Convergence Review

Submission by Telstra Corporation Ltd

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TABLE OF CONTENTS

PART I: EXECUTIVE SUMMARY

The phenomenon of convergence – services sector restructuring enabled by technological change – is an imminent reality which demands reform of regulatory policy affecting the telecommunications, media and computing industries. Telstra therefore considers the Department's Convergence Review Issues Paper to be timely, and welcomes its focus on review of regulatory policy, which is premised on structurally distinct industries, in light of the structural dimension of convergence – the breakdown of industry distinctions at both the infrastructure and services layers.

To assist the Department in its consideration of the implications of convergence, Telstra has included in this submission a "Technology Roadmap", which highlights the technological trends which characterise convergence:

- Increasing mobility
- Enhanced and converging applications
- "Mass customisation"
- The importance of high-speed access
- Expanded infrastructure options
- Exponential increases in speed and volume of data transmission

In bringing about industry restructuring, convergence of its nature enhances competition, and brings benefits to consumers in the form of more efficient pricing and greater diversity, as well as enhancing Australia's international competitiveness. Additionally, consumers in the convergence era are increasingly enjoying enhanced choice and "mass customisation" of services.

But convergence also gives rise to heightened uncertainty, about demand, technology choices, value chain structure and the impact of regulation on service offerings and investment decisions. In light of the uncertainties of the convergent environment, the risks and costs of regulatory error are likely to be high. These risks and costs are likely to be increasingly aggravated by the tensions in current regulation of the telecommunications industry which are exacerbated by convergence.

Telstra is therefore disappointed that the Department's Issues Paper focuses on the potential necessity of further regulation in light of convergence. On the contrary, Telstra submits, the Government's policy objectives require review to focus on desired outcomes rather than regulatory processes, and its regulatory policy requires review in light of the possibility that convergence will enhance the likelihood of broadening markets, of their own accord, achieving Government policy objectives.

Accordingly, Telstra articulates proposed convergence policy objectives, regulatory principles and elements of a regulatory framework:

Convergence Policy Objectives

1. Competitive markets for high-speed broadband access infrastructure (physical or wireless):
   - Where market conditions are such that competition will not emerge, regulation should do no more than seek efficient market outcomes (dynamic, productive and allocative efficiency)

2. Competitive markets for communications, content and applications services:
   - Telstra considers that there is little likelihood of these markets not being competitive;

3. The development of an internationally competitive convergent industries sector;

4. Universal access to affordable communications services and infrastructure which are sufficient to meet the essential heterogeneous needs of consumers;

5. To increase the economic welfare of the community without compromising essential social and cultural values.

Regulatory Principles

- Minimise regulatory intervention in converging markets
- Competitive neutrality
- Technology-neutrality
- Flexibility to adapt to changing conditions in dynamic convergent markets
- Provide as much certainty as possible as to the circumstances and manner in which regulatory instruments may be applied.
- Minimise the costs of regulation

A Convergence Policy Framework

The purpose of the policy framework is to set out the terms of engagement for regulatory intervention in converging markets. In accord with the regulatory principles articulated above, Telstra proposes the following elements of an ideal framework for regulatory policy in a convergence environment:

1. A rebuttable presumption in favour of the ability of new markets to become competitive in reliance upon nothing more than generic competition regulation. Thus there would be no automatic/reflexive competition regulation of new markets.

2. A clearly articulated process for progressively winding back regulation of existing markets and transitioning to a neutral, generic (competitively neutral, technology neutral, minimalist) regulatory framework:

    - regulatory forbearance - a requirement that the regulatory agencies (ie those with responsibility for administering legislation) have clearly articulated criteria/policies establishing the circumstances in which they will refrain from applying the regulatory tools at their disposal - ideally calibrated with the emergence of competition in various markets

    - legislatively enshrined policy of progressive elimination of existing competitive regulation, together with clearly articulated indicia to support that elimination

3. Regulation by reference to function or service, not industry category of firm type (a fundamental of competitive neutrality).

4. The progressive and rapid elimination of cross subsidies to ensure internationally competitive cost structures (ie. the removal of asymmetric hidden taxes) and competitive neutrality.

5. A rebuttable presumption in favour of the ability of new markets to achieve social policy objectives. To the extent that social obligations must be imposed, they are funded on a broad base to minimise the costs of regulation and maximise competitive neutrality.

6. No pro-competitive regulation unless it can be expected to lead to sustainable competition.

7. Regulatory intervention is clearly targeted and limited to clear instances of market failure (ie. efficient prices are absent) where there is no likelihood of competition emerging to remedy this.

Regulatory Reform

It is clear that a number of aspects of "telecommunications industry" regulation require review in light of their inconsistency with the regulatory principles identified above, and hence with the ideal regulatory framework for convergence.

Telstra submits that the telecommunications regulatory reviews scheduled over the next 3 years provide the Government with the opportunity to consider reform with a view to migrating to a generic regulatory framework for convergent industries.

PART II: CONVERGENCE AND ITS IMPLICATIONS

1 INTRODUCTION

Telstra welcomes the Department of Communications and the Arts' (the Department) Convergence Review Issues Paper. Telstra considers that this Review is timely in light of the increasingly apparent tensions in a number of elements of the current communications regulatory regime, and the increasingly harmful impact of these tensions on the potential for Australian consumers and Australian businesses to benefit from convergence.

Telstra agrees with the Department that convergence will be *enabled* by technological change and *driven* by commercial forces. Telstra considers that an appropriate definition of convergence will recognise that the technological changes currently occurring are broader than just digitalisation. Thus an appropriate definition would be:

Convergence is defined as services sector restructuring enabled by technological change.

The relevant technological changes which are enablers of convergence include:

- *Digitalisation* – the development of infrastructure supporting digital transmission and reception, and high-speed digital networks based on packet technology;
- *Compression* – the development of techniques to compress an analogue signal (radio, television, speech) for digital transmission with an acceptable quality when decoded;
- *Computing power* – the continuing reduction in the cost of central processors, storage and all other components of processing;
- *Access bandwidth* – the development of new techniques, using existing and new infrastructure, for high-speed transmission of information to and from end-users;
- *Very Large Scale Integration (VLSI)* – the ability to develop complex VLSI to integrate technology using agreed standards to create the economies of scope and scale for mass market products; and
- *Application interfaces* – the development of suites of interface standards to support delivery of multiple services over a digital interface.

Telstra particularly welcomes the questions raised by the Issues Paper in relation to the structural dimension of convergence and the need to review regulatory policy which is premised on structurally distinct industries, given that convergence is breaking down those distinctions at both the infrastructure and services layers.

2 TECHNOLOGY ROAD-MAP

To assist the Department in its understanding of the technological enablers and implications of convergence, Telstra has prepared a "Technology Roadmap", which is attached (Appendix 1). The Roadmap attempts to articulate the state of communications technology today, and to forecast likely developments within three and seven years. While this gives some indication of the technological possibilities, the services provided in the convergence era will ultimately be demand-driven.

2.1 Trends

2.1.1 Introduction - The Impact of Technology

Innovation in the provision of new services comes from applications developed by what may be termed "application service providers". This innovation would not be possible without underlying availability of application interfaces and infrastructure, enabled by the rapid growth in technology. As an example, digital transmission of voice has been a theoretical possibility since before the middle of this century, and the first telecommunications technology, the telegraph, was digital. It was only after the commercial use of the transistor and the integrated circuit that economic realisation of digital transmission and switching was possible. The progressive move from analog to digital in the telephone network took place from the early 1980s when large-scale integrated circuits and agreed standards meant that digital networks became cheaper to build and operate.

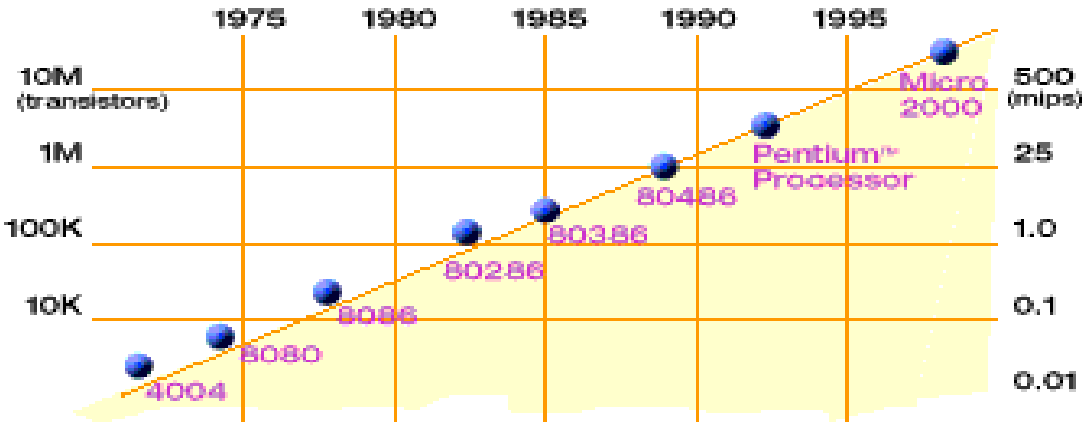
2.1.2 Demand

Demand for new applications is both a consequence of new technology as well as one of its major drivers. Australian communications history demonstrates that Australians have been very rapid adopters of new technologies and applications. Declining costs of new technology combined with the Australian propensity for rapid adoption have resulted in a high level of innovation in Australia, further encouraged in more recent times by the vast number of possibilities which arise from convergence. Significantly, demand is also being strengthened by government policies globally which recognise the social implications of convergent communication technology (information infrastructure) as well as its potential to more cost-effectively deliver government services.

2.1.3 Electronics - The Major Enabler

The inexorable development of electronic technology has been the major enabler of growth during the past century, with relays and coils replaced by vacuum tubes, which in turn were replaced by transistors and integrated circuits. In 1975, "Moore's New Law" was proposed, predicting the number of transistors on a chip would double every 18 months. As Figure 1 below shows, this figure was conservative and the actual observed rate so far has been a doubling every 15 months.

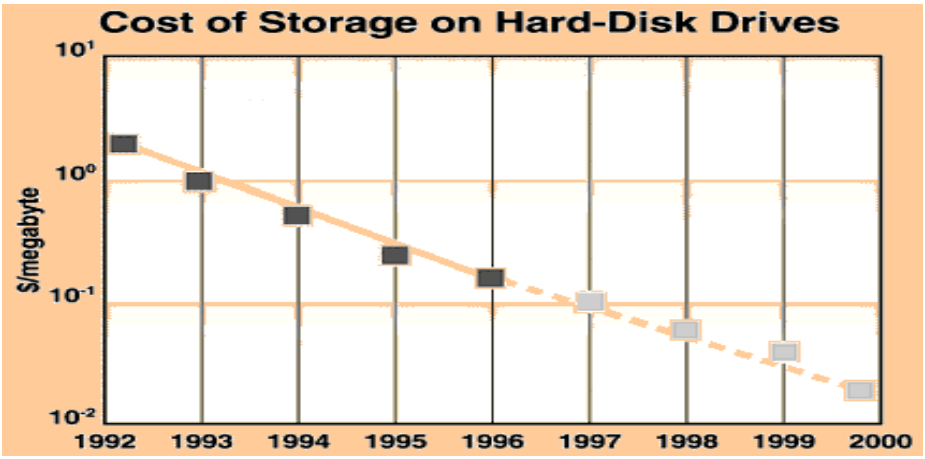
Figure 1: Growth of Electronic Capability



This growth has supported growth in other related technologies – the right hand axis shows how computing power (in millions of instructions per second) has grown as the complexity of available electronics increases.

The same pattern has been evident in other technologies working with and supporting electronic equipment, for example the storage capacity of magnetic media – see Figure 2.

Figure 2: Cost of Storage on Hard-Disk Drives



2.1.4 *Supporting Convergence*

Digital technology, supported by very large scale integration of electronics, has lead to the development of new technologies that are wholly digital, including:

- Consumer entertainment technology (for example CD,DVD and MP3); and
- Computers, evolving from major business machines to personal computers and 'digital assistants' to embedded chips controlling most of the devices that support our society.

Continuing development of large scale integrated electronics has enabled digital switching and transmission, computer control and low cost delivery of complex mass-market services, driving the move to digital. The present environment is one of:

- Rapidly increasing computing power and storage capability; and
- Increasing availability of ubiquitous digital connectivity at steadily increasing bandwidths.

2.1.5 *Digital Transmission of Video*

Television provides a good example of the process of convergence. Originally video delivery was limited to broadcasting, using 6, 7 or 8 MHz of radio spectrum to deliver an analogue signal to a television set. Later technology enabled analogue recording of video, and cable based transmission.

A video image carries a lot of redundant information, for example sending the same image frame after frame when there had been no change. The work of the Motion Pictures Expert Group (MPEG) enabled the development of a suite of standards that compressed analogue video and audio signals into a digital signal that stripped out redundant information. These standards also enabled choice of the quality and characteristics of the signal, from very high

definition (requiring 20 Mbit/s) to quality comparable with analogue video recordings (requiring 2 Mbit/s).

Digital encoding and decoding is only possible because of the availability of computing power and the development of special purpose electronics, integrated on a VLSI chip. Users require complex decoding equipment to convert the compressed signal into a viewable analog signal, and to support other functions that can be provided.

Because the signal is digital, a wide range of transmission media can be used, including
- A digital TV multiplex;
- Digital recording media (magnetic tape, CD, DVD etc);
- Terrestrial digital telecommunications networks;
- Direct satellite broadcasting; and
- In the future, digital mobile communications.

On each medium, a single digital signal can be multiplexed with others, allowing user choice of the information to be received. If a return channel is available, interactivity is possible.

2.1.6 Development of Telecommunications Networks

The economics of digitalisation have lead to changes in most existing technologies. For example, telecommunications networks have grown using digital switching and transmission since the early 1980s, and during 1990s the older analog portions of the network have been replaced with digital equipment. Telstra completed the transition to a fully digital network in 1999, with the exception of the "customer access network" from user to exchange. During the 1980s specialist digital networks were developed for business to business applications. The "core network" is now fully digital, with a common digital transmission infrastructure supporting a range of services.

The "fixed" portion of the telecommunications networks now make extensive use of optical fibres for very high-speed digital transmission. Current installed equipment allows hundreds of Mbit/s to be carried down a single fibre, with extension into the Gbit/s range becoming commercially available. Technologies such as Dense Wave Division Multiplexing now under development will allow data rates in the Terabit/s down a single optical fibre. As most commercial optical fibre cables carry multiple fibres, the data capacity of the core network is very large, and the incremental cost of carrying additional traffic is reducing as capacity increases.

2.1.7 The Move to Mobility

The major emphasis up to and during the 1980s was the provision of universal (telephone) service at an affordable price. There has always been demand for communication on the move but this was a very high cost service, and limited by available radio spectrum. The first mobile telephony services used a similar approach to free-to-air broadcasting, with an antenna mounted at the highest possible location covering a large area with a powerful signal. The available spectrum restricted the service to, at most, a few thousand users with many problems caused by interference to the radio signal.

This simple radio model was replaced by the much more complex cellular communications approach. Signals were broadcast at low power from an antenna mounted close to the ground, and a complicated control system established so that, as the user moved, the network and the mobile station co-operated together to switch to a new frequency. The same radio frequencies could then be reused multiple times in an area, and the capacity increased a thousandfold (at least). As demand increased, the distance between transmitter sites was reduced and the radio power dropped, resulting in smaller cells and more intensive frequency re-use.

These systems depended on complex open standards and complicated electronics to implement the standards. As demand increased and electronic capability increased, mobile units originally the size of a bar fridge reduced in size to hand-held portables able to fit in a pocket, with all electronics on two or three large integrated circuits.

The first generation cellular systems were analog, and the second generation systems in place now are digital. Current systems are optimised to carry voice (using low bit-rate encoding), but enhancements to enable these systems to carry medium-speed data are now under trial. Current systems are able to support multiple millions of customers across a city.

Mobile service penetration is now almost 50% - every second member of the population owns and uses a mobile, and demand is approaching that for the fixed telephone. Future penetration will be enhanced by the growth of mobile data, with device-to-device communication growing rapidly.

Digital Carriage Supporting Multiple Applications

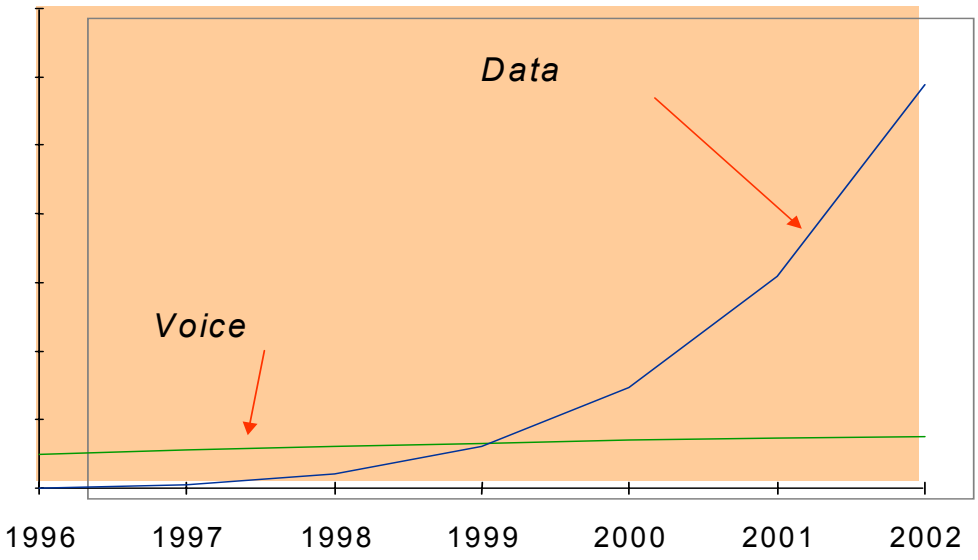
Today's telecommunications networks are digital. The PSTN (public switched telephone network) carries voice and many forms of data, and the core transmission network supports the PSTN and specialist data networks. The analog mobile networks have ceased to grow, and are being replaced with second generation digital networks. The PSTN provides the basic support for the growth of the Internet, now acknowledged as the basis for development of future networks.

A digital bit stream is flexible enough to support a range of applications, with the only limitations being the access speed available to and from the network and the end-to-end performance across the network. The same network could carry text, voice, music or video all encoded as digital signals, but an access speed and network performance suitable for text may not be adequate for video, for example.

The first applications using digital connectivity have been specialist business-to-business services including facsimile and computer networking. Similar services are now being provided from the PSTN, using digital access to provide end-to-end 64 kbit/s digital connectivity. This ISDN shares infrastructure with voice services and has a much lower costs structure than that of previous specialist networks.

The amount of data on the network has been steadily growing. The volume of data has been greater than the volume of voice on some international routes for over five years, and the total volume of data is now approximately the same as the volume of voice across the network as a whole. As Figure 3 shows, the rapid growth of data traffic will result in data traffic volume greatly exceeding voice traffic in the near future.

Figure 3: Traffic Growth – Data v. Voice



2.1.8 The Packet Future

The majority of existing digital uses are based on circuit switching, but most future applications are likely to be based on data packets. A circuit based application sets up a dedicated digital circuit for the duration of a call, allocating a two-way digital data stream (generally multiples of 64 kb/s) even when no information is being transmitted. Many real-world applications are "bursty", with periods of major activity followed by periods of little activity, for example the pauses in speech and the sequences of video transmission where there is very little change.

As an alternative, data can be assembled into "packets", sent only when required and increasing the efficiency of network use. The very successful Internet Protocol is based on the use of packets (although access via the PSTN utilises a dedicated channel up until the point of entry to the Internet).

2.1.9 The Internet

The Internet provides an open platform to support a wide range of services. The current success of the Internet is based on:

- The ability to use current widely available networks such as the PSTN;
- An inter-network arrangement that allows multiple routing across various networks;
- The efficient use of available resources based on an Internet Protocol using packet transmission; and
- Availability of open standards for the carriage of data, and standards supporting the development of many and varied applications.

The Internet supports a wide range of application, including the "killer services" of

- electronic-mail;
- the World Wide Web (which is itself an applications platform);
- electronic commerce;

and moving to support

- voice (with interconnection to the telephone network);
- entertainment audio (both for distribution and real-time broadcast); and
- entertainment video.

The current Internet is a "best endeavours" network, with no guarantee of delivery and considerable congestion. Future development of networks based on the Internet Protocol will include much higher quality "industrial strength" networks, with higher quality requiring greater resources (and thus a higher price to users). This should occur through global standards- setting activities.

2.1.10 The Importance of Access

The core digital network can be configured to carry digital data at a wide range of speeds. The utility of the network is often determined by the arrangements for the user to access the network.

For example,

- Access at 20 Mbit/s from the network to the user allows delivery of HDTV to the highest DVB standard
- Access at 2 Mbit/s from the network to the user allows delivery of video to current entertainment standards
- Access at 64 kbit/s to and from the network allows voice, file transfer and entertainment quality music
- Analogue access allows voice and data delivered by VF modem at up to 56 kbit/s
- Digital access at 10-20 kbit/s allows voice, for example via a digital mobile

Table 1 outlines currently available access technologies, and the data speeds supported by each technology.

Table 1: Access Technologies

Access Medium	Access supported	Other features
Analogue broadcasting	• 6 or 7 MHz PAL TV • AM & FM radio	Unidirectional, point-to-multipoint
Digital broadcasting	• ~20 Mbit/s DTV multiplex, able to support HDTV and/or SDTV plus datacasting • ~4 Mbit/s DAB multiplex, able to support varying quality audio plus data	Unidirectional, primarily point-to-multipoint but able to support point-to-point. Unidirectional, primarily point-to-multipoint but able to support point-to-point.
Satellite access	• Satellites in geo-synchronous orbit able to support low to high-speed data, radio and TV broadcasting, data and voice. • Satellites in low or medium earth orbit (LEO/MEO) supporting voice and low speed data, with ability to reuse spectrum in different areas.	Can support both broadcast and (with more difficulty) point-to-point applications. Round-trip delay degrades quality for some two-way applications Future LEO/MEO satellites will also support medium/high data rates
Copper: Twisted pair from network to user	• Analog voice • Data via modem at up to 56 kbit/s • Data via ISDN digital access at 128 kbit/s • Data via ADSL at up to 2 Mbit/s (Future rates at up to 20 Mbit/s	xDSL and ISDN are distance limited ADSL and future xDSL are asymmetric, with a higher data rate from network to user than from user to network. Other access symmetric, with same data rate in each direction between user and network.
Hybrid Fibre Coaxial Cable	• Analog television • Digital television • Data at speeds up to ~2 Mbit/s • Analog voice (using digital coding)	All services can be either point-to-point or point-to-multipoint. HFC fully supports two-way communication
Optical Fibre	• Supports data at speeds up to several Gbit/s	Cost effective for high data rate applications. Supports two-way communication
Mobile cellular	• Analog voice (using compressed digital coding) • Low speed data	Systems are symmetric. Current systems will soon have limited medium speed (115 kbit/s) data capabilities. Future systems will offer higher data speed
Fixed Radio Access	• Analog voice (using digital coding) • Low/medium speed data (varying with different technologies)	Current systems are symmetric, optimised for voice. Future systems (e.g. LMDS) will be able to support higher speed data.

2.2 Implications for Industry Structure, Service Delivery and Service Offerings

Telstra makes no attempt to forecast the ultimate impact of convergence upon currently separate industries, except to concur with general observations that industry boundaries, and market boundaries, are breaking down and that restructuring is occurring. Convergence enhances market entry possibilities and hence entry opportunities at both infrastructure and services layers. Rather than traditional "value chains" it may become customary to speak of "value spaces" due to mass customisation and the blurring of industry and market boundaries.

Similarly, Telstra makes no attempt to forecast what services will be demanded or offered as converging industries evolve, and merely seeks to articulate the consequences of convergence for service offerings and service delivery in a generic sense. Convergence of material importance is now widely recognised to be taking place in the communications, broadcasting and content-provision industries, with at least the following effects:

- *Existing services may be supplied via new media.* Essentially there is technology substitutability. For example, video signals can now be delivered to users by free-to-air broadcasting, terrestrial cable, magnetic tape, CD, DVD and direct broadcast satellite. In the near future they will also be able to be delivered by digital free-to-air broadcasting and by the digital telecommunications network. Similarly, in addition to copper wire, two-way carriage may now be effected via new infrastructure such as HFC, and to a limited extent via satellite and terrestrial wireless, new bandwidth on existing infrastructure created by technologies such as xDSL, and hybrid technologies, such as terrestrial wireless and satellite in conjunction with a wireline reverse path (copper or HFC). Another example is in content markets, where electronic games may be provided via chip-based technologies, disk and tape-based technologies or via online services, or a combination of the above.

- *Existing services may be enhanced.* For example, the conversion from analogue to digital television, the availability of increased bandwidth for Internet access together with streaming technology, enhance the quality and variety of services provided to consumers.

- *New services may be offered.* These new services may resemble existing services supplied in traditional markets, but the use of new distribution mechanisms or the enhancement of the service are so significant that they are regarded as a new "converged" services, supplied in broader, converged markets. Datacasting is a key example. It is likely to resemble online services in some respects, but will be viewed on a television.

- *Services provided will be able to be customised to meet user's needs.* For example, as well as choosing the delivery technology, it will be possible for users to choose the quality of a video program they require (from HDTV to very low definition), whether they wish to access a mass-market "broadcast service" or call up a specific program for their exclusive use, and whether they wish to view the material passively or interactively. They will also have the opportunity to access further information (which may be video, text or pictures) on chosen points of interest, and in many cases to view the desired program (for example a sporting event) from different perspectives. This "mass customisation" will be made possible by the convergence of new digital delivery mechanisms, greater computing power and new types of programme material

3 REGULATORY POLICY FOR A CONVERGED WORLD

Despite the level of uncertainty inherent in any attempt to forecast the future, the Technology Roadmap does give a broad picture of the technological possibilities from Telstra's perspective. In its Issues Paper the Department takes its own view of the technological possibilities. Clearly this is an important step in any attempt to develop a policy approach to a convergent environment.

The next steps, in Telstra's view, are to develop (1) policy objectives; (2) regulatory principles and (3) a policy framework for that environment. In this step, Telstra's approach differs from that taken by the Department.

The Department takes the Government's high-level policy objectives, then, in essence, proceeds straight to the question: "What regulatory intervention will be required to ensure that these policy objectives are met?" For example, the Issues Paper clearly identifies a Departmental concern with new sources of market power – so called "intangibles", such as brand power and the ability to exploit customer databases. It then posits that it may be necessary to "directly address the abuse of the economic power conferred by intangibles." Additionally, it poses questions such as:

> *"Should the Government's long term role be the facilitation of the delivery of applications and services? Or should the Government's focus be on the provision of connectivity, bandwidth and the associated infrastructure?"*

These questions presume industry's inability to deliver these outcomes in the absence of Government intervention, and that the likely cost of market failure outweighs the risk of regulatory failure (unintended and undesirable distortions from regulation).

This, in Telstra's view, is a dangerous approach, because it fails to make an assessment of the ability of markets, in the context of convergence, to achieve the government's policy goals of their own accord – or at least to be expected to get closer to desired outcomes than regulatory intervention. There may indeed, for example, be new potential sources of market power, but equally in increasingly competitive, broadening, converging markets there are likely to be additional constraints on market power. Furthermore, regulating in areas where developments are in many regards unknown will carry its own particular risks, including inadvertent restriction on beneficial technological and commercial developments.

Telstra submits that convergence implies a greater potential for markets to achieve the Government's policy objectives without regulatory intervention. Alternatively, it may be that different type of intervention may be appropriate given the fundamental structural changes that are occurring.

3.1 Background – Characteristics of Convergence

In addition to the above observations about industry structure, service delivery and service offerings, Telstra contends that there are a number of characteristics of convergence from the point of view of market participants – suppliers and consumers – which must be considered in the policy development process:

1. Heightened uncertainty for market participants;
2. Increased competition in converging markets;
3. Significant potential benefits for consumers in terms of choice, diversity and price; and
4. Significantly greater risks of regulatory error.

(i) Convergence Heightens Uncertainty

Both here and overseas, the overwhelming characteristic of convergence is the extent of uncertainty which businesses face:

- *Demand uncertainty* has been most apparent in the markets in which online services are supplied. Firms providing these services, including Telstra, are still endeavouring to fathom what content or applications will succeed and at what price. Customer segmentation and the fragmentation of markets heightens the growing irrelevance of a "one size fits all" approach. In the area of electronic commerce, it is becoming clear that applications must be useful to consumers or efficiency-enhancing for businesses, but there is no certainty as to what types of electronic applications will best meet these criteria. Demand uncertainty for convergent services is illustrated by a 1999 Ovum report estimate that the number of digital television subscribers in Australia in the year 2000 will be only 103,000 and to interactive television services, only 5,000.[1] Clearly this has implications of extreme uncertainty for the aspiring suppliers of datacasting services.

- Convergence is characterised by the deployment of new technologies, with new investment occurring in new infrastructure (eg. HFC cable, electronic commerce platforms) and new uses for existing technologies (eg. the PSTN for the provision of xDSL). Firms investing in these technologies face *technology risks*, in terms of choice of functionality, implementation and viability (with a real risk of stranded investment as the pace of technology development accelerates), often in the absence of any significant precedent or established standards.

- Added to this is *regulatory uncertainty*. Regulation of a firm generally reduces commercial flexibility and is a factor for consideration in investment decisions. Uncertainty as to whether and how a firm's new services and infrastructure will be regulated increases the risk associated with investment in such services and infrastructure. For example, the investment by Optus Vision and Telstra Multimedia in HFC cable rollouts would not have occurred but for the assurance, through the July 1996 *Telecommunications (Carrier Associate Class Licence) Direction* which ensured minimal access obligations in relation to cable until July 1997. These same investors are now faced with decisions on digitisation of their networks, in the face of significant risk of further regulatory intervention if/when they choose to invest.

- All of the above amount to significant *commercial uncertainty*. In the case of online services, the risk is exacerbated by the absence of uniform profitable business models. While there is clear commercial potential in the Internet, what is not clear is precisely how to make money. Will the revenue model be based on the provision of access, content or advertising, or a combination of these? Currently around the world, no consistent, profitable, business model has yet emerged, and significant experimentation is occurring with new models appearing regularly (eg. free ISPs in the UK and, more recently, Australia). There is also uncertainty as to the potential sources of competitive products. Firms competing in converging markets may be less concerned about their traditional competitors (in Telstra's case, other telcos), than they are about integrated and/or specialised competitors from other industries (for example, media companies, software companies, computer hardware companies) and successful start-up companies in new markets (for example, some portals).

- This underlies deep uncertainty about where profit will be claimed in the emerging, but as yet poorly understood, value-chains of production. A heavy investor in the wrong parts of the chain may find their asset is used, but profit is claimed by a supplier somewhere else in the chain. As a result, vertical integration as a means of mitigating investment risk becomes very attractive (subject to any countervailing diseconomies of scale, eg. Possible

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[1] Ovum, *Ovum Forecasts, Telecoms, the Internet and Digital TV*, 1999, p 159.

slow speed to market in such a dynamic environment). However, if regulation puts constraints on vertical integration then the capacity of investors to ensure they earn a return on their investment is reduced, and too little investment takes place. Broadly this could be termed *structural uncertainty*.

The uncertain environment clearly has implications for policy-makers and market participants.

(ii) Convergence enhances competition

In Telstra's view, a definitive characteristic of convergence is that developments in two previously separate industries lead to each developing similar and hence competing product ranges. This implies a significant broadening of the converging markets. In place of, or in addition to, multiple industries, a new arena emerges in which participants of the previously separate industries compete. This must increase competition, and may even enable competition where it once did not exist. Since each industry typically brings with it quite different strengths, technologies and methods of operation, the resultant competition can be very robust.

Convergence renders existing markets more contestable and more competitive, broadening market definitions and generally reducing the market power of incumbent firms. Importantly, this brings the benefits of competition - new or enhanced services and lower prices - to consumers.

Convergence essentially leads to the redefinition of markets as the process of convergence itself is one of market and industry restructuring. Clearly regulatory policy and practice in a convergent environment must take account of competition from non-traditional sources and the supply-side substitutability of new technologies when defining markets. The market analysis underpinning this will need to be forward-looking, recognising in particular that the structure of converging markets is by its nature dynamic.

(iii) Convergence has the potential to benefit consumers

With enhanced competition and new and improved services available, convergence clearly brings significant potential benefit to consumers. Further, as highlighted in the Issues Paper and reinforced in Telstra's Technology Roadmap, the technology that drives convergence permits enhanced consumer choice both through personalisation and/or customisation by suppliers or the consumers themselves as well as simply as a result of competition.

However, to achieve these benefits, converging industries will need to retain the flexibility to develop viable business models, to make technology and investment decisions and to customise their services.

(iv) Convergence increases the risk of regulatory error

The costs of regulatory error – in terms of distorted signals to markets, unnecessary imposts on particular players and incentives for regulatory gaming – are high in newly emerging or restructuring markets, and the risk is also greater because such markets are unlikely to be well-understood, by participants themselves, let alone regulators.

There are a number of reasons for this, derived from the characteristics of convergence enunciated above:

- The speed and unpredictability of technology change and its market consequences. The market is better placed that Government or a regulator to respond flexibly and quickly to these uncertainties.

- The other uncertainties which characterise rapidly changing markets – eg. uncertainty as to levels and patterns of demand for new services. In such an environment, a light-handed regulatory approach is imperative to maximise the flexibility of market participants to seek viable business models.
- Convergence implies a broadening of markets and enhancement of competition. Whereas competition has traditionally been limited within industries, or even within segments of industries, a definitive characteristic of convergence is increasing substitutability of goods and services, across traditional industry boundaries. Absent regulatory distortion, this should be so for both infrastructure and services markets. Emerging competition will lessen the need for, but heighten the potential distortion of, intervention.

3.2 Policy Objectives in the Convergence Era

Telstra considers that the magnitude of change effected by convergence is such that all policy objectives relevant to converging industries are potential candidates for review.

International Examples

International examples of convergence policy goals are set out in Appendix 2. The primary goal in most cases is to promote and sustain competition. Another important goal is consumer benefit or consumer protection. Oftel, the UK telecommunications regulator, takes the view that competition must be the primary goal, in its own right and as a means to benefit consumers.

Australian Policy Objectives

Like the Department, Telstra takes as given the broad national policy objectives relating to efficiency, achievement of social goals and industry development.

Telstra considers that the elucidation of Government policy objectives in the Issues Paper highlights the problem identified by Oftel – that policy objectives have, to date, been process-focussed rather than outcome-focussed. In an era of convergence, in which market outcomes may be achieved by a variety of processes, Government needs to move from process-focussed goals to outcomes-focussed goals.

For example, key economic objectives outlined in the Issues Paper include the formation of intermediate markets, the protection of competition and the promotion of service innovation. These objectives have historically been regarded as the bases for government intervention in markets. As markets converge, the necessity for interventions such as these may well reduce and the risks associated with intervention will almost certainly increase.

Similarly, the social objectives articulated in the Issues Paper are premised on the need for regulatory intervention to achieve them – eg. To promote minimum performance standards and maintain plurality of control. Intervention to support these processes may be rendered unnecessary, ineffective and/or harmful in an environment of convergence.

Accordingly it is important that in developing policy objectives for an era of convergence, the Government focuses on desired outcomes, without any predisposition as to the process by which those outcomes will be achieved, nor that regulation will necessarily be required to achieve them.

In Telstra's submission, the relevant policy objectives in an environment of convergence are:

1. Competitive markets for high-speed broadband access infrastructure (physical or wireless):
   - Where market conditions are such that competition will not emerge, regulation should do no more than seek efficient market outcomes (dynamic, productive and allocative efficiency);

2. Competitive markets for communications, content and applications services:
   - Telstra considers that there is little likelihood of these markets not being competitive;

3. The development of an internationally competitive convergent industries sector;

4. Universal access to affordable communications services and infrastructure which are sufficient to meet the essential heterogeneous needs of consumers;

5. To increase the economic welfare of the community without compromising essential social and cultural values.

It is the balancing and resolution of the tensions between these objectives, together with regulatory principles appropriate to a convergence environment, that will dictate the regulatory policy framework for the convergence era.

3.3 Regulatory Principles for a Convergence Policy Framework

In this section Telstra reflects on some international examples of regulatory principles for the convergence era, then articulates some key regulatory principles appropriate to the convergence environment in Australia.

International Examples

The regulatory principles espoused by regulators and administrators in the UK, European Community and the US are summarised in Appendix 3. Telstra is particularly persuaded by the simple logic of Oftel's approach – only regulate to promote competition where sustainable competition is likely to emerge, and remove pro-competitive regulation as soon as that occurs. Also like Oftel, Telstra considers competition has the greatest potential to maximise consumer benefits in terms of service, quality and price choice, although clearly there are circumstances in which consumers will not be afforded the benefits of competition. In these circumstances, if there is no prospect of competition, appropriately targeted regulation may be required.

Australian Regulatory Principles

The regulatory principles for the convergence era in Australia that Telstra suggests here are essentially derived from the characteristics of convergence highlighted above. Telstra considers that a regulatory framework resting on these principles would be well-placed to minimise the harm and maximise the benefits it may bring to converging markets.

Minimise regulatory intervention in converging markets

The key regulatory principle is to *minimise regulatory intervention in converging markets*. This can be achieved in a practical sense by constraining regulation to that with a clear and unambiguous net benefit effect. Even a Government which is not committed to laissez-faire economics would need to take this view, in light of:

1. The likelihood, which will need to be evaluated, that converging industries will increasingly, of their own accord, meet or move towards the Government policy objectives without intervention; and

2. The significant and increasing risk of regulatory failure in the migration to the convergence environment.

Competitive neutrality

The second key principle is that in as industries converge, any regulation must be applied in a consistent fashion across previously distinct industry sectors. In particular, the competition-enhancing effects of convergence are likely to be hindered by the distortionary effect of asymmetric regulation. Thus, in an era of convergence, *competitive neutrality* must become an entrenched regulatory principle.

What this means is that all market participants should be treated alike - the level playing field. Legal structures should not treat firms differently because of their industry of origin, or because of characteristics associated with their originating industries - whether this be a reliance on particular technologies, corporate structure, business models or marketing approaches. If industries, once separate, but now converging, are each regulated differently, then competition is distorted. Firms in the most favoured industries do better than equally or more efficient firms elsewhere. In contrast, unhindered competition pushes the most efficient firms to the fore, regardless of origin.

Firms competing in converging markets will bring with them strengths and competencies which, chiefly, reflect the nature and extent of their traditional business. These differing strengths and competencies will also reflect differing degrees of horizontal and vertical integration and the differing nature and extent of their economies and diseconomies of scale and scope. Additionally, there may be new entrants, sporting new competencies, such as the "intangibles" identified in the Issues Paper.

The ability of such a variety of firms to enter markets and compete in them, using their competencies, subject to the constraints on anti-competitive conduct imposed by general competition law under the *Trade Practices Act 1974* (TPA), is entirely consistent with an efficient, competitive market. Such a market is one that produces a diversity of product offerings at competitive prices. Such is the potential of converging markets.

All regulation is in some sense distortionary. But regulation distorts least when it treats all firms and all technologies in a market in a broadly neutral manner.

Technology-neutrality

The third regulatory principle is *technology-neutrality*. In order to ensure that market participants make the economically optimal choice of technology, positioned as they are to evaluate the risks and benefits of each option, these markets must remain free of regulatory distortion. The implications of this are that regulation should not "pick winners" (or losers), and the impact of regulation on technology choices should be neutral.

Flexibility

The dynamism of converging markets means that any regulatory framework will have to provide the *flexibility* to adapt to change. It is suggested that broad principles requiring case-by-case analysis, would in general be preferable to a rules-based approach, which would limit the regime's ability to take account of evolving and emerging markets.

Certainty

In light of the many uncertainties which characterise the convergence environment, an uncertain regulatory environment is perhaps inevitable, but should be avoided to the extent

possible. The regulatory framework needs to provide as much *certainty* as possible as to the circumstances and manner in which regulatory instruments may be applied.

Minimise the costs of regulation

It is important in light of the above principles that proposed regulation of converging markets is rigorously evaluated in a cost/benefit analysis before it is imposed, in order to *minimise the costs of regulation*. The costs and risks associated with regulating should be weighed against the benefit sought to be conferred and the likelihood that the particular benefit or a similar benefit will be conferred within a reasonable timeframe by the market. The analysis would ideally involve assessments of the value of social goals and social costs, as well as the more readily quantifiable economic costs and benefits, including risk of error. Clearly more targeted regulation imposes less costs of the regulation itself.

3.4 Elements of a Convergence Policy Framework

The purpose of the policy framework is to set out the terms of engagement for regulatory intervention in converging markets. In accord with the regulatory principles articulated above, it would promote the minimum regulation required to achieve the Government's policy objectives where markets are unlikely to do so, and take account of the characteristics of convergent markets – uncertainty, enhanced competitiveness, benefits to consumers and the risk of regulatory error. Intervention would be targeted, and only applied where a cost/benefit analysis favours it. The framework would treat participants in converging markets neutrally with respect to their technology choices and traditional industry origins. It should allow for flexibility in a dynamic environment, but set out clear indicators to provide as much certainty as possible.

The benefits of having a uniform approach, across all sectors of the economy, to regulation generally, and to the application of the competition laws in particular, have long been recognised. Thus, in 1976, the Swanston Committee, in its review of the *Trade Practices Act*, concluded that:

> *"We believe it should be extremely important that the Trade Practice Act should start from a position of universal application to all business activity, whether public sector or private sector, corporate or otherwise. Only in this way will the law be fair, be seen to be fair, and avoid giving a privileged position to those not bound to adhere to its standards."*

This assessment was confirmed by the Hilmer Committee[2] and underpins the Government's National Competition Policy. Its importance has been accepted by the ACCC, whose Chairman, Professor Allan Fels, recently commented that:

> *"A national competition policy presents opportunities to progress reform more broadly, to promote nationally consistent approaches and to avoid the costs of establishing diverse industry-specific and sub-national regulatory arrangements."*[3]

However, once industry-specific arrangements are in place, it is exceptionally difficult to wind them back. Rather, they tend to become more detailed and entrenched over time. This reflects an asymmetry in the pressures that bear on governments. In the face of 'bad news', further, more invasive, regulations are put in place, as a means of responding to the immediate demands of the public. But 'good news' -- such as the fact that markets are becoming more competitive, and the need for regulation diminishing -- gets little attention, and hence creates few incentives to wind back arrangements that are no longer needed. The fact that such a winding back might compromise some existing interests, which have

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[2] (Independent Committee of Inquiry into Competition Policy in Australia: National Competition Policy: AGPS, Canberra 1993)

[3] (Professor Allan Fels "Decision Making at the Centre", European University Institute Workshop on the Implementation of Antitrust Rules in a "Federal" Context).

developed commercial stakes tied to ongoing regulatory intervention, makes the decision to wind back all the more difficult.

The impetus coming from convergence provides both a need and an opportunity to confront these issues. The need is there because the inherited arrangements, set in a converging environment, are likely to create substantial distortions -- distortions that undermine national wealth, and harm rather than advance the consumer interest. Those harmed – the opportunities not created -- will, left to themselves, have little weight in the debate: the noise from existing interests can all too easily drown them out. This makes it essential that the Department take the initiative in proposing an accelerated transition away from the distortions the inherited arrangements create.

At the same time, the convergence process provides an ideal opportunity for this to occur. As boundary issues become more pressing, the scope is there to respond not by fiddling at the edges, but by setting policy on a sustainable course for the longer term."

Accordingly, Telstra proposes the following elements of an ideal framework for regulatory policy in a convergence environment:

1. A rebuttable presumption in favour of the ability of new markets to become competitive in reliance upon nothing more than generic competition regulation. Thus there would be no automatic/reflexive competition regulation of new markets.

2. A clearly articulated process for progressively winding back regulation of existing markets and transitioning to a generic (competitively neutral, technology neutral, minimalist) regulatory framework:

    ◊ regulatory forbearance - a requirement that the regulatory agencies (ie those with responsibility for administering legislation) have clearly articulated criteria/policies establishing the circumstances in which they will refrain from applying the regulatory tools at their disposal - ideally calibrated with the emergence of competition in various markets

    ◊ legislatively enshrined policy of progressive elimination of existing competitive regulation, together with clearly articulated indicia to support that elimination

3. Regulation by reference to function or service, not industry category of firm type (a fundamental of competitive neutrality).

4. The progressive and rapid elimination of cross subsidies to ensure internationally competitive cost structures (ie. the removal of asymmetric hidden taxes) and competitive neutrality.

5. A rebuttable presumption in favour of the ability of new markets to achieve social policy objectives. To the extent that social obligations must be imposed, they are funded on a broad base to minimise the costs of regulation and maximise competitive neutrality.

6. No pro-competitive regulation unless it can be expected to lead to sustainable competition.

7. Regulatory intervention is clearly targeted and limited to clear instances of market failure (ie. efficient prices are absent) where there is no likelihood of competition emerging to remedy this.

PART III : TELECOMMUNICATIONS REGULATORY ISSUES IN A CONVERGENCE ERA

4 LEGACY TELECOMMUNICATIONS REGULATION

Telstra believes that there are key elements of the current telecommunications regulatory regime, which was established principally on the basis of PSTN technology and services, the policy basis for which, and the efficacy of which, are called into question in a convergence environment. Furthermore, aspects of these elements are today having an adverse effect on the availability, in particular, of high speed access infrastructure which is a fundamental enabler of convergence, and are potentially constraining the benefits available to consumers in a convergence environment. Finally, aspects of these elements are inconsistent with the regulatory principles articulated in this submission, and inconsistent with an ideal convergence regulatory framework.

The elements of legacy telecommunications regulation to which these comments refer include:

(a) Retail Price Regulation:
The system of price controls that limit Telstra's ability to re-balance prices under subsections 20, 21 and 23 of the *Telstra Corporation Act* and Part 9 of the *Telecommunications (Consumer Protection and Service Standards) Act 1999*;

(b) Universal Service Regulation:
The regime for funding the universal service obligations that Telstra is required to provide, as detailed in Part 2 of the *Telecommunications (Consumer Protection and Service Standards) Act 1999* and the *Telecommunications Laws Amendment (Universal Service Cap) Act 1999*; and

(c) Service Quality Regulation:
The system of customer service guarantee set out in Part 5 of the *Telecommunications (Consumer Protection and Safeguards) Act 1999*.

This regulation is a legacy of an era when Australian telecommunications was characterised by limited competition for the supply of a narrow range of services. Telstra is concerned that as communications, media and computing industries converge, these regulations are now:

- Based on process-focussed policy, born in the PSTN era, which must be reviewed in the context of convergence and the desired regulatory framework for the convergence environment;
- To an increasing extent, ineffective in light of convergence; and
- May actually act as an impediment to the achievement of infrastructure competition and services competition, key policy objectives in a convergence environment.

What follows is a critique of each of these regulations viewed in the context of their policy basis, efficacy and potential harmfulness in a convergence environment, in light of the desirability of applying the regulatory framework for convergence to reform telecommunications regulation.

The inefficacy and harms of these elements of legacy telecommunications regulation are exacerbated by the fact that each was developed in isolation. For example, the periodic reviews of the price control determinations take no account of the impacts of price reductions on quality of service. Equally the development of the CSG standard did not take into account that Telstra, as the universal service provider, has no option as to where it offers universal service. Unlike its competitors it must offer standard telephone services to all, at regulated prices, and subject to the CSG.

Telstra urges the Government to seek reform of this legacy regime as part of the migration path to the desired policy framework for a convergent environment.

4.1 Retail Price Regulation

The policy basis for retail price regulation finds its genesis in the era of a Government-owned monopoly telecommunications infrastructure owner and service provider. Price controls commenced in Australia in 1989 with their key function being as a surrogate for competition, imposing price pressures where there were none, with the intention of forcing the realisation of greater efficiencies by Telecom and OTC, in preparation for a competitive market. They also ensured that customers shared in any efficiency gains through lower prices for telecommunications services rather than these gains being retained as monopoly profits.

From 1992 price controls were designed primarily to protect and foster competition during the early years of the Optus-Telstra duopoly. Sub-caps were introduced to protect consumers from price increases ("rate shock") required to enable Telstra to rebalance – ie. correct the historical cross-subsidy of access charges from usage charges, forcing Telstra to do so through cost-cutting and productivity improvements. They also sought to ensure that customers shared in any efficiency dividend.

Price controls since 1996 have had an added purpose to ensure more equitable distribution of benefits through such requirements as rural/metro local call pricing parity.

In short, the policy rationale for the price controls have been threefold:
- to substitute for competition;
- to protect consumers;
- to promote efficiency.

The Australian system of price controls keeps PSTN access charges (rentals) artificially low and consequently inflates usage charges, including charges for the bandwidth services essential for service delivery in the era of convergence. This effectively pushes up the costs of bandwidth and enhances the "digital divide" by reducing the incentives for investment in infrastructure in rural and regional areas. By taxing usage, the controls discourage the development of the new, usage-intensive, applications which would otherwise be likely to prevail in a convergence environment.

The regulatory impediment to re-balancing embodied in the sub-cap regime constrains investment in access infrastructure. As a result of the distortion which entrenches under-recovery of access network costs, very few carriers are prepared to provide competitive customer access network facilities outside the low-cost capital cities (particularly given the failure of the universal service funding mechanism discussed in section (b) below). In part this is because potential entrants are unwilling to compete against an incumbent providing services at artificially low prices. More generally, there is little incentive to upgrade incumbent networks if revenues are constrained or are falling.

Paradoxically, the growth of the Internet is exacerbating the price distortions. As use of the Internet increases, average local call holding times also increase, threatening the viability of the local call service and further eroding sources of cross-subsidisation for the losses on Telstra's CAN. The Industry Commission detailed this problem to a Federal Parliamentary Committee in early 1998:

> *"For most users, the PSTN component of an internet transaction involves a local call to their ISP's site over a standard copper-pair line.... Under the current regulatory regime, local calls for both voice and data services have to be charged at a flat rate per call. Furthermore, the rate itself is subject to price-cap regulation. However, the average length, and hence cost, of voice and data calls are very different. Estimates indicate that the average length of a local voice call*

in Australia is 3 to 4 minutes, while that of an internet session is 30 minutes. [As a result of Internet usage, Telstra estimates that the average local call holding time is now approximately 7 minutes.]"[4]

"[T]he Industry Commission estimated that the average long-run marginal cost of providing a local call service is 2.5 cents per minute (IC 1997). Hence, based on the estimated average length of calls, a carrier providing local calls incurs an average cost per call of approximately 10 cents for voice calls and 75 cents for data calls. For both calls, the most that carriers are able to charge customers is 25 cents. The implication of these figures is that internet users are being cross-subsidised by users of voice telephony.

While the subsidisation of local data calls by users of voice telephony probably has encouraged an increasing number of Australians to use the internet, the current pricing arrangements may hamper the development of internet commerce in the longer term. For instance, the losses made by carriers on local data calls may undermine the incentives to upgrade the technology of the PSTN to provide higher quality internet access. The current pricing of local data calls may even explain the development of a separate network in some areas to carry data between dial-up users and their ISPs at high speeds for a timed charge, with the current PSTN continuing to carrying voice and low speed data at an untimed rate."[5]

Increasingly in an environment of convergence, the basis for maintaining retail price regulation must be questioned.

- There is already robust at least services competition in a number of the markets in which services currently included in the price control baskets are supplied.
- Convergence, unless hindered by the retention of regulatory settings which deter infrastructure investment, could be expected to bring about competition from a range of new entrants using different infrastructure in all markets in which services currently included in the price control baskets are supplied.
- Further, the whole paradigm of fixed-line telephony is trending to a mobile paradigm, rendering price controls of basic fixed line services virtually redundant.
- Price controls have manifestly resulted in under-investment in infrastructure. Until full rebalancing is made possible by the removal of price controls, entry to infrastructure markets will be constrained. This is clearly contrary to the policy objectives for the convergence era.
- Given the inherent distortions, the disincentives that they create and the price signals that they give, price controls are essentially anti-competitive.

In summary, Telstra submits that retail price regulation is increasingly unnecessary in the face of increased competition and consumer choice, and harmful in terms of its distortionary effects on investment and technology choices, and its impact on Australia's international competitiveness in the context of convergence. A review of price control regulation in light of the regulatory principles and proposed regulatory framework needs to be undertaken.

4.2 Universal Service Regulation

The policy basis for universal service regulation is that there is a minimum level of "essential" telecommunications services which are necessary to an individual's ability to participate in Australian society, which individuals should be guaranteed regardless of whether it is commercially viable to provide those services to those individuals. The current Universal Service Obligation (USO) includes the standard telephone service – essentially the ability to make voice telephony calls – as well as payphones, directory assistance and the

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[4] See Telstra submission in response to the ACCC's Discussion Paper, *Interconnection Charges and Telstra's Access Deficit*.

[5] Industry Commission, 1998, *Submission to the JCPA Inquiry Into Internet Commerce*, http://www.pc.gov.au.

availability upon demand of a digital data service (ISDN to 96% of the population; digital satellite download service to the remaining 4% of the population).

The Issues Paper poses several key questions in relation to universal service policy:

- Will the growing diversity of demand undermine the relevance of "one size fits all" interventions such as the USO?
- Is the universal provision of a standardised telecommunications service the correct objective in a convergence environment?
- Are there non-regulatory mechanisms, including commercial mechanisms, which could be used by the Government to promote access to connectivity in otherwise marginal consumer markets and user communities?

The detrimental impact of price controls on the development of competitive infrastructure is exacerbated by the failure to ensure adequate funding for the provision of services in remote and rural Australia.

Under the current USO funding regime the universal service provider bears the overwhelming share of the costs of supplying access in rural areas at regulated prices. It does this in three ways:

- First, the USO funding mechanism only takes effect when all of the universal service provider's PSTN revenues in an area are offset against the costs incurred in serving that area. The ACA estimated the revenue forgone in 1997-1998 to be $545,689,833. In other words, the USO mechanism only comes into effect when the profits from Telstra's supply of local, STD, and IDD calls in net loss areas have been taxed at 100%;

- Second, only licensed telecommunications carriers contribute to the remaining deficit (estimated by the ACA to amount to $548,087,665 in 1997-1998) on the basis of their total market share. Thus Telstra funds in excess of 80% of the net universal service cost through revenues generated in other parts of the country; and

- Third, the net universal service cost has systematically been underestimated, with the universal service provider's shareholders left to make up the difference. For the years 1992-93 to 1996-97 Telstra has not received a USO cost contribution based on an amount independently assessed by the Regulatory body responsible for doing so. Rather, the contributions received have been based on prior commercial agreements between the contributing carriers, set at $253.32 million, which clearly does not reflect the actual cost of USO provision. The contributing carriers are contributing just over 15% of this cost - $38.646million. With the amendment of the *Telecommunications Act 1997* by the *Telecommunications Laws Amendment (Universal Service Cap) Act 1999* this under-funding of the USO has been enshrined in legislation at least until the end of 1999-2000.

As a consequence of the failure to adequately fund the USO the incentives for the universal service provider to upgrade the rural and remote access network are further undermined. All universal service providers, including Telstra, require a commercial return before committing the investment necessary to provide the required services. Without certainty of commercial returns, universal service providers operating in a competitive market will either not make the investments required, or ultimately demand a higher risk premium than those investments would otherwise require. In the longer term this could exacerbate the digital divide between urban and rural Australia.

USO funding is not the only issue. From time to time there is pressure to upgrade the USO to bring a higher level of telecommunications service to all Australians. This manifested itself most recently in the 1998 Digital Data Review and the recent amendments to the USO which require Telstra to provide the digital data service (via ISDN or satellite) upon demand. Such pressure is likely to intensify in the face of new services being made available, at least in lucrative markets, in an era of convergence.

The distortion, cost and efficiency burden of the USO will only increase in the face of such pressure unless it is acknowledged that a "one-size-fits-all" approach to universal service is increasingly obsolete. This diversity of demand has been apparent for some time, but will be exacerbated by the consumer-empowering effects of convergence. As customer demands fragment, it is reasonable to assume that what is "essential" for one customer is not the same as for all others. The principle of minimising the cost of regulation would require that if the USO is retained, it be more specifically targeted.

Telstra urges the Government to resist pressure to augment the USO uniformly or ubiquitously. The broad policy goal to guarantee a minimum level of "essential" services which are necessary to an individual's ability to participate in Australian society remains applicable, but recognition is required that this is not the same for all Australians. Further, the USO mechanism is not a demand-driver, nor should it mandate ubiquitous provision of "nice to haves" which would impose excessive costs on Australian converging industries.

Whether or not the actual costs of USO provision are recovered by the universal service provider, the USO still represents an efficiency cost to the Australian telecommunications industry. As the Davidson Committee emphasised more than 15 years ago, arrangements that place on Telstra a disproportionate share of the burden of funding uneconomic services are inherently inefficient.[6] By reducing Telstra's ability to compete in markets that are increasingly vigorously contested, they allow rivals to expand even when their costs are higher than Telstra's. Such an outcome can hardly position Australia – its converging industries and those which rely upon them - well in the global information economy. To compete, Australian industry, including that outside the main metropolitan centres, needs access to an efficient telecommunications infrastructure; distorting that infrastructure's development will, in the long run, serve all Australians poorly.

4.3 Quality of Service Regulation

The Australian quality of service regulations should also be reviewed in light of their negative impact and dubious efficacy in the context of convergence.

The quality of telecommunications services is an issue of major political concern in Australia. Successive Australian governments have put in place some of the world's most stringent quality of service requirements. A system of 'Customer Service Guarantee' benchmarks was introduced in January 1998, whereby carriage service providers may be liable to pay damages for failure to comply with the performance standards set out in the *Telecommunications (Customer Service Guarantee) Standard 1997*.

This system is highly inefficient:

- First, the standards are not based on any systematic cost-benefit analysis, in which the cost of the resources needed to achieve these goals is weighed against the benefits their achievement would provide. Rather, the standards have been set on the basis of administrative and political considerations, with no obvious link or reference to broader efficiency goals.[7] Under the current system, carriage service providers are forced to provide consumers with a service standard that may bear no relation to their needs.
- Second, there is little practical scope under the regime for carriage service providers and consumers to "contract out" of the regulated service standards. Thus, a carriage service provider could not readily discharge its obligations by offering consumers prices for service standards lower than those mandated by the regulator, or by proposing insurance-like contracts in which stipulated payments would be made when specified

[6] The Committee of Inquiry into Telecommunications Services in Australia (Chaired by J.A. Davidson), 1982.

[7] (Although the CSG standards reflected Telstra's market offering to customers at the time of its introduction, this occurred in the context of a legislated government monopoly and, due to price controls, did not reflect true costs.

contingencies (say, a prolonged outage) had occurred. The willingness of customers to accept lower standards in return for lower prices is evidenced by the large number of consumers using voice over the Internet technologies.

- This inflexibility is particularly inappropriate in an era of convergence, which is characterised by enhanced customer choice of services, most of which will be delivered using IP. Given that a key characteristic of convergence is the opportunities it generates for customers to choose the nature and quality of services they acquire, it is anomalous that customers are required to be provided with telecommunications services to a regulated standard. It is equally anomalous that, in an increasingly IP world, that standard presumes that those services are provided via the PSTN.
- Finally, the application of such standards to the new IP-based network systems will be highly problematic. In broad terms this is because in IP and next generation wireless environments, both service functionality and network access are less dependent on the core network, determined more by facilities that largely reside outside of the core network, and by the individual characteristics of a wider range of access providers.

Such strict, arbitrary and inappropriate standards are certain to seriously distort the network investment decisions of carriers, particularly in rural areas. In the longer term this could exacerbate the digital divide between urban and rural Australia. Specifically:

- For an incumbent such as Telstra, the threat of such penalties will induce it to adopt a very conservative investment pattern. It will be forced to invest in the maintenance of the existing network infrastructure to a point where the costs far exceed the true benefits — a problem generally referred to as network gold plating. Furthermore, Telstra may have less incentive to completely upgrade the network in rural and remote areas for fear that any decline in quality associated with the start-up phase of an upgraded network may attract liability under the CSG Standard.
- The threat of such liability will also deter potential entrants that otherwise may invest in rural and regional telecommunications networks. In effect, potential entrants will have to factor in the possibility of regulatory penalties when developing investment plans. This can only further reduce the incentives for competitive entry in rural and regional Australia.

5 TELECOMMUNICATIONS INDUSTRY CONDUCT REGULATION

It is somewhat anomalous in an era of convergence that firms originating in the telecommunications industry and competing in converging industries are subject to telecommunications industry-specific competition regulation. It is the only industry with a specific additional layer of competition law overlaying the generic Part IV of the TPA[8], yet its participants increasingly compete with firms that are not so regulated.

> ***Hypothetical - On-line Services - Competition Rule***
>
> *Assume that two firms compete in the market in which on-line services are supplied. Both provide infotainment-type content that is accessed by their customers on the Internet. Firm A is a telecommunications carrier, while Firm B is the owner of substantial media assets which include content of the type which forms both of their on-line service offerings.*
>
> *It seems likely that the market in which the Firms' on-line services are supplied is a telecommunications market. Assume that in this market - call it Market X - neither Firm A nor Firm B could be said to have market power. Assume also that Firms A and B both have market power in their traditional markets - Firm A in telecommunications markets and Firm B in a media market, for example the market in which national daily newspapers are supplied.*
>
> *Say Firm A wishes to compete aggressively in Market X, and undertakes a strategy whereby it cross-subsidises its on-line services from telephony revenues. Similarly, assume Firm B's competitive strategy in Market X is funded by cross-subsidies from its print media business. This conduct is not per se illegal. Assuming that in instance it constitutes a use of market power in one market, it would only be a breach of section 46 of the Trade Practices Act if the conduct was motivated by a purpose proscribed by sub-section 46(1) - essentially to deter or damage competition or a competitor in Market X.*
>
> *However, while the purpose of the conduct is rooted in fierce competition between Firms A and B, assume that the effect of the conduct is that it is more difficult for other firms to enter Market X. This could create a situation where Firm A, being a firm with market power in a telecommunications market, has breached the competition rule. Firm B, which may enjoy equivalent or greater power in its traditional media market, is not subject to the competition rule. Thus the Commission may be empowered to issue a competition notice against Firm A's illegal conduct, but the same conduct, with the same purpose and effect, by Firm B is legal and goes unsanctioned. If Firm B were disposed to regulatory gaming, the Commission's investigation may even be prompted and assisted by Firm B.*

It is clear from this example that industry-specific competition regulation is a highly distortionary instrument when its application in converging markets is considered. Further, even the threat or possibility of intervention to restrain a telecommunications firm's competitive behaviour confers a distortionary competitive advantage upon competitor firms deriving advantage from their incumbent positions in other converging industries. This is particularly so given the incentives for regulatory gaming created through the mere possibility of regulatory intervention.

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[8] While the broadcasting industry is subject to industry-specific competition regulation, it serves largely to protect rather than constrain the activities of firms in that industry. Also, broadcasting regulation is currently premised on non-economic policy goals, such as plurality and diversity of opinion.

6 ACCESS AND ACCESS PRICING[9]

6.1 Policy Basis

Few policies designed to ameliorate transitional problems in the market for PSTN services have such a detrimental impact on the supply of communications infrastructure in Australia as the Part XIC access regime. Part XIC of the Trade Practice Act confers on the Australian Competition and Consumer Commission (ACCC) a broad power to declare the set of telecommunications services that must be supplied to access seekers on terms and conditions that the Commission has the power to set in lieu of commercial agreement. The propensity of the ACCC to declare services which are not required for any-to-any connectivity, and which are not bottleneck services dramatically undermines the incentives for investment in infrastructure which would deliver to consumers the benefits of convergence. What business will invest in new communications infrastructure if it faces the very real possibility of supplying that service to competitors at regulated prices and having its own plans for use of that infrastructure thwarted?

Essential facility legislation – such as Part XIC – seeks to ameliorate the anti-competitive possibilities associated with vertically integrated firms controlling an upstream facility essential for competition in a downstream market. While such legislation can be very important in situations where the upstream facility is a natural monopoly (or is still to be exposed to competition), it is widely recognised that there are compelling economic and legal reasons for constraining the operation of essential facility legislation. Most importantly, regulators seldom get the price signals right such that optimal investment decisions can be made. This point was made in a recent case in the US Supreme Court, when Justice Breyer noted:

> *"Rules that force firms to share every resource or element of a business would create, not competition, but pervasive regulation, for the regulators, not the marketplace, would set the relevant terms."*[10]

More generally, in the European Court of Justice, Advocate General Jacobs has highlighted the very real costs associated with regulated access:

> *"First, it is apparent that the right to choose one's trading partners and freely to dispose of one's property are generally recognised principles... Incursions of these rights require careful justification. Secondly the justification in terms of competition policy for interfering with a dominant undertaking's freedom to contract often requires a careful balancing of conflicting considerations. In the long term it is generally pro-competitive and in the interests of consumers to allow a company to retain for its own use facilities which it has developed for the purpose of its business. For example, if access to a production, purchasing or distribution facility were allowed too easily there would be no incentive for a competitor to develop competing facilities. Thus while competition was increased in the short term it would be reduced in the long term. Moreover the incentive for a dominant undertaking to invest in efficient facilities would be reduced if its competitors were, upon request, able to share the benefits."*[11]

Reflecting these views, the EU's Court of First Instance has recently determined that:

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[9] For an elaboration of these issues see H. Ergas and L. Evans, 1999, 'Providing a Right of Access to Essential Facilities: The Australian Experience' Paper Presented to Centre for Research in Network Economics Conference, Auckland, 1 September.

[10] AT&T Corp. et. al. v. Iowa Utils. Bd. et al., S. Ct. 721 (1999) at 754.

[11] Case C-7/97, Oscar Bronner GmbH & Co. KG v Mediaprint Zeitungs-under Zeitschriftenverlag GmbH & Co. KG and Others, not yet published, delivered on 28th May 1998.

"a product or service cannot be considered necessary or essential unless there is no real or potential substitute .. (that is) there are no viable alternatives".[12]

Finally, the Hilmer Report echoed the concerns noted above about the consequences regulated access could have for the incentives to invest and compete.

In light of this weight of opinion and the enhanced infrastructure choices being brought about by convergence, policy which permits the declaration of inessential services which are not required to achieve any-to-any connectivity should be reviewed.

6.2 Efficacy

Despite these arguments for constraining the application of essential facilities legislation, Part XIC allows the ACCC to declare a service if it is satisfied "*declaration will promote the long-term interests of end-users of carriage services or of services provided by means of carriage services*".[13] As a consequence, the ACCC has declared many services that are contestable, extending regulation into areas best constrained by competition. More importantly in the context of policy objectives for convergence era:

- While Part XIC is ostensibly neutral as to the promotion of competition in services markets and infrastructure markets, the ACCC has shown a predisposition toward services competition; and
- While the ACCC is required by law to assess the implications of declaration on investment, it appears to have placed very little emphasis on this leg of the statutory test.

For example, the ACCC declared transmission capacity on all intercapital transmission routes except the Melbourne-Sydney route. Declaration was opposed not only by Telstra and Optus but also by other actual and potential entrants, such as Macrocom and electricity utilities. It was argued that declaration would stifle investment in transmission infrastructure and impede new entrants. Indeed, there was specific evidence tendered from actual and potential new entrants that declaration would impact on their network roll-out strategies and marketing plans.

Furthermore, the ACCC has moved to regulate a range of services that are the means by which customers will access new services made available through convergence. For instance:

- In August 1999, the ACCC announced its intention to declare an analogue Pay TV carriage service carried over Hybrid Fibre Coax cable.[14] This is despite the fact that carriage of Pay TV signals by that means competes with carriage over the Optus satellite and via MDS, as well as with transmission by Free-to-air channels. The Commission has provided no reasoning to support such a narrow, technology-specific approach to market and service definition (these issues are separately expanded in a case study below);
- The ACCC has also recently declared an ISDN access service in a form that is virtually indistinguishable from a retail service.[15] As a result, it has taken on the role of setting the retail price of ISDN; and
- The ACCC has recently interpreted its powers to require Telstra to supply a data access service to third parties without using intermediate grooming at Digital Cross Connects.[16]

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[12] Joined Cases T-374/94, T-375/94, T-384/94 and T-388/94, European Night Services and Others v. Commission, Judgement of September 15, 1998, not yet published, at para 285 and 207-9.

[13] sub-section 152AL(3)(d) of the Act

[14] ACCC (August 1999): *Declaration of Analogue Subscription Television Broadcast Carriage Service. A report on the declaration of an analogue-specific subscription television broadcast carriage service under Part XIC of the Trade Practices Act 1974.*

[15] ACCC (October 1998): *Competition in data markets – Final Report.*

[16] ACCC (October 1998): *Competition in data markets – Final Report.*

> Declaration is in this instance being used to force a supplier to alter the technology it uses for service provision.

The decision of the ACCC to micro-regulate these services has potentially damaging implications for the achievement of policy objectives for the convergence era in Australia. It is highly unlikely that the Commission will set terms and conditions that induce efficient investment decisions. If prices are too low incumbent investors will have diminished incentives to upgrade the facilities used to provide these services. Potential entrants will be discouraged from investing both by the presence of an incumbent network with artificially low prices and the threat of declaration of their own services.

More specifically, the declaration of a wide range of transmission facilities by the ACCC could easily deter the development of facilities-based competition. In effect, entrants, rather than risk their own resources, would be encouraged to merely rely on Telstra's transmission facilities.

Given the importance of competitive high-speed access services for the delivery of new services, these disincentives to provide the infrastructure such services threaten the ability of Australian consumers to reap the benefits of convergence.

6.3 Case Study – Pay TV Cable Infrastructure

Of all the policies that require review in the face of convergence, the current Government's "policy" on access to cable infrastructure owned by Telstra and Optus for the purpose of delivering pay television services is one of the most wanting.

In its 1996 communications policy statement, *Better Communications*, the Government announced its intention that pay television would be subject to the proposed telecommunications access regime, which was to come into force on 1 July 1997:

> *"[T]he Coalition will require subscription television network operators, from 1 July 1997, to provide access to their infrastructure under a compulsory interconnect regime, in line with the regime for telephony and interactive services."*[17]

This was in contrast to the Carrier Associate Class Licence regime created by the previous Government, which enabled the investment in pay TV infrastructure to occur. In brief, the regime permitted the carriers to create subsidiaries – "carrier associates" – to own and operate their HFC cable networks. Carrier associates were not subject to the *Telecommunications Act 1991* access regime in respect of their networks; rather, the Carrier Associate Class Licence precluded access to pay TV carriage services and unbundling of any other services provided on the cable networks. Without these regulatory arrangements designed to facilitate investment in cable infrastructure, it is unlikely that the investment in broadband cable undertaken by Telstra and Optus would have occurred.

The Government's policy was implemented by the 1997 reforms. However, pay TV operators were not made subject to access "in line with the regime for telephony and interactive services". Access to all other telecommunications services was subject to the "long-term interests of end-users" test. However, inclusion of a pay TV broadcasting access service in the ACCC's transitional "Deeming Statement" of declared services was mandated, with no test to be applied.[18]

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[17] Liberal and National Parties Policy, *"Better Communications"*, 1996, p.36

[18] This applied, albeit in the negative, even to services (other than interconnection services) which were already the subject of existing access arrangements between Telstra and Optus. See Section 39 *Telecommunications (Transitional Provisions and Consequential Amendments) Act 1997*

The more recent inquiry into the declaration of an analogue subscription broadcasting carriage service was announced by the ACCC in December 1998. The stated purpose of the inquiry was to resolve uncertainty as to the validity of the "declaration" of the broadcasting access service pursuant to the 1997 Deeming Statement.

The basis for the ACCC's decision, announced in August 1999, to declare an analogue subscription television broadcasting service, is far from clear. It appears that the ACCC was motivated principally by two factors:

- A perceived imperative to implement government policy, dating from 1996, that access to pay TV infrastructure be made available; and
- A perception that declaration would facilitate the distribution of "niche programming", which was considered to constitute enhanced competition in the provision of pay television services to end-users.

The ACCC's analysis was expressly premised on market analysis which defined a separate market for the provision of pay television broadcast services to end-users. The ACCC failed to acknowledge the fact of convergence, and its dynamic effect on market structure in Australia. It ignored the evidence that pay television and free-to-air television increasingly compete in converged markets for audience, for advertising and for programming.

The declaration decision was cable-specific. The decision failed to acknowledge that other infrastructures compete with cable, despite the fact that pay television services are today being delivered via satellite and MDS, and that convergence is making further infrastructure options available.

The need for policy review in relation to access to broadband infrastructure is clear. So-called "current" regulatory policy was developed in 1996, and 3 years on in a dynamic convergence environment is irrelevant. The policy was initially premised on addressing public concern at the dual rollout of cable by Telstra and Optus, and sought to mandate cable sharing. Today the National Bandwidth Inquiry is highlighting the problems of the absence of infrastructure competition in much of Australia. Decisions since 1996 have been attempts to implement that outdated policy.

Added to that, the policy is technology-specific and industry-specific. Of all infrastructures which are or could be delivering pay television services, it regulates only cable. Further, it is specific to the pay television industry, ignoring the broadening effect of convergence on both infrastructure and services markets.

In particular, it is clear that the pay television industry increasingly competes with free-to-air television for audience, advertising and programming. In stark contrast to the pay TV industry, free-to-air broadcasters in Australia are protected by their own industry-specific legislation from competitive entry, and have been provided with free spectrum for digital conversion. Further, in the free-to-air context, "niche" programming is broadcast by the government-funded ABC and SBS. In contrast, the pay TV operators utilising cable have access obligations imposed to require their commercial infrastructure investment to be redeployed to the distribution of "niche" programming at regulated prices. There is absolutely no evidence that this "niche" programming will provide sustainable competition in the currently loss-making pay TV industry.

The access regime and its application to broadband infrastructure places at risk the timing and availability of future services and the making of future infrastructure investment in converging industries. For example, the access regime mitigates against a decision by cable operators to undertake the capacity-enhancing step of digitising their HFC networks. The availability of greater capacity is ostensibly good for market entry and for consumers, and accords with policy objectives in a convergence environment. But cable operators will be motivated by a perfectly reasonable commercial desire to maintain autonomy in respect of

the capacity available on their networks for their own proposed services and to maximise the value of the third party services they carry. The current access regime does nothing to assure them this autonomy.

Cable operators have even less incentive to extend the reach of their broadband networks given the costs involved and the likelihood that regulated prices will not sufficiently reward them for their total network investment. In fact Telstra is selling off equipment originally acquired to build its network, which equipment is no longer required due to the reduced size of its planned rollout.

7 SPECTRUM ALLOCATION AND MANAGEMENT

Background

The regulation and management of spectrum is clearly a pivotal issue in relation to regulation for structural convergence in that both traditional and new services can use this delivery mechanism to deliver the full range of services: from voice to video. The importance of the regulatory approach to spectrum is heightened by the fact that currently the Australian population has receiving equipment (eg. radio and television sets) tuned to receive particular channels within the broadcasting services bands.

In approaching this issue, it is useful to examine the rationale behind the existing regulation of radiocommunications. Licensing of spectrum is aimed at the efficient allocation and technical management of a scarce public resource. However, unlike those for other services, spectrum licences for Free–to-Air (FTA) broadcasting include a right to broadcast content subject to conditions on licensees. Spectrum is allocated for broadcasting subject to a predetermined limit on the number of FTA services permitted, FTA licence fees are not related to the amount of spectrum allocated, and the spectrum is effectively quarantined from broader spectrum planning considerations. Clearly there is a disparity in the regulatory treatment afforded to spectrum used for FTA broadcasting services and other services using spectrum. This disparity is not sustainable in a convergent environment due to its distortionary impact on certain services. To remedy this, as Telstra has argued in the context of the Productivity Commission's Broadcasting Inquiry, the management of spectrum for broadcasting and other services should be based on uniform principles.

Radio Spectrum Characteristics

In light of convergence and the trend towards substitutable delivery mechanisms, it is worth noting some key characteristics of radio spectrum that are relevant to developing appropriate regulation. The natural ubiquity of radio spectrum, for delivery of services over a broad area, makes spectrum a valuable resource in the delivery of services. However, several key characteristics of radio spectrum are especially notable[19]:

- Spectrum is heterogeneous – the various frequency bands are better suited to particular applications than are alternative bands. The global market - international usage and availability of equipment to agreed standards also influence the usage of different frequency bands;
- Spectrum is finite – the possibility of interference from other users limits the number of services able to be supported by any given spectrum segment at any time;
- Spectrum is non-depletable – while use at any time is limited, the spectrum remains available for future use without depletion.

As spectrum is a common resource with benefits available to the community at large, if there is no authority charged with managing spectrum usage then there is a natural tendency for people to over-use the finite spectrum resource; technical efficiency may not be maximised (due to a lack of coordination). For example, technically inefficient use of spectrum can create interference between applications, subsequently resulting in diminished utility for all spectrum users. In that sense, managing usage of the radio spectrum is a rational solution that directly maximises the utility deriving from the spectrum and the wider benefits for the community. Spectrum management regulation is therefore widely acknowledged to be essential, even in an otherwise "light-handed" regulatory environment. The role of regulators in the context of spectrum management will be discussed below.

[19] Broadcasting: Productivity Commission report, November 1999, section 4.1

7.1 Consistent Management of Radio Spectrum

Telstra supports many of the views put forward by the Productivity Commission in its October 1999 draft report of its inquiry into broadcasting legislation, proposing the separation of licences for spectrum usage from broadcasting services licences. These arguments are based on the notion that, to maximise the benefits to the community, economic measures including, most importantly, incentives to efficiently utilise rather than hoard spectrum, are appropriate. The Productivity Commission's arguments cover:

- Methods of improving the efficient use of spectrum
- Methods to drive the transition to digital broadcasting
- Support for digital convergence
- Improvements to regulatory efficiency
- The likely development of broadcasting carriage services

In addition to the points raised by the Productivity Commission, Telstra suggests that there are clear long-term economic and technical benefits associated with separating the licensing of access to radio spectrum from licensing of content (which has been the traditional approach to broadcasting regulation). These benefits are generated by the following:

- Allocating the spectrum access rights to the most economically efficient purpose, in terms of obtaining a genuine economic rent for the scarce community resource. This is achieved in principle by allocating the radio spectrum to those who place the highest commercial value on it by implementing competitive spectrum auction processes. Developing technology allows broadcasting, narrowcasting and point-to-point services to coexist in the same spectrum, for example a DTV multiplex, and inconsistent regulation has no place in this converged environment.

- Allowing the broader market dynamics, to determine the sustainable number and technical quality of services to be supported within the constraints of spectrum availability. This deflects the need for regulators to 'pick winners', and/or make choices that try to pre-empt evolving consumer preferences. Notwithstanding, there is a balance to be struck in protecting consumers from the impact of commercial failures due to over-ambitious ventures based on non-viable spectrum holdings. In that sense, a rationale exists for regulatory management that sets minimum spectrum lot sizes to avoid excessive fragmentation of spectrum.

- Applying consistent technical planning, allocation and usage rules that are aimed at maximising the overall utility (mainly characterised by maximum capacity and interference metrics) of scarce spectrum resources, without compromising other non-technical considerations.

7.2 Restructuring of Regulatory Responsibilities to reflect Convergence

Telstra supports the reasons the Productivity Commission has identified supporting the restructuring of regulatory responsibilities between the ACA and the ABA, to reflect the separation of spectrum and content licensing components. These are:

- Taking advantage of ACA spectrum management expertise – in such areas as clearing and redesignating spectrum for new uses; implementing effective contestability in allocations; providing greater security of tenure; reducing unnecessary regulatory

activities and intervention; and effectively managing multiple use management of spectrum.

- Balancing community interests and specific interests – by assigning the spectrum. As the spectrum management agency, the ACA appears to be in the best position to ensure adequate weight is given to community interests and competing demands for spectrum.

- Reducing the overlap between functions of the ABA and the ACA – as the general spectrum management agency, the ACA appears to be in a good position to take over the technical planning of broadcasting services bands (and might reasonably take on the specialist broadcast skills currently resident in the ABA).

In the context of these considerations, Telstra suggests that the ACA should become the sole regulator and licensing authority for access and usage of the radio spectrum. Further, the ACA should be charged with the responsibility for achieving several specific objectives (which would apply across convergent services):

- Maximising the utility of the scarce radio spectrum resource – embodying planning for efficient usage, allocating spectrum in the most efficient manner, and minimising interference;

- Obtaining an appropriate economic rent for exclusive use of relevant radio spectrum segments by licensees; and

- Maintaining an accurate centralised public database of all spectrum allocations, (subject only to national defence and law enforcement security considerations), and a scheme (as currently operates under the ACA) for maintaining the highest reasonable technical integrity in the allocation of spectrum.

To compliment the ACA's role, Telstra suggests that the ABA should focus on the regulation of content services, with the primary objectives being associated with social and cultural policy outcomes. This may logically include a variety of aims such as: reflection of the desirable Australian cultural values; service provider conduct, local production considerations; and other such matters that are currently dealt with within the existing broadcasting regulatory regime. In reviewing this role in light of convergence, it is likely that the Government and the ABA will need to consider the possibility that convergence will enhance the ability of markets to meet social/cultural objectives of their own accord, thus lessening the need for regulatory intervention.

A further point, that the Productivity Commission may have overlooked, emerges from the separate forward planning processes that are undertaken in respect of broadcasting services bands on the one hand, and all other radio spectrum bands on the other. The separation of these processes results in divergent industry expectations and unnecessary conflict arising over the evolution of spectrum allocations. Amalgamating the responsibility for licensing of all spectrum access solely under the ACA would achieve greater consistency and competitive neutrality (while acknowledging that this is a limited concept given the heterogeneous nature of spectrum) across convergent services using spectrum.

8 MIGRATION PATH

Telstra notes that there are a number of reviews of telecommunications regulation and policy already scheduled to occur over the next 3 years. These include this Convergence Review, the current USO funding review, the Year 2000 Review of Parts XIB and XIC of the Trade Practices Act, the price control review that will be required before June 2001 and the anticipated Year 2002 telecommunications regulation review.

The issues raised in this submission in relation to the appropriateness of aspects of telecommunications regulation in an era of convergence should be considered in these reviews. The reviews also provide the opportune vehicle to articulate a path for, and ultimately to implement migration to, a generic regulatory framework for converging industries, as advocated in this submission.

APPENDIX 1

TECHNOLOGY ROADMAP

This "roadmap" attempts to plot some likely technological developments three and seven years ahead, and compare them with the current situation. The flexibility and increased user choice that come from convergence make it very difficult to predict demand three years hence, let alone seven years, but the underlying technical factors that will be used to support future applications are a little easier to predict. In the rapidly growing and very competitive converged communications industry, user demand will determine the eventual shape of the industry.

1/1/2000	1/1/2003	1/1/2007	Notes
Summary			
Free-to-air television is based on a 7 MHz channel carrying one PAL analogue channel, with very limited data sent as part of the transmission.	Analogue TV transmission continues, with 7 MHz channels formerly unusable because of analogue to analogue interference developed as digital "multiplexes" able to carry 20 Mbit/s of digital data. This multiplex is able to support ➢ High Definition TV ➢ Multiple standard definition TV channels ➢ Other digital data ("data-casting") One or two 7 MHz channels are developed solely for datacasting in each market, primarily for point to multi-point distribution.	The imminent closure of analogue TV will allow at least 4 additional datacasting multiplexes in each market, providing 80 Mbit/s of capacity for either point-to-multi-point or point-to-point use.	
Hybrid Fibre-Coax networks serve several major cities, providing analogue subscription television, higher speed Internet access and limited telephony access. Direct-to-home Digital satellite delivery is used for subscription television in areas where HFC is not available.	The subscription television provided over HFC will be move from analogue to digital, with a wider range of programs and options. Satellite delivery will become competitive in suburban as well as rural areas.	HFC and satellite networks developed for subscription networks will be used to carry other services over the same digital bit-stream ➢ Variable Definition TV ➢ Internet access ➢ Other digital data ("data-casting")	

Voice over the PSTN (public switched telephone network) is a major service, with voice over mobile networks and Internet service growing rapidly. Data traffic levels approaching voice traffic levels on the fixed network.	Data now exceeds voice over the fixed network, with data over mobile networks growing rapidly.	Voice continues as an important service amongst a wide range of services, able to be carried on the one data stream	
The "core" network is fully digital, based on 64 kbit/s digital channels. The large majority of transmission is over optical fibre, with some other technologies (e.g. radio or satellite) when economic. Networks generally interconnect using multiple 64 kbit/s channels and "common channel signalling"	The "core" network is being extended using packet technology, based on Internet Protocol (IP) standards but with underlying arrangements to guarantee quality and support operation. Data is separated from voice at the point of network access, with data carried over the growing IP section of the network. Separate circuit switched and IP network interconnection is in place.	The "core" network is fully served by packet technology based on IP standards (evolving to meet needs, for example to provide an "active" network). As voice can be more efficiently carried over IP, the 64 kbit/s circuit switched network is no longer economic.	
Access is predominantly over a twisted copper pair of wires, primarily carrying analogue voice but also able to carry ISDN digital data. Some other technologies (e.g. radio or satellite) are used when more economic Analogue signals are converted into digital format either at the user's equipment (for ISDN) or at the local exchange building (for traditional telephony). The PSTN is able to carry data at speeds up to 56 kbit/s using voice frequency modems	Access is still primarily over a twisted copper pair, with a growing use of ADSL technology to give high speed data access, dimensioned to provide a higher bit rate from network to user than from user to network. Increasing use of equipment, located at the kerbside remote from the traditional exchange site, to terminate copper from user's premises and provide both circuit switched and packet switched connection over optical fibre to the core network. ADSL technology supports an "always	Access on the fixed network is still primarily over a twisted copper pair, with increased use of kerbside remote units near to the user's premises. These units are able to support higher speed VDSL over shorter distances. Mobile network technologies present a viable alternative for applications requiring lower data speeds. In areas of higher residential density, direct OF connections (or upgraded HFC connections) may also be used.	

The PSTN provides ubiquitous service, including access to ISPs using either VF modems or ISDN. The Internet is a "best endeavours" network built on the IP protocol standards, with open interfaces supporting a wide range of services and service suppliers. Mobile networks cover ~95% of Australia's population, providing voice connectivity and limited data service. Specialist data networks have been developed for business use, based on ATM and Frame Relay, using direct optical fibre access to the network.	on" IP connection as well as analogue voice over the same copper pair. Additional voice connections can be established as part of the IP data stream. Access to both the "best-endeavours" Internet and the guaranteed delivery IP service will be provided. Mobile networks will be carrying medium speed data, with limits on the total data carried set by available spectrum. Development of third generation mobile networks will begin. Specialist data networks will be developed based on Internet Protocol, extended as necessary to provide features required.	One of the services able to be supported by the higher speed access will be full motion, high quality video. Third generation mobile networks, able to support data at speeds up to 2 Mbit/s, will carry an increasing proportion of mobile traffic. Continuing development of specialist networks, using features provided by core network and configured to meet user's requirements	

Details

Mass market access			
• 2 wire copper providing analogue voice and digital data at speeds up to 50 kbit/s (with V.90 modems)	• 2 wire copper providing analogue voice and digital data at speeds up to 50 kbit/s (with V.90 modems)	[Some legacy analogue voice possible, but mainly replaced by voice carried over IP]	
• 2 wire copper providing Basic Rate ISDN (two 64 kbit/s channels and a 16 kbit/s signalling channel)	• 2 wire copper providing Basic Rate ISDN (two 64 kbit/s channels and a 16 kbit/s signalling channel)	• 2 wire copper providing Basic Rate ISDN (two 64 kbit/s channels and a 16 kbit/s signalling channel)	
• (ADSL trials)	• 2 wire copper supporting ADSL transmission, providing asymmetrical data transfer rates ➢ Higher speed from network to user (up to 2 Mbit/s) ➢ Lower speed from user to network (up to 384 kbit/s)	• 2 wire copper supporting ADSL transmission, providing asymmetrical data transfer rates ➢ Higher speed from network to user (up to 2 Mbit/s) ➢ Lower speed from user to network (up to 256 kbit/s)	• ADSL likely to be the standard access mechanism in urban/suburban areas, with Internet Protocol based transmission used to carry a range of services, including voice
		• 2 wire copper connected to kerb-side remote customer multiplexers, linked by optical fibre to the network, supporting high speed VDSL transmission, providing asymmetrical data transfer rates ➢ Higher speed from network to user (up to 20 Mbit/s) ➢ Lower speed from user to network (up to 2 Mbit/s)	• Primarily for urban/suburban areas with high to medium customer density, supporting economic deployment of remote multiplexers.
• Fixed Radio Access supporting voice and low speed data ➢ (using radio spectrum at 3.4 GHz)	• Fixed Radio Access supporting voice and low speed data ➢ using radio spectrum at 3.4 GHz ➢ using CDMA technology at 800 MHz (shared with mobile usage)	• Fixed Radio Access supporting medium speed IP access	

Mobile Access			
• Second generation GSM mobile, supporting primarily voice but also short message service and data at speeds up to 9.6 kbit/s	• Second generation GSM mobile supporting voice and medium speed data (~ 115 kbit/s) with 2.5 G enhancements (WAP, GPRS and 384 Kbit/s EDGE) [spectrum limits to data carriage] GSM evolving to initial third generation UMTS service	• Second and third generation mobile able to support a range of services (including voice) at data rates up to 2 Mbit/s)	• Mobiles developing as Personal Assistants, providing access to information (both general and assisting mobility) and many other applications (for example, game playing)
• Second generation CDMA mobile system, supporting primarily voice but also short message service and data capacity up to 14 kbit/s	• Second generation CDMA mobile system, supporting voice medium speed data (~ 115 kbit/s) with 2.5 G enhancements (1xRTT) [spectrum limits to data carriage] • CDMA-One evolving to Initial third generation CDMA-2000 service	• Second and third generation mobile able to support a range of services (including voice) at data rates up to 2 Mbit/s)	
• Specialist mobile data networks	• Development of device to device mobile communication on “core” mobile networks as well as specialised mobile networks.	• Substantial device to device data traffic on “core” mobile networks as well as specialised networks	

Specialist/Business Access			
• Voice-band systems over copper and derived circuits	• Low data rate services, multiplexed with other services	• Low data rate services, multiplexed with other services	
• DDS	• DDS	• Medium speed data rate services, multiplexed with other services	
• 4 wire copper providing an E1 PCM system (30 x 64 kbit/s channels and a 64 kbit/s signalling channel) to	• 4 wire copper providing an E1 PCM system (30 x 64 kbit/s channels and a 64 kbit/s signalling channel) to	• Some E1 PCM systems supporting legacy applications.	• Technology may cater for higher speeds, but compatibility with xDSL will determine limits

support data and ISDN Primary rate Access	support data and ISDN Primary rate Access		
• Direct Optical Fibre Access supporting high speed business data services, including ➢ Frame relay ➢ ATM	• Direct Optical Fibre Access supporting high speed business data services, including ➢ Business to business IP based services ➢ Frame relay ➢ ATM	• Direct Optical Fibre Access supporting high speed business data services, including ➢ Business to business IP based services ➢ Frame relay (for legacy applications) ➢ ATM	• Increasing service speed with use of new OF techniques e.g. DWDM

Rural and Remote Access			
• Rural and remote area Digital Radio Concentrator Systems supporting voice and low speed data (operating in radio spectrum at 500 MHz and 1.5 GHz)	• Use of DRCS and CDMA mobile to give voice and low-medium speed data access • Some use of low-earth orbit (LEO) satellites to give voice access	• Use of high capacity satellites (e.g. Teledesic, SkyBridge) to give medium-high speed data access • Some use of LEO and medium earth orbits (MEO) satellites.	
• Geosynchronous satellite systems supporting voice and low speed data, for example ➢ Inmarsat, ➢ Aussat	• Geosynchronous satellite systems supporting voice and medium speed data	• Continued use as appropriate, with development to support higher speed data.	• Some applications have reduced quality (or are not practicable) because of round-trip signal delay.
• Geosynchronous satellite systems supporting data at up to 64 kbit/s for Internet and other uses.	• Geosynchronous satellite systems supporting data at up to 64 kbit/s for Internet and other uses.	• Continued use as appropriate	

Internet Access			
• Access using telephone network and VF modem, by connecting to ISP then establishing Internet connection. (Maximum connection speed ~50	• Access using ADSL connection to provide IP connection at up to 2 Mbit/s from network to customer. Able to be configured as “always on”.	• Access using ADSL or VDSL connection to provide IP connection at up to 20 Mbit/s from network to customer. Able to be configured as “always	

kbit/s to ISP, ~32 kbit/s from ISP if ISP has digital connection)		on".	
• Access using ISDN connections, dialling ISP then establishing Internet connection. (Maximum connection speed 128 kbit/s for ISDN basic access)	• Continued use of ISDN	• Declining use of ISDN	
• Limited cable modem access over HFC cable	• Extensive cable modem access in areas with HFC access	• Extensive cable modem access in areas with HFC access	
• Mobile Internet access at 9.6 kbit/s only suitable for text	• Internet access via "2.5 G" mobiles at ~ 100 kbit/s, using specially configured browsers and specialist information providers	• Internet access via 3G mobiles	• Internet applications will be developed for mobile applications, utilising small displays and mobility information.
• Dedicated high speed Internet access over specialist data networks for business users	• Development of business-to-business networks based on IP meeting business requirements for security and reliability, with connectivity to the public Internet	• Widespread use of business networks based on IP for business-to-business, business-to-customer and device-to-device	

Other Access Mechanisms			
• Hybrid Fibre Coax (HFC) cables, with optical fibre distribution to an area and final distribution by coaxial cable. HFC access provides ➢ Analogue entertainment video; ➢ High speed cable modem access; and ➢ Voice telephony,	• HFC access will be extended to provide ➢ Analogue entertainment video; ➢ Digital entertainment video; ➢ Interactive digital services ➢ High speed cable modem access; and ➢ Voice telephony	• It is likely that Analogue entertainment video will have been phased out. HFC access provides ➢ Interactive digital services ➢ Digital entertainment video ➢ High speed IP access; supporting a range of services including voice telephony.	

	• Local Microwave Distribution Systems (at frequencies above 20 GHz) able to provide two-way high speed access, supporting ➢ High speed data transmission; and; ➢ High speed IP access; supporting a range of services including voice telephony.	• Use of LMDS at a number of frequencies, when acceptable quality can be achieved.	• Extent of coverage likely to be limited by environment and radio propagation considerations

APPENDIX 2

International Examples of Policy Objectives for the Convergence Era

European Community – European Commission (EC)

The European Commission has articulated its policy goals for the new regulatory framework to apply in a convergence environment as follows[20]:

1. To promote and sustain an open and competitive European market for communications services (in order to improve consumer benefits on price, quality and value for money);

2. To benefit the European citizen (focusing on affordable access to a universal service, access to information society services, protecting consumers, data protection and privacy, transparent terms and conditions and addressing the special needs of special groups); and

3. To consolidate the European internal market in a converging environment.

United Kingdom - Oftel

Oftel, the UK telecommunications regulator, has recognised that in a dynamic convergence environment, it is increasingly important that policy objectives focus on outcomes rather than processes. This approach reflects the reality that policy outcomes may be achieved in new ways as structural change occurs. OFTEL has identified four outcome-focused objectives[21]:

1. Effective competition established;
2. Well-informed consumers;
3. Anti-competitive practices prevented; and
4. Consumers adequately protected.

United States - National Telecommunications and Information Administration (NTIA)

The NTIA has four stated convergence policy goals[22]:

1. To promote open markets and encourage competition (with the resulting anticipated benefits of lower prices, increased innovation and more options for consumers);

2. To ensure that spectrum provides the greatest benefit to all people (for example, through use of efficient technologies and improved management of Federal and non-Federal spectrum to maximise the value of spectrum to society);

3. To advance the public interest in telecommunications, mass media and information (for example, through promotion of universal service and access, maintenance and extension of public broadcasting and promoting a diversity of choices and programming sources in the mass media); and

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[20] See Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions, "Towards a new framework for Electronic Communications infrastructure and associated services: The 1999 Communications Review", November 1999, p.iv

[21] Alan Bell, Director, Strategy and Forecasting, Oftel, "*Oftel's Long Term Strategy*", 4 October 1999

[22] NTIA *Strategic Plan 1999-2004* p (??)

4. To promote the availability and sources of advanced telecommunications and information services (for example, through R&D, technology demonstrations, promotion of e-commerce and Internet usage).

APPENDIX 3

International examples of Regulatory Principles for the Convergence Era

European Community - European Commission

The five regulatory principles recently enunciated by the European Commission[23] are that future regulation (in the context of convergence) should:

- be based on clearly defined policy objectives;
- be the minimum necessary to meet these objectives (which involves (1) removing obligations which are no-longer necessary; and (2) building mechanisms into the framework to reduce regulation further where policy objectives are achieved by competition);
- further enhance legal certainty in a dynamic market (but remain flexible enough to respond to market dynamics);
- aim to be technology-neutral; and
- be enforced as closely as practicable to the activities being regulated.

United Kingdom - Oftel

Oftel is reviewing the role of telecommunications sectoral regulation. It has recognised that:

- the UK telecommunications market is effectively competitive in many areas, and new technologies hold the prospect of greater competition in the future;
- there is a heavy downside associated with over-regulation, including undermining of incentives to invest and to innovate and the likelihood of wrong technology choices;
- consumers interests are best protected by competition; and
- any regulatory approach needs to have clear goals, be coherent and minimise uncertainty.

Oftel's strategy identifies regulatory principles to support its four outcome-based objectives (summarised above):

1. In relation to all objectives, the overriding principles are to regulate only if it benefits consumers and to impose the minimum regulation necessary.

2. In light of the above observations, Oftel will only seek to promote competition if there is some prospect of sustainable competition in the long-term. Oftel's approach is to cease and refrain from competition regulation (ie. the type which is competition-promoting) where there is already "effective" competition. Where effective competition is in prospect, the goal is to ensure that regulation does not undermine incentives for entry and innovation. Oftel acknowledges that regulation may be required where competition cannot provide desirable outcomes (eg. social provision, market failures), but any regulation must not jeopardise incentives to invest.

3. The principles underlying the objective of well-informed customers are that greater consumer awareness will make competition more effective. Oftel proposes to rely on

[23] See Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions, "Towards a new framework for Electronic Communications infrastructure and associated services: The 1999 Communications Review", November 1999, p.v

general consumer legislation where it is sufficient and to encourage industry to meet consumer needs.

4. To prevent anti-competitive practices, general competition law is to be used where it meets the required outcomes. The use of licence conditions to seek to promote competition must be affirmatively justified.

5. Consumers are to be protected from market power through regulation which ensures minimal distortion, eg. price controls would be used only where effective competition is not in prospect. Consumers are to be protected from other market failures through regulation to simulate efficient outcomes without undermining incentives, and through encouraging industry to self-regulate wherever feasible.

These principles are intended to provide the 'flexible framework' by which policy objectives can be met over time in different markets at different stages of development.

United States – Federal Communications Commission

In general, the Unites States administration and regulators have not articulated regulatory principles for the convergence era nearly as succinctly as their European and United Kingdom counterparts. However, the following principles have been articulated in recent speeches by officers of the Federal Communications Commission (FCC):

- The need for rules and structures which facilitate the dynamism of converging industries (ie. encouraging fast growth into converging industries)[24];

- Technology-neutrality (such that regulators are not attempting to "pick winners", and their decisions have a neutral effect as to the type of technology that is deployed)[25];

- Balance the opening of markets and deployment of new technologies; also protect the interests of consumers;

- Promote competition by the elimination of barriers to investment in competing technologies (cable modems, digital subscriber lines, terrestrial, wireless and satellite), to provide consumers with real alternatives;

- Make timely decisions – critical in a dynamic convergence environment;

- Inform regulation with business and market sensitivity (including awareness of key indicators such as returns on investment, cost of capital etc.);

- The regulator has a role to ensure that advanced services and technologies are actually built and deployed, but in a manner which benefits the broadest number of Americans;

- Effectively and efficiently manage spectrum as a precious, finite resource;

- Reconcile existing conflicting regulatory approaches so that convergence regulation embodies a forward-looking, pro-competitive approach;

- Promote a public policy environment that embraces innovation, encourages competition and empowers consumers.

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[24] Chairman William Kennard, FCC, "*A new FCC for the 21st Century*", Washington DC, 20 May 1999

[25] This and the remaining points were articulated in the speech of Deborah A Lathem, Chief, Cable Services Bureau, FCC, "The Emergence of Convergence", 22 July 1999