis). All others have objectives to provide universal service.

outlines the various arrangements used in OECD countries to deliver universal telecommunications services, separately for voice and broadband. Section C.4 concludes with an overview of funding arrangements mainly focused on improving the availability of universal services.

C.1 Objectives of universal service policies

The objectives of universal service policies in different OECD countries are commonly based on economic and social policy rationales (box C.1). While these rationales are not always explicit, some countries (for example, France and Finland) have explicitly legislated universal service as a ‘right’ (AHRC 2013).

Box C.1 Rationales for universal service policies in selected OECD countries

Canada

One objective of the Telecommunications ACT (1993) in Canada is:

... to facilitate the orderly development throughout Canada of a telecommunications system that serves to safeguard, enrich and strengthen the social and economic fabric of Canada and its regions. (Longford, Moll and Shade 2012, p. 441)

European Union (applicable to 22 OECD countries)

European Union (EU) Directive 2009/140/EC, which is applicable to 22 OECD countries, stated:

... the Internet is essential for education and for the practical exercise of freedom of expression and access to information. (Garcia Calvo 2012, p. 57)

United States

The United States’ National Broadband Plan stated:

... broadband is a foundation for economic growth, job creation, global competitiveness and a better way of life. (FCC 2010, p. xi)

United Kingdom

Ofcom, the telecommunications regulator in the United Kingdom, in its 2005 review of universal service stated:

... there are both social equity and economic grounds for [universal service obligation] USO. It provides services to help vulnerable customers and those in remote and rural areas, whom the market might not otherwise choose to serve, allowing them to take their full part in the economy and society. In addition, all citizens benefit by having a larger telephone network; they can contact and be contacted by more people. Cheap communication also enhances economic growth. (Ofcom 2005, p. 7)

A common goal of universal service policies in many countries is to guarantee the availability of basic telecommunications services to all residents at an affordable price (box C.2).

Box C.2 Objectives of universal service policies in selected OECD countries

Australia

In Australia the universal service obligation is the obligation placed on the universal service provider (Telstra) to ensure that standard telephone services, payphones and prescribed carriage services are reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business. (ACMA 2016l)

Canada

In Canada, one goal of the universal service policy is:

... to render reliable and affordable telecommunications services of high quality accessible to all people in Canada in both urban and rural areas in all regions of Canada. (Garcia Calvo 2012, p. 54)

European Union (applicable to 22 OECD countries)

The EU defines universal services as:

... a minimum set of services of specified quality which is available to all users regardless of their geographical location and, in the light of specific national conditions, at an affordable price. (Garcia Calvo 2012, p. 56)

South Korea

According to the South Korean Telecommunications Business Act, universal service is:

... the basic telecommunications service that any user may receive at an appropriate charge anytime and anywhere within South Korea. (Garcia Calvo 2012, p. 62)

Switzerland

The Swiss Constitution (article 92) stated that:

The Confederation shall ensure the adequate, universal, and reasonably priced provision of postal and telecommunications services in all regions of the country. (Jaag, Maegli and Morel 2016, p. 232)

United States

The main objective of the Universal Service Fund in the United States is to promote the availability of quality telecommunications services at just, reasonable and affordable rates for all consumers (FCC 2016).

C.2 The scope of universal service policies

Services covered in the scope of a universal voice service in OECD countries typically include: residential telephone services, access to a comprehensive telephone directory, a directory assistance service, access to free emergency calls, and special services for people with disability. In the 22 European Union (EU) member states¹⁰⁵ of the OECD, for

¹⁰⁵ The 22 OECD countries that are members of the EU are: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and the UK.

example, the universal provision of a minimum set of telephone services (of specified quality) is a requirement of the EU Universal Service Directive 2002 (amended in 2009) (box C.2). This could be provided by market drivers — which the Directive considers to be the main mechanism — or through regulatory interventions such as universal service obligations in cases of market failures (Batura 2016).

However, the inclusion of payphones in the scope of universal services has dwindled over time and many countries are expanding the scope of universal services to include broadband.

Public payphones have dwindled in importance

The demand for public payphones services across the world has declined considerably in recent years (CRTC 2015a). This trend is strongly evident in many OECD countries. For example, the European Commission (2014) reported that in France 80 per cent of payphones were not being used and that 95 per cent of them were loss-making.

The provision of payphone services has also decreased in importance in the scope of universal service policies across the OECD. As at 2014, in 18 of 35 OECD countries, there were no universal service obligations in place to support payphone services. These countries were Belgium, Canada, Chile, Denmark, Estonia, Finland, France, Germany, Israel, Latvia, Luxemburg, Mexico, Netherlands, New Zealand, Poland, South Korea, Sweden, and the United States.

... while universal broadband services have become more prominent

As modern telecommunications services not only include telephone services but also data services, and in view of the economic and social benefits of access to the internet (chapter 5), many developed nations have either widened or are seeking to widen the scope of their universal service objectives to include broadband. In particular, many OECD countries have a national broadband plan designed to provide high-speed broadband services nationally (table C.1).

Table C.1 National broadband plans in selected OECD countries 2016

<i>Country</i>	<i>National broadband plan</i>
Australia	Australia's national broadband network aims to provide peak wholesale download data rates (and proportionate upload rates) of at least 25 megabits per second (Mbps) to all premises, and at least 50 Mbps to 90 per cent of fixed-line premises, as soon as possible.
Canada	National target to provide at least 5 Mbps broadband to all Canadians by 2015.
Chile	National target to provide broadband to 100 per cent of households by 2018.
EU (which includes 22 OECD members)	The European Commission's Digital Agenda for Europe aims to provide every EU premises with 30 Mbps broadband and 50 per cent of premises with 100 Mbps broadband by 2020.
Israel	Universal service providers must provide all of their services, which include a broadband connection with a minimum of 1.5 Mbps.
Japan	The national broadband strategy aims to provide at least 30 Mbps broadband to 100 per cent of premises by around 2015.
Mexico	The national broadband strategy aims to provide high-speed broadband to most of the schools, medical centres and government premises in the country.
New Zealand	The national broadband strategy aims to provide 80 per cent of New Zealand premises with at least 100 Mbps broadband and almost all other premises with 5 Mbps broadband by 2022.
Norway	National target to offer a high-speed connection to all citizens.
Switzerland	Broadband is included within the scope of the USO.
Turkey	Turkey aims to provide the opportunity of high-quality and affordable broadband access to all segments of society.
United States	The national broadband strategy aims to provide at least 4 Mbps broadband to all Americans by 2020.

Sources: CRTC (2011a); EU (2016a); Fifield and Cormann (2016b); nbn (sub. 47); OECD (2011).

The scope of universal services is regularly reviewed

Given the dynamic nature of the telecommunications sector, many governments regularly review the scope of their universal service policies. For example, the European Commission is required to regularly review the list of minimum telecommunications services that the EU member states should provide universally. In these reviews, the European Commission applies two tests:

- first, whether a particular service is a 'necessary' service
- second, whether the service is likely to be delivered by competitive market forces, in which case the service is not included within the scope of universal services policies.

This is not to say that member states cannot include additional services within the scope of the universal service policies if they so wish (Batura 2016).

In 2006 and 2008, the European Commission reviewed the scope of the EU universal service policy and decided not to add broadband internet or mobile telephony to the list of universal services (infoDev and ITU 2016). The European Commission determined that access to broadband was not an ‘essential’ service in Europe. While mobile phone services were recognised as essential for social inclusion, the European Commission concluded that market forces were sufficient to deliver these services universally across Europe.

C.3 Delivery of universal services

OECD governments have taken various approaches in pursuing their universal service objectives. For example, among the 22 EU member countries in the OECD, Batura (2016) noted that the EU’s universal services directive considers market forces to be the primary mechanism except in cases of market failure, where regulatory mechanisms are in place.

That said, all OECD countries have moved away from state-owned telecommunications monopolies to a combination of different approaches including:

- imposing USOs on one or more service providers
- allowing competitive market forces to deliver universal services
- establishing universal service funds to disburse subsidies to targeted universal service programs
- using open access networks
- implementing small-scale and targeted universal service programs.

Each of these is discussed in turn below.

Imposing USOs on service providers

USOs are common for the delivery of voice services

Following the liberalisation of their telecommunications sectors, many OECD governments imposed service obligations on incumbent carriers to meet all reasonable requests for a voice service to ensure that these were available even in non-commercial conditions, typically (but not always) at a reasonable price and a given quality. In 2014, nearly 70 per cent of OECD countries had USOs in place (table C.2). These obligations mainly covered availability but often included uniform national prices and a variety of accessibility obligations.

There has been a gradual shift to contestable models

Over time, different forms of USOs have evolved somewhat from the traditional model of *administrative* USOs, which were imposed primarily on incumbent (that is, former state owned) carriers without inviting expressions of interest from other service providers.

While this approach remains the most common across the OECD, some countries have shifted to *contestable* USO models (table C.2). As competition in telecommunications markets has strengthened over time, a number of countries (mainly in the EU) have chosen to designate universal service providers through competitive tenders. In 2014, at least three OECD countries had contestable USOs in place — Austria, Hungary, and Portugal.

In general, a competition-based designation applies to a specified period of time. The lowest bidder for universal service subsidies is usually designated as the universal service provider. If there are no bidders, the incumbent carrier or the carrier with the largest market share is often designated as the universal service provider for a specified period of time.

Geographically segmented USOs are another type of USO that is used in the OECD. These USOs are applicable only to a specific geographical area and can be contestable or administrative. This type of USO allows for the gradual phase-out of obligations as the market matures. This approach is being used in Canada (box C.3).

Table C.2 Main approaches used by OECD countries to achieve universal telecommunications service objectives 2014

Country	Approach	
	Telephone service ^a	Broadband service ^b
Australia	Administrative universal services obligation (USO)	A publicly-funded national broadband network and price controls
Austria	Contestable USO	Market forces and targeted public funding for infrastructure projects
Belgium	Market forces	Market forces
Canada	Administrative USO	Market forces and targeted public funding for infrastructure projects
Chile	Universal services fund (USF)	Market forces and targeted public funding for infrastructure projects
Czech Republic	Market forces	Market forces and targeted public funding for infrastructure projects
Denmark	Contestable USO	Market forces
Estonia	Market forces	Market forces and a public funded middle-mile broadband network
Finland	Administrative USO	Administrative USO

(continued on next page)

Table C.2 (continued)

Country	<i>Approaches</i>	
	<i>Telephone service^a</i>	<i>Broadband service^b</i>
France	Administrative USO	Market forces and targeted public funding for infrastructure projects
Germany	Market forces	Market forces
Greece	Administrative USO	Market forces
Hungary	Contestable USO	Market forces and targeted public funding for infrastructure projects
Iceland	Administrative USO	Market forces
Ireland	Administrative USO	Market forces and targeted public funding for infrastructure projects
Israel	Administrative USO	Administrative USO
Italy	Administrative USO	Market forces and targeted public funding for infrastructure projects
Japan	Administrative USO	Subsidised funding for a national broadband network
Latvia	Administrative USO	Administrative USO
Luxemburg	Market forces	Subsidised funding for a national broadband network
Mexico	USF	Universal access of broadband is aimed to guarantee through a national broadband network
Netherlands	Administrative USO	Market forces
New Zealand	Administrative USO	Public-private partnership for two national broadband networks
Norway	Administrative USO	Market forces
Poland	Market forces	Market forces and targeted public funding for infrastructure projects
Portugal	Contestable USO	Market forces and targeted public funding for infrastructure projects
Slovak Republic	Market forces	Market forces and targeted public funding for infrastructure projects
Slovenia ^c	Administrative USO	Market forces and targeted public funding for infrastructure projects
South Korea	Administrative USO	Market forces
Spain	Administrative USO	Administrative USO
Sweden	Market forces	Market forces and targeted public funding for infrastructure projects
Switzerland	Administrative USO	Administrative USO
Turkey	Administrative USO	Administrative USO
United Kingdom ^c	Administrative USO	Market forces and targeted public funding for infrastructure projects
United States	USF	Market forces and targeted public funding for infrastructure projects

^a An administrative USO is typically imposed on an incumbent carrier(s) without inviting expressions of interest from other service providers. A contestable USO is where a designated service provider is chosen by competitive tender. ^b In most OECD countries, a universal service objective for broadband is largely focused on ensuring 'availability' mainly through extending broadband services to non-commercial areas.

^c The United Kingdom and Slovenia are planning to include broadband within the scope of their USO.

Sources: European Commission (2015, 2016a); nbn (sub. 47).

Box C.3 **Universal voice service provision in Canada**

In Canada, universal voice service objectives are achieved through a combination of universal service obligations (USOs) and competitive market forces.

Geographically segmented USOs

USOs apply only to geographical areas where competition is deemed insufficient to provide universal services. These areas are identified and regulated by the Canadian Radio-television and Telecommunications Commission (CRTC), which is Canada's telecommunications regulator. In regulated areas, the CRTC has stipulated a maximum price for telecommunications services.

Services that are within the scope of these USOs include residential telephone service, dial-up Internet service, operator or directory assistance services, access to emergency services, voice message relay service, and a print copy of the current local telephone directory.

USOs are imposed on incumbent local exchange carriers (ILECs), which were the monopoly providers of telephone services in their respective geographical areas prior to the 1990s.

Subsidies are provided for meeting the USOs, but only to those ILECs that incur losses when meeting the obligations. The CRTC has defined some of the geographical areas in Canada as high-cost serving areas (HCSAs), which are primarily located in rural and remote areas. ILECs that meet the USOs in HCSAs are given a subsidy to close the gap between the stipulated rate and the associated costs of providing that service.

Subsidies are entirely funded through an industry levy. All telecommunications service providers who generate more than CAN\$10 million of annual revenue are required to pay the industry levy.

Payphone services

Payphone services are not within the scope of the current USOs. However, the CRTC recognises that payphones are still important to Canadians. In 2015, the CRTC proposed that all ILECs be required to notify communities affected before removing the last public telephone from a particular location.

Competitive market forces

In 2006, Canadian Government decided to rely on market forces to the maximum extent feasible for the provision of universal services. Accordingly, the Government reduced the number of regulated areas and HCSAs considerably. This resulted in a reduction of the total subsidy provided for meeting basic telephone service obligations from CAN\$920 million in 2001 to CAN\$175 million in 2010. This amount has been further reduced in recent years.

*Sources:*CRTC (2011b, 2015b); Garcia Calvo (2012).

... along with a move to technologically neutral solutions

In the past, regulators have typically required that the telephone service obligation be met as a fixed-line service. More recently, however, governments have increasingly supported technologically neutral approaches to USOs. For example, in the EU, the directives related to the telecommunications sector encourage member countries to formulate technologically neutral regulations (Garcia Calvo 2012). Finland and Norway are examples of OECD

countries that currently have technologically neutral USOs in place (Garcia Calvo 2012). However, in some countries (for instance, Canada and Australia) the basic voice service obligations still generally applies to a fixed-line service.

... but USOs are not as common for broadband services

However, broadband USOs are not common in the OECD. In 2014, only eight of 35 OECD countries had included or planned to include broadband service within their existing USOs (table C.2). In most of those countries, a minimum broadband speed was also stipulated. For example, in Spain the minimum speed was set at 1 megabits per second (Mbps); in Finland at 2 Mbps; in Switzerland at 600 kilobits per second (Kbps); and in Turkey at 512 Kbps (Garcia Calvo 2012). In the United Kingdom, the intention is to set the minimum speed at 10 Mbps once their proposed USO comes into effect (expected in 2020) (UK Department for Culture, Media & Sport 2016).

An increasing reliance on market forces

Many OECD countries increasingly rely on market forces to meet their universal service objectives. In 2014, eight OECD countries relied entirely on market forces to deliver universal voice services (table C.2). However, the national telecommunications regulators of these countries constantly monitor market developments and are empowered to take corrective actions (such as imposing USOs) when markets do not bring about sufficient universal service provision.

Germany is one example of an OECD country that relies entirely on competitive market forces to achieve its universal service objectives. According to the national telecommunications regulator in Germany, the incumbent is well positioned to provide universal services in Germany. However, if the incumbent decides not to provide universal services, the regulator has to be notified at least one year in advance. In such circumstances, there are legal provisions to take regulatory actions (and provide subsidies) to ensure universal service provision. Belgium, the Czech Republic, Estonia, Luxemburg, Poland, Slovak Republic and Sweden are other OECD countries that entirely rely on market forces to achieve universal services for voice-based telecommunications.¹⁰⁶

Most OECD countries also rely on competitive market forces to deliver their broadband universal service objectives. Currently, 28 OECD countries rely on competitive market forces, combined with targeted subsidies aimed to address the gaps that markets are unable (or slow) to fill, as the main mechanism for achieving universality in the provision of broadband services. For example, in 2011, Canada decided not to include broadband within the scope of its existing voice-based USOs as that would have increased the subsidy requirement substantially. Instead, universal broadband goals in Canada are expected to be

¹⁰⁶ In the Czech Republic and the Slovak Republic, certain other services (such as payphones and services for people with a disability) are guaranteed through USOs.

achieved through a combination of market forces, targeted funding, and public-private partnerships at all levels of government.

Universal service funds are used in some countries

Universal service funds — a system for allocating subsidies to different universal service programs (usually through competitive tendering) — are now used in some OECD countries to improve the availability (and in some cases the accessibility and affordability) of telephone services. The Universal Service Fund in the United States, which provides subsidies for various universal service programs targeting availability, accessibility and affordability, is one of the first of its kind (box C.4). Chile and Mexico also have universal service funds, but they target ‘universal access’ (that is, availability on a shared basis).

Most OECD countries use a targeted subsidy approach to extend the reach of broadband services even though most of them have not explicitly established universal service funds for this purpose. For example, most of the 22 EU member states of the OECD have made public funds available to disburse subsidies and/or subsidised loans, on a competitive basis, for programs that fill fibre-optic based infrastructure gaps (table C.2).

Open access arrangements can promote universal service objectives

Many OECD countries use open access arrangements to promote the availability and affordability of telecommunications services. Open access refers to wholesale access to network infrastructure or services that are provided on fair and reasonable terms (OECD 2013). In telecommunications, these arrangements can apply to many types of infrastructure networks, including traditional copper based, fibre-optic based, and wireless networks.

On the one hand, such arrangements can help achieve universal service objectives by stimulating competition in retail markets, which in turn can enhance the availability and affordability of telecommunications services. On the other hand, open access arrangements might also undermine universal service provision by dampening incentives to invest in commercially marginal areas.

Open access obligations on copper networks (on the ‘last-mile’ connection) are common in many OECD countries through the mandatory provision of local loop unbundling (a wholesale product delivered over copper based networks). However, some OECD countries do not mandate local loop unbundling. These include South Korea, Mexico, Chile, Israel, and the United States (OECD 2013).

Box C.4 **The Universal Service Fund in the United States**

In the United States, the Universal Service Fund is the primary source of finance for universal service arrangements. The main objective of the Universal Service Fund is to promote the availability of quality telecommunications services at ‘just, reasonable and affordable’ rates for all consumers.

Scope

The Universal Service Fund aims to ensure:

- universal availability of voice and broadband to homes and businesses
- the availability of mobile voice and mobile broadband where Americans live, work or travel.

Implementation

The Universal Service Fund aims to achieve its objectives through the following four programs.

High-Cost Support (now known as the Connect America Fund)

This program provides support to certain qualifying telephone companies that serve high-cost areas. In turn it helps ensure the residents of these regions have access to reasonably comparable service at rates reasonably comparable to urban areas. This program also supports extensions to broadband and mobile communications infrastructure in areas that lack these services. Funds for infrastructure projects are distributed through a competitive bidding process.

Low-Income Support (also called the Lifeline program)

This program assists low-income customers by helping to pay for monthly telephone charges. It also supports initiatives to expand phone service for residents of Tribal lands.

Schools and Libraries Support (also known as the E-Rate)

This program provides telecommunication services to eligible schools and libraries.

Rural Health Care Support

This program allows rural health care providers to pay rates for telecommunications services similar to those of their urban counterparts, making telehealth services affordable.

Financing

The Universal Service Fund is financed by contributions from a range of telecommunications service providers including telecommunications carriers (wireline, wireless and satellite), interconnected Voice over Internet Protocol (VoIP) providers, and cable companies that provide voice services. The level of contribution is based on respective interstate and international end-user revenues.

Governance

The Universal Service Fund is administered by the Universal Service Administrative Company, which is an independent, not-for-profit corporation. The annual monitoring report of the Federal Communications Commission, the telecommunications regulator of the United States, tracks contributions and disbursements.

Source: The Federal Communications Commission (<https://www.fcc.gov/general/universal-service>).

Open access fibre-based networks are also becoming popular in OECD countries. Once it is rolled out, Australia's National Broadband Network will be one of the most extensive open access fibre-based networks in the world. New Zealand's fibre-optic network is another nationwide open access network. In many other OECD countries, at least some parts of the fibre-optic footprint are open access networks. For example, in the province of Alberta in Canada, an open access network is used to provide high-speed broadband services across that province — especially in its sparsely populated rural areas. A public-private partnership arrangement underpins this network. The Alberta Government owns a fibre-optic network, Alberta SuperNet, which spans across Alberta province. Axia, a private company, has a ten-year renewable contract with the Alberta Government to provide wholesale services to interested retail service providers at prices that are benchmarked to metropolitan wholesale rates (Axia NetMedia Corporation 2007). Retail service providers deliver broadband services in a competitive environment. Axia, the operator of Alberta SuperNet, is not allowed to provide retail services. Other examples of partial open access regimes for fibre-optic networks are also evident in countries such as Sweden, Denmark and Spain.

Open access arrangements also apply to wireless networks in many OECD countries including Australia, France and Japan. In these countries, mobile carrier licenses are generally restricted to a small number of carriers due mainly to the scarcity of spectrum. However, commercially negotiated open access arrangements allow many retail service providers to operate off these networks (OECD 2013). The Australian Competition and Consumer Commission is examining other countries' experiences with inter-carrier mobile roaming in their inquiry on domestic mobile roaming regulations (ACCC 2016f).

Small-scale community-based programs

Across both OECD and non-OECD countries, small-scale programs initiated by co-operatives, local governments, educational institutions, private entrepreneurs, non-government organisations and community-based organisations provide telecommunications services in areas that are unserved or under-served by commercial service providers. Rural telecommunications service provision by co-operative societies in some parts of the United States and by community-based organisations in some parts of Australia are examples of such programs.

C.4 Funding arrangements

While much of the material in this appendix covers availability, accessibility and affordability elements of universal services, this section largely focuses on how the availability element of universal service objective is funded.

The pursuit of a universal service availability objective often entails the mandated provision of services in areas that are assessed as non-commercial. There is a diverse range

of approaches used in OECD countries to address the funding of these non-commercial services.

Most OECD countries have ‘defined’ a universal service funding approach within their legislative framework. The most commonly ‘defined’ approach is funding through an industry levy (nearly half of all OECD countries). Other commonly ‘defined’ approaches are funding entirely by the national budget and funding by a mix of the national budget and an industry levy. However, not all countries implement their ‘defined’ approaches (table C.3).

In practice, there appears to be no clear relationship between the type of the program funded and the funding method used. The diversity in the choice of funding approaches may depend on different factors, including the size of the required funding, a country’s fiscal and macroeconomic situation, its political leanings, historical precedent and so on.

Many OECD countries provide no compensation

In 2015, nearly half of OECD countries did not provide recurrent subsidies for universal service provision (table C.3). In countries such as Ireland, Norway and the United Kingdom, the obliged universal service providers are not compensated because it is deemed that they do not incur an unfair burden in fulfilling these obligations. For example, in the United Kingdom, where Ofcom assessed the net costs of the USO in 2005, it was deemed that the costs of universal provision of telephone services and payphones were not substantially higher than the associated benefits (ubiquity benefit, life-cycle effects, brand enhancement, corporate reputation and advertising on public payphones) (Garcia Calvo 2012). On this basis, Ofcom determined that the universal service providers did not incur an unfair burden in fulfilling their obligations and, hence, did not require a subsidy.

... but most rely solely on industry funding

Of the OECD countries that provided subsidies in 2015, the majority (more than 60 per cent) used industry levies to fully fund universal service provision. This was the case in 11 OECD countries: Canada, France, Iceland, Japan, Netherlands, New Zealand, Portugal, Slovenia, South Korea, Spain, and the United States. In some of these countries, industry levies were directed to a universal service fund from which subsidies were subsequently disbursed. In others, the levies were disbursed directly to the relevant universal service providers.

For example, in Canada, subsidies for the provision of universal services are entirely funded by an industry levy. The levy is applied to the ‘eligible revenues’ of all service providers with an annual revenue of more than CAN\$10 million. The subsidies are distributed among the universal service providers who incur losses in the provision of basic telephone services in pre-defined high-cost serving areas (box C.3).

Table C.3 Universal service funding approaches in the OECD
Approaches to recurrent funding primarily targeted at availability, 2015

Country	Funding approach	
	The 'defined' approach ^a	The approach implemented
Australia	Budget contribution and industry levy	Budget contribution and industry levy
Austria	Private agreement between the universal service provider and the largest 10 other providers	Private agreement between the universal service provider and the largest 10 other providers
Belgium	Industry levy	No funding
Canada	Industry levy	Industry levy
Chile	Budget funded	Budget funded
Czech Republic	Budget funded	Budget funded
Denmark	Budget contribution and Industry levy	Budget contribution and industry levy
Estonia	Not defined	No funding
Finland	Budget funded	No funding
France	Industry levy	Industry levy
Germany	Not defined	No funding
Greece	Industry levy	No funding
Hungary	Industry levy	No funding
Iceland	Industry levy	Industry levy
Ireland	Not defined	No funding
Israel	Not defined	No funding
Italy	Industry levy	No funding
Japan	Industry levy	Industry levy
Latvia	Budget funded	Budget funded
Luxemburg	Not defined	No funding
Mexico	Budget funded	Budget funded
Netherlands	Industry levy	Industry levy
New Zealand	Industry levy	Industry levy
Norway	Not defined	No funding
Poland	Industry levy	No funding
Portugal	Industry levy	Industry levy
Slovak Republic	Industry levy	No funding
Slovenia	Industry levy	Industry levy
South Korea	Industry levy	Industry levy
Spain	Industry levy	Industry levy
Sweden	Not defined	No funding
Switzerland	Not defined	No funding
Turkey	Budget and Industry levy	No funding
United Kingdom	Not defined	No funding
United States	Industry levy	Industry levy

^a The 'defined' approach is one that is specified in legislation.

Sources: European Commission (2016b); ITU (2016).

New Zealand provides another example of where subsidies for the provision of universal voice services is entirely funded by an industry levy. Every year, the Commerce Commission (the regulatory authority in New Zealand) estimates the subsidy amount to be distributed to universal service providers and accordingly determines the amount to be collected via the levy. The funds collected are paid directly to universal service providers (Commerce Commission New Zealand 2016).

... or a mix of industry- and government-funded subsidies

In some OECD countries, such as Australia and Denmark, subsidies for universal service provision are funded by a combination of industry levies and appropriations from the national budget.

Some rely entirely on government to fund universal services

In some countries, subsidies for universal service provision are entirely funded from the national budget. In four OECD countries — Chile, the Czech Republic (payphones only), Latvia and Mexico — universal service subsidies, albeit small, are entirely funded by the national budget.

D Affordability and the NBN

Most users of fixed telecommunications services are expected to migrate to National Broadband Network (NBN) infrastructure as it is rolled out to all premises in Australia over the period to 2020. This appendix assesses the relative affordability of broadband and voice services as currently available over the NBN, with a particular focus on low-income users.

Section D.1 describes the methodology and sources of data used in this analysis. Section D.2 presents the results.

D.1 Methodology and sources of data

The methodology used in this appendix involved two steps. The first step involved identifying basic fixed broadband and voice packages available in the market through desktop research. The second step was to compare the relative affordability of these packages. The primary measure of relative affordability used was the price of the package. If the price of NBN packages is lower than that of other available basic fixed broadband and voice packages, then that indicates an improvement in affordability for users migrating to the NBN. The share of income spent on packages is also considered as a measure of affordability. Ideally, income should reflect disposable, rather than gross, income as this is what is available to people for discretionary expenditure on goods and services such as telecommunications.

Data for this analysis were collected from multiple sources.

- Prices and service inclusions of various broadband packages were collected from www.whistleout.com.au, which compares broadband packages offered by 36 service providers.
- Information on basic voice services offered by Telstra was collected from Telstra's website (www.telstra.com.au).
- Information on packages offered by retail service providers over nbn's *Sky Muster* satellite were collected from their respective websites.
- Data on gross income were collected from the Australian Bureau of Statistics (ABS). While data on disposable income for lowest-income quintile users were not available, gross income and disposable income are almost the same in practice for people on very low incomes.

The analysis is subject to a number of assumptions and qualifications. First, it assumes that a customer does not use a mix of telecommunications services to minimise expenditure on telecommunications or to meet their specific needs. In practice, however, consumers are increasingly making use of ‘Over-the-Top’ VoIP services such as Skype and WhatsApp which offer free calls and messaging as well as mobile services. A second assumption is that the caller and recipient of the call are with different service providers. However, if they are with the same service provider, charges for a call between them may be lower or even free. A third assumption is that the prices and inclusions of the packages considered in the analysis are as at October 2016. These may change in the future. Finally, the analysis focuses on affordability assuming that the quality of the voice call is the same regardless of where on the NBN it is made. However, some users may experience a change in the quality of their voice service after they migrate to the NBN. For example, some users may have to rely on nbn’s *Sky Muster* satellites for voice calls, which could result in them receiving a lower quality voice service (chapter 6).

D.2 Results

Basic fixed broadband packages are cheaper with the NBN

Asymmetric digital subscriber line 2+ (ADSL2+) technology provides the fastest broadband speeds — peak theoretical download rates of up to 24 megabits per second (Mbps) — for most Australian homes that are not yet connected to NBN infrastructure.¹⁰⁷ The cheapest ADSL2+ packages (with monthly phone line rental and 40 gigabytes (GB) data allowance) currently available on the market, both in metro and regional areas, cost around \$40 per month (table D.1).

NBN infrastructure is capable of providing much faster broadband. Retail connections are sold in speed tiers, with peak download speeds ranging from 12 Mbps to 1000 Mbps, although higher speeds are not available in some areas.

The cheapest NBN package, with up to 12 Mbps download speed costs around \$30 per month in metro areas and around \$35 per month in non-metro areas (both of these offer a 10 GB monthly data allowance). Hence, the basic NBN packages currently on the market are at least 25 per cent cheaper in metro areas and 14 per cent cheaper in non-metro areas than the cheapest ADSL2+ plans.

¹⁰⁷ Across Australia, around 91 per cent of premises were capable of receiving asymmetric digital subscriber line or digital subscriber line (DSL) broadband services and 24 per cent of premises were capable of receiving hybrid fibre coaxial (HFC) services in 2013, although due to significant overlaps the combined coverage of these networks was around 94 per cent of premises (DoC 2013). Given that the majority of consumers receiving HFC broadband can also receive ADSL/DSL broadband, and that DSL broadband is generally available for a lower price than HFC broadband, this appendix does not consider the affordability of HFC broadband packages.

Table D.1 The cheapest available broadband packages in Australia^{a,b,c,d,e}
October 2016

Technology	Provider	Monthly data allowance	Theoretical peak speed (download)	Monthly rental
		GB	Mbps	\$
Metro areas				
ADSL2+	Spin Tel	40	Up to 24	39.95
NBN (Tier 1)	Dodo	10	Up to 12	29.90
NBN (Tier 2)	Dodo	10	Up to 25	44.90
Non-metro areas				
ADSL2+	Spin Tel	40	Up to 24	39.95
NBN (Tier 1)	Aus BBS	10	Up to 12	34.95
NBN (Tier 2)	Activ8me	50	Up to 25	49.95
NBN (Satellite, Tier 1)	Sky Mesh	10	Up to 12	34.95

^a Monthly rental of ADSL2+ packages includes monthly home phone line rental. ^b ADSL2+ packages are not available in areas where the NBN is available. ^c Some services may not be available in all areas and pricing may vary depending on the exchange to which a customer is attached. ^d Prices may be subject to change. ^e Actual peak ADSL2+ speeds depend on the length of the copper run from the exchange to the premises, and may be greatly less than 24 Mbps download.

Source: WhistleOut (2016)

Affordability of voice-only services for customers migrating to NBN's fixed-line and fixed wireless services will not be affected

Following the rollout of NBN infrastructure, premises in the fixed-line and fixed wireless footprints will be able to access a fixed voice-only service.

The affordability of fixed voice-only services is unlikely to change for most customers seeking this service over NBN infrastructure.

- Telstra's *standard telephone service* under the telecommunications universal service obligation is currently available across Australia for around \$26 per month (plus call charges) and is also available to customers of NBN fixed-line services.
- Optus' home phone plans — currently starting from \$22 per month (plus call charges) are available to customers of NBN fixed-line and fixed wireless services.

... but many in the satellite footprint could even pay less

It is likely that many customers in the NBN satellite footprint could even pay less for voice communication. Voice-only packages are not available over nbn's satellite service — customers wanting a voice service need to purchase a more expensive bundled broadband and managed voice over internet protocol (VoIP) service. However, prices per call can be

significantly less than for existing voice-only services in areas serviced by the *Sky Muster* satellites. For example, monthly rentals associated with the combined broadband and VoIP packages on nbn's *Sky Muster* satellites are higher than basic voice-only packages offered by Telstra (for example, its Home Phone Basic). That said, call charges are lower in some cases with unlimited calls included in the monthly rental (table D.2).

Table D.2 The relative costs of obtaining VoIP services over nbn's *Sky Muster*^a

	<i>Monthly rental</i>	<i>Local calls^b</i>	<i>Standard national calls^c</i>	<i>Calls to standard Australian mobiles</i>
Telstra home phone packages^d				
Telstra Home Phone Basic	\$25.95	\$0.30 per call	\$0.05 per minute plus \$0.55 call connection fee per call	\$0.36 per minute plus \$0.55 call connection fee per call
Telstra Home Phone National	\$50.00	free	free	\$0.30 per minute plus \$0.55 call connection fee per call
VoIP Packages over <i>Sky Muster</i>^e				
Sky Mesh	\$34.95	\$0.10 per call	\$0.10 per call	\$0.30 per minute
Clear Networks	\$37.90	\$0.13 per call	\$0.13 per call	\$0.27 per minute
Activ8me	\$39.95	\$0.11 per call	\$0.17 per call	\$0.25 per minute plus \$0.38 connection fee per call
ANT Communications	\$44.90	Free	free	\$0.26 per minute
IPSTAR	\$44.95	\$0.01 per call	\$0.01 per call	\$0.27 per minute
Harbour ISP	\$45.00	Free	free	\$0.27 per minute

^a Comparison is limited to monthly rentals and a selected set of call charges. Different retail service providers may offer additional services to those listed in the table. Prices of the cheapest packages were taken into account in the comparison. ^b Local calls are calls made within a local area. ^c Standard national calls are long distance calls to fixed-line numbers within Australia. ^d Telstra home phone services are available over NBN fixed-line network and under the copper continuity agreement within the NBN fixed wireless and NBN satellite footprint. They are not available over NBN's *Sky Muster* and are listed for comparative purposes only. ^e Monthly rentals of VoIP packages include the monthly rental of the cheapest broadband package by the same provider.

Sources: Online prices as advertised by each listed service provider, October 2016.

By comparison, for a household that makes one standard national call (which is a long distance call to a fixed-line number within Australia) per day, the cheapest VoIP package (SkyMesh) costs less than the Telstra option (accounting for 2 per cent of gross household income versus 2.4 per cent of gross household income) (table D.3, scenario 1).

For a household in the lowest income quintile that makes five 2 minute standard national calls a day, their expenditure could amount to 2.5 per cent of their gross household income if they choose Telstra's Home Phone National package, which offers unlimited standard

national calls for \$50 per month (table D.3, scenario 2). A similar result occurs for retail service providers of nbn's *Sky Muster* satellite service who offer similar packages at around the same price.

Table D.3 Stylised examples of affordability for low income households^a

Telecommunications voice option	Share of gross household income spent on a voice service ^b		
	Scenario 1: One 2-minute standard national call a day %	Scenario 2: Five 2-minute standard national calls a day %	Scenario 3: Emergency calls and incoming calls only %
NBN satellite (VoIP) ^c	2.0	2.4	1.9
Telstra home phone ^c	2.4	2.6	1.4

^a Low-income households are defined as households in the lowest gross income quintile. ^b Mean monthly gross household income for the lowest income quintile in 2013-14 was \$1885. ^cNBN satellite VoIP costs for scenarios 1 and 2 are based on NBN- SA- 5- 5 and SkyMesh Voice (VoIP) packages offered by SkyMesh and scenario 3 is based on ANT Communications. Telstra home phone costs for scenarios 1 and 2 are based on Home Phone Basic package and scenario 3 is based on Home Phone National package.

Source: Productivity Commission estimates based on ABS (Household Income and Wealth, Australia, 2013-14, Cat. no. 6523.0) and online prices advertised (as at October 2016) by SkyMesh and Telstra.

However, under a restricted set of circumstances, some people wanting a voice-only service may be worse off in terms of affordability if they migrate to the nbn's *Sky Muster* satellite service. For example, if the monthly rental of the cheapest combined broadband and VoIP package over nbn's *Sky Muster* satellite service is around \$35 (offered by SkyMesh), for a household that keeps a phone line just to make free emergency calls and receive incoming calls — an unlikely scenario — this package is estimated to cost 35 per cent more (around \$10 per month) than the basic Telstra voice-only service. Nonetheless, expenditure on the package under these stylised circumstances still accounts for less than 2 per cent of the gross income of a household in the lowest gross income quintile (table D.3, scenario 3).

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