



CASE STUDY

TOWARD UNIVERSAL BROADBAND ACCESS IN NEW ZEALAND

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1 FOREWORD

Over the past twenty five years, the policy environment for telecommunications in New Zealand has been characterised by innovative approaches to solving traditional policy problems. In broad terms, the New Zealand experience is comparable to a wide range of countries which have moved from traditional government owned monopolies to a more diverse competitive environment. However, there are also a number of distinct features. New Zealand liberalised its market at an early stage. It persisted with regulation by generic competition law for a long period during the 1990s, supported by a highly targeted price control regime on local access prices. When the pendulum swung back to greater regulation, New Zealand adopted a model of operational separation that was relatively untested internationally at that time.

As with other jurisdictions, New Zealand's policy has been driven by successive governments' concern with supporting investment to drive efficiency and innovation in the telecommunications industry, flowing through to the broader economy. Increasingly, this has been seen as beneficial not only to direct consumers, and particularly to businesses, but also in fields such as health and education. Broadband is seen as an enabling tool for greater productivity, and for the delivery of innovative services not merely to consumers, but also to pupils, patients and citizens, among others.

Competition policy has been at the centre of the telecommunications reforms over the past decade. New entrants have been able to secure significant market share from the incumbent, Telecom New Zealand (**TelecomNZ**). Extensive competing infrastructure has been rolled out through backhaul, mobile and, in some cities, cable networks. Generally competition has been seen as a successful driver of broadband growth, which has been among the highest in the OECD in recent years.

New Zealand has also sought to spread the benefits of innovation and productivity beyond the major urban centres that have been the early beneficiaries of competition. There has been a series of government funding initiatives which have supported greater availability of broadband services for rural and regional customers.

The New Zealand Government's Ultra Fast Broadband (**UFB**) initiative and other linked initiatives follow the recent trend of direct government intervention in the telecommunications industry to secure investment that is perceived to be critical to national objectives. The previous Labour government had secured TelecomNZ's commitment to build a fibre-to-the-node network, which is expected to be completed in 2011.

The UFB initiative is designed to fund, in cooperation with private investors, a fibre-to-the-home network to 75% of New Zealand's population¹.

¹ The goal for ultra-fast broadband investment is to accelerate the roll-out of ultra-fast broadband to 75 percent of New Zealanders, concentrating in the first six years on priority broadband users such as

The initiative contains a number of innovative elements that will be relevant to other jurisdictions looking for opportunities to stimulate additional investment in telecommunications infrastructure:

- it is a public-private partnership. At a time of budgetary restraint, it is not purely reliant on government funding;
- it allows for a staggered network build, initially focusing on business customers, and schools and hospitals, and then moving onto connecting residential customers;
- it is supported by complementary initiatives which address supply of improved broadband services to underserved regions;
- the financial structure of the Government funding means that the Government assumes a significant proportion of the demand risk;
- the financial structure also allows funds to be recycled as the private investors build up their investment in the network; and
- finally, the investment is structured to avoid the traditional incentive problems in telecommunications, as the recipients of the funding for network build are barred from involvement in retail services.

The UFB initiative is at an early stage, but it provides a model of private public partnership that may be attractive to both funding governments and private investors.

The Case Study that follows outlines the development of the New Zealand telecommunications environment from market liberalisation to the present day, highlighting the major controversies and initiatives that have shaped current policy. It then focuses on current New Zealand government initiatives, with a particular emphasis on the UFB and related initiatives. The lessons that are drawn from the experience by the authors will allow policy makers to test the New Zealand model for alignment with their own policy processes and objectives.



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businesses, schools and health services, plus green field developments and certain tranches of residential areas.

2 EXECUTIVE SUMMARY

New Zealand is currently embarking on a series of major telecommunications policy initiatives, aimed at accelerating the rollout of ultra-fast broadband to its businesses, citizens and social services institutions:

- *the Ultra-fast Broadband (UFB) Initiative*: a NZ\$1.5 billion government investment programme to establish public-private-partnerships for the construction of Fibre-to-the-Premises (FTTP) access networks connecting 75% of New Zealanders;
- *the Rural Broadband Initiative (RBI)*: a NZ\$300 million government funding programme to improve the availability of fibre backhaul links in less-urbanised parts of New Zealand, and to provide the country's schools with reliable, ultra-fast connectivity; and
- *the Complementary Measures Work Programme*: a series of measures to streamline and coordinate telecommunications infrastructure deployments and associated processes, and to aggregate demand for enhanced broadband networks.

This case study traces the development of New Zealand's telecommunications policy and regulatory environment, explaining the key motivations behind the current policy direction, and examines New Zealand's approach to implementing these landmark initiatives.

2.1 Developments in New Zealand's Telecommunications Policy

New Zealand was an early adopter in the 1980s and 90s of market liberalisation policies in the telecommunications industry. The incumbent, Telecom New Zealand Limited (**TelecomNZ**), was privatised in 1990 under a deregulatory policy framework.

Following a decade of reliance on general competition law to provide regulatory constraint, the Labour Party Governments of the 2000s moved progressively to introduce a sector-specific regulatory framework, with the establishment of an independent telecommunications regulator in 2001 and the imposition of broader reforms, such as local loop unbundling and operational separation, in 2006.

In parallel to the development of a regulatory framework aligned with international best practice, governments over this period increasingly looked to intervene directly in telecommunications sector development, through fiscal initiatives and infrastructure development programmes.

Both the trend toward deeper regulatory intervention and the increased emphasis on fiscal intervention to promote infrastructure deployment have been driven by—

- public and political dissatisfaction with the level of telecommunications industry investment and, commensurately, the pace of sector development and innovation; and
- the increasing “digital divide” between the advanced services available in urban areas and the generally lower quality services provided to rural New Zealand.

These motivations can also be seen as underpinning the telecommunications policy direction of the current Government in New Zealand.

2.2 The Ultra-fast Broadband Initiative

The Government's overall objective for the UFB Initiative is:

“To accelerate the roll-out of ultra-fast broadband to 75 percent of New Zealanders² over ten years, concentrating in the first six years on priority broadband users such as businesses, schools and health services, plus greenfield developments and certain tranches of residential areas (UFB Objective).”

The UFB objective is supported by Government investment of up to NZ\$1.5 billion, which is expected to be directed toward public-private-partnerships that will construct FTTP access networks and operate them according to a wholesale-only, open access model.

The initiative is currently under implementation, with a competitive commercial tender programme being administered by a crown company, Crown Fibre Holdings (CFH). The initial tender received a high degree of interest, with 18 respondents including two national proposals from TelecomNZ and Axia Netmedia, and a co-ordinated response from a consortium of regional electricity lines companies and smaller regional telecommunications providers.

Notably, TelecomNZ has proposed an ownership separation of its network and retail businesses as part of its response to the CFH tender.

2.3 The Rural Broadband Initiative

Complementing the UFB, which focuses on urbanised regions of New Zealand, the Government has announced a NZ\$300 million grant funding initiative to support the deployment of fibre backhaul capacity in rural areas and subsidise the connection of rural schools to ultra-fast broadband networks. Like the UFB, the RBI is being implemented through a competitive commercial tender process and has received a substantial degree of interest from the industry with 39 expressions of interest submitted, including proposals from TelecomNZ, Axia Netmedia and Vodafone NZ.

2.4 Complementary Measures and Demand Side Initiatives

In support of the Government's network deployment initiatives, a work programme has been developed to:

- facilitate and streamline the processes for deployment of telecommunications infrastructure and facilities;
- aggregate key centres of demand for ultra-fast broadband services; and
- develop a National Education Network to encourage and support the use of the UFB and RBI networks across New Zealand schools.

3 INTRODUCTION

Even a casual glance at the world map shows that few countries on Earth have as great a tyranny of distance to overcome as New Zealand.

New Zealand is a small country of little more than four million people at the bottom of the South Pacific. Most of New Zealand's major markets – Europe, North America, East and South Asia – and the sources of its customers, migrants and investors, are ringed around the other edge of the world map.

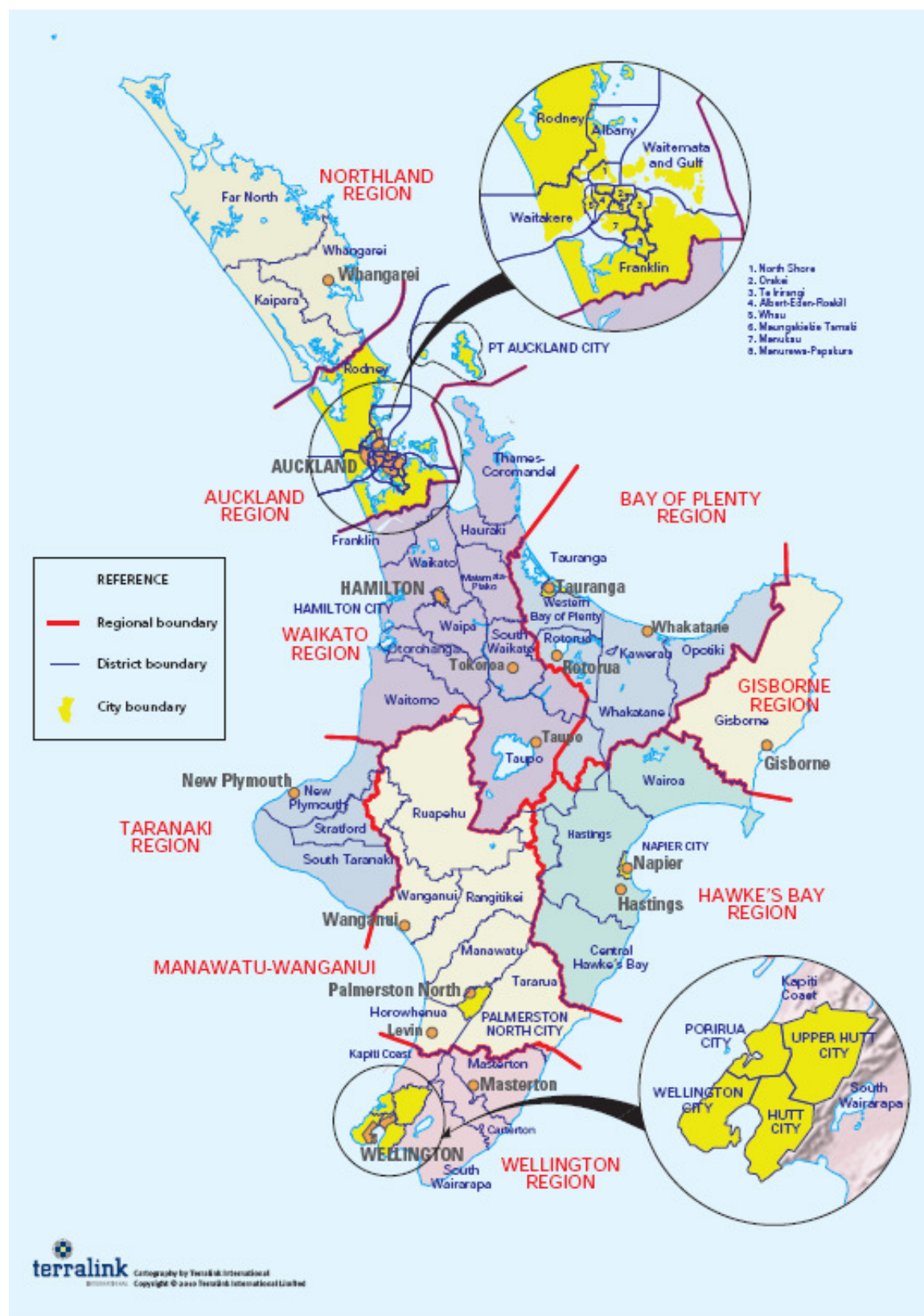
As a result, New Zealand has more to gain than most from telecommunications – through weightless exports and the rise of E-commerce; through working from home.

So perhaps it should not be a surprise that New Zealand has often been an outlier in telecommunications policy.

New Zealand was one of the world's first countries to deregulate its telecommunications sector and privatise the Government-owned telecommunications network – deregulating as other countries developed industry-specific regulatory regimes. In 2006, it was nearly the last country in the OECD to unbundle the local loop. In the following year, it was amongst the leading countries in imposing an operational separation on its incumbent telecommunications operator.

Now New Zealand is again leading the world with an ambitious Government funded national broadband network roll-out, and is contemplating the structural separation of the incumbent telecommunications operator.

This paper examines these new developments: it looks at why the New Zealand Government has decided to drive the deployment of ultra-fast broadband and how it is going about it.

Figure 1: Regional Map of New Zealand²

² Sourced from Local Government New Zealand: Available at www.lgnz.co.nz/co.nz. An interactive map identifying current infrastructure deployments and demand centres is also available at: <http://broadbandmap.govt.nz/map/>



4 THE HISTORY OF NEW ZEALAND TELECOMMUNICATIONS POLICY

4.1 Overview

Over the last two decades, many of the major changes in New Zealand's telecommunications regulatory environment have been driven by changes in Government policy, rather than intervention by the competition regulator. This has resulted in occasional periods of intense reform in contrast to the evolutionary reform generally seen in regulator-driven environments.

The key policy interventions over the last two decades have been:

- the privatisation of the incumbent operator without the implementation of industry specific regulation;
- the introduction of limited industry-specific legislation in 2001;
- the introduction of broader industry-specific legislation to implement local loop unbundling and operational separation in 2006; and
- the introduction of the current Government programmes to accelerate the roll-out of fibre networks, including possible legislation to enable the structural separation of the incumbent telecommunications operator.

4.2 Building the National Network

As in most developed countries, New Zealand's telecommunications network was built as a state monopoly. From its origins in the late 1870s, the telephone network spread across the country, built and operated by a Government department – the New Zealand Post Office.

By 1930, the country had 125,000 telephone subscribers, with all the main centres connected to the national telephone network and, by 1965, the world's third highest telephone density of 35 percent.

In 1984, a new Labour Party Government was elected with a mandate to adopt de-regulatory reforms across the economy, including deregulation of the telecommunications sector and priming the national telecommunications network for sale.

4.3 The Era of Deregulation

During the second half of the 1980s and into the 1990s, New Zealand implemented sweeping reforms that transformed the economy into one of the world's most open markets. Laissez faire economics underpinned the economic approach of both major political parties and

dominated political debate. Privatisation and reliance on generic competition law was adopted across economic sectors, including the telecommunications industry.

4.3.1 Corporatisation and privatisation

On 31 March 1987, Telecom New Zealand (**TelecomNZ**) was established as a Government-owned enterprise, purchasing telecommunications assets from the New Zealand Post Office for NZ\$3.2 billion.

After being operated for three years as a Government-owned enterprise, TelecomNZ was sold to US-based operators Bell Atlantic and Ameritech for NZ\$4.25 billion.

Consistent with the wider de-regulatory reforms occurring at the time, New Zealand did not adopt a licensing regime for telecommunications operators. This remains the case, with any person able to provide telecommunications services in New Zealand, subject to a few targeted restrictions, such as the requirement to provide lawful interception.

4.3.2 Deregulation and competition

As noted above, Government telecommunications policy in the 1990s emphasised deregulation and a reliance on the generic competition legislation. Competition arose, with early entry into the tolls and business markets by the British Telecom-owned Clear Communications and the Australian telecommunications incumbent Telstra. Limited competition also eventuated in the residential market, with the locally-funded Saturn Communications rolling out a limited cable footprint in Wellington, and later Christchurch.

4.3.3 The Commerce Act 1986

Without telecommunications industry-specific legislation, new market entrants were forced to rely on provisions of the generic competition legislation – the Commerce Act 1986 – to obtain fair access to TelecomNZ’s network. However, this was widely regarded as ineffective. One long-running court case on PSTN interconnection between Clear Communications and TelecomNZ, for example, went as far as the Privy Council in London (then New Zealand’s highest Court) which approved the continued use of the Baumol-Willig rule for pricing interconnection in New Zealand.³ Some years later, the use of the Baumol-Willig pricing rule for interconnection was explicitly prohibited in the Telecommunications Act 2001 (see below), which instead introduced TSLRIC pricing.

³ *Telecom Corporation of New Zealand v. Clear Communications* [1995] 1 NZLR 385, 406. The Baumol-Willig rule, also known as the Efficient Components Pricing Rule, is a method for setting the charge for competitors to use the incumbent operator’s bottleneck facilities. In contrast to most approaches to pricing interconnection (which base the charge on direct costs), the Baumol-Willig rule starts from the revenue consequences for the incumbent of allowing competitors to use its facilities, setting the charge for interconnection on the basis of the resulting revenue loss. A good assessment of the Baumol-Willig rule can be found in Henry Ergas & George Ralph, *Pricing Network Interconnection: is the Baumol-Willig Rule the Answer*, 1996.

Reliance on generic competition law proved time-consuming, costly, and unsatisfactory for promoting competition and driving network investment.⁴ By the end of the 1990s, New Zealand's trend of deregulation since 1987 was waning.

4.4 Telecommunications Reform in New Zealand

4.4.1 The Fletcher Inquiry

A new Labour Party⁵ Government was formed on 5 December 1999. The new Government immediately indicated its interest in telecommunications industry reform by announcing a Ministerial Inquiry into the telecommunications sector by Hugh Fletcher, a prominent New Zealand businessman. The Fletcher Inquiry published its final report⁶ less than a year later on 27 September 2000, recommending major regulatory reform.

4.4.2 As much market as possible, as much Government as necessary

In May 2001, Communications Minister Paul Swain introduced the 2001 Telecommunications Bill, the Government's response to the Fletcher Inquiry.

While the Bill signalled the end to the era of self-regulation and reliance on generic competition law, the new regulatory regime was still light-handed by international standards. As Paul Swain put it in addressing Parliament, the Bill sought to provide "*as much market as possible and as much Government as necessary*".

The Bill introduced a new industry specific telecommunications regime with:

- the creation of a new position of Telecommunications Commissioner within the New Zealand Commerce Commission (the competition regulator) to administer the implementation of the Act;
- a set of designated (price and non-price term regulated) and specified (non-price term regulated) telecommunications services including:
 - PSTN interconnection and number portability; and
 - resale of the retail services TelecomNZ offered using its fixed telecommunications network.

⁴ See, for example, the critique by Christopher Nicoll of New Zealand's experiment with light-handed regulation of telecommunications in the 1990s: Nicoll, *Light-handed Regulation of Telecommunications-The Unfortunate Experiment*, Information & Communications Technology Law, Volume 11, Issue 2, May 2002, pages 109-120.

⁵ New Zealand politics has traditionally be dominated by the centre-left Labour party and the centre-right National Party. The introduction of a proportional voting system (Mixed Member Proportional or MMP) in 1996, to replace the First-Past-the-Post system strengthened the role of smaller parties. However, the coalition Governments, since 1996, have continued to be led by either Labour or National.

⁶ Ministerial Inquiry into Telecommunications – Final Report, 27 September 2000. The full proceedings of the Inquiry, including its Final Report, are available at: http://www.med.govt.nz/templates/StandardSummary_16318.aspx.

- a process to enable the Telecommunications Commissioner, acting in concert with two other Commissioners, to make recommendations to the Minister for Communications regarding the regulation of further telecommunications services, including (if designated) the pricing principles that should be imposed;
- a process to allow the Telecommunications Commissioner, if requested, to resolve disputes between parties relating to the supply of designated or specified services; and
- a framework (referred to as Telecommunications Service Obligations or TSOs) for funding telecommunications services that were considered a social good by the Government.

The purpose of the new Act was “to promote competition in telecommunications services markets for the long-term benefit of end-users of telecommunications services in New Zealand”⁷. The Government’s stated objective of “as much market as possible” was clearly emphasised in the detail of the Bill, notably in the following features:

- unbundled copper local loop (**UCLL**) and unbundled bitstream services (**UBS**) were not regulated. Instead, the Commission was required to investigate whether or not to recommend regulation of these services to the Minister for Communications;
- the dispute resolution process administered by the Telecommunications Commissioner was limited to bilateral resolution of disputed terms and was at the cost of the parties to the dispute; and
- TelecomNZ received compensation from the industry for continuing to deliver universal basic telephone service.

4.5 The Path to Further Telecommunications Reform

Contrary to general expectations, at the end of 2004, the Commission recommended against the unbundling of TelecomNZ’s copper local loop network, recommending instead the designation of a Layer 2 unbundled bitstream service (wholesaling of TelecomNZ’s ADSL) that had been proposed by TelecomNZ during the Commission’s investigation.

The Commission’s recommendation surprised some observers, many of whom were expecting New Zealand to follow international precedent. The Minister for Communications, Paul Swain, and the Ministry for Economic Development (**MED**) advised that the Government ask the Commission to reconsider its recommendation. Following representations from TelecomNZ, however, the Government decided to accept the Commissioner’s recommendation.

These representations were made in correspondence⁸ between TelecomNZ CEO, Theresa Gattung, and the Government, which understood that, in return for a decision to not unbundle the local loop, TelecomNZ would ensure that one third of all DSL connections would be sold by other providers through wholesaling and resale.

⁷ *Telecommunications Act 2001*, section 18.

⁸ Letter from Theresa Gattung to Paul Swain, May 2004.

As time passed, however, the Government concluded that TelecomNZ was not delivering on these commitments. This was compounded by disagreement between the Government and TelecomNZ over the exact commitments into which TelecomNZ had entered; for example, TelecomNZ stated that they considered that their promise was for one third of *new*, rather than *all*, DSL connections to be sold by other providers.

By 2005 the Government considered, in particular, that wholesale broadband subscriptions were well below the number the Government considered Ms. Gattung had committed to in 2004. In late 2005, the Government commenced a “stocktake” of the telecommunications industry.

In February 2006, Prime Minister Helen Clark told Parliament that New Zealand’s uptake of broadband was unsatisfactory and that improving it was a top three priority for the Government. The Government began to prepare significant reforms to the regulatory regime, including local loop unbundling, to support the Government’s goal of lifting the country into the top quarter of OECD broadband statistics.

The Government’s plans were to come sensationally to light little more than a month later on 3 May 2006.

4.5.1 Unbundling the local loop

On May 3rd, as the Government was considering the recommendations of the Minister for Communications to unbundle the local loop along with a series of other regulatory reforms, a Parliamentary messenger leaked a copy of the key Government paper to a TelecomNZ employee. Due to the market-sensitivity of the policies, the Government was forced to hurriedly announce the reforms that evening, abandoning its plan to make them a centrepiece of the 16 May Budget.

The extraordinary manner of the announcement, as much as its substance, generated enormous public interest. Within weeks, “unbundling of the local loop” was common currency and public support swelled behind the reforms. By the end of May, the Chairman of TelecomNZ, Dr. Roderick Dean, had announced his resignation, followed just a few weeks later by CEO Theresa Gattung.

4.5.2 The new telecommunications regulatory regime

On 22 December 2006, barely five years after the 2001 reforms, the Telecommunications Amendment Bill 2006 was passed by Parliament. The Bill introduced an extended telecommunications regulatory regime including:

- a raft of new regulated wholesale services aimed at implementing a “ladder of investment” access regime;
- a new Standard Terms Determination process that empowered the Commission to set industry wide ‘Standard Terms’ for regulated services;
- the operational and accounting separation of TelecomNZ into at least three separate business units:

- the access network business (later christened “Chorus”)⁹;
 - TelecomNZ wholesale; and
 - other business units (retail, mobile, etc);
- greatly expanded monitoring, enforcement and information disclosure powers.

Riding a wave of popular support, the Bill was enacted with the support of all but two of the Members of Parliament. Almost overnight, TelecomNZ went from being one of the developed world’s most lightly regulated incumbents, to one of the most constrained.

4.6 Fibre and the 2008 General Elections

While the 2006 regulatory reforms appeared to deliver on many of the aspirations upon which they were founded, by 2008 it was evident that the political debate had moved on.

When New Zealand voters went to the polls at the end of 2008, they faced two very different visions of the future of broadband:

- the Labour Party offering a new Broadband Investment Fund, comprising grants of up to NZ\$325 million operating and NZ\$15 million capital funding over five years focusing on business and health users and under-served rural areas; and
- the National Party offering a \$1.5 billion investment to roll-out fibre-to-the-premises (FTTP) to 75% of New Zealand’s population within 10 years focusing in the first 6 years on schools, hospitals and businesses.

The National Party victory led to a concentrated focus on a national ultra-fast broadband network for New Zealand.

⁹ Chorus is similar to BT’s Openreach.

5 NEW ZEALAND'S TELECOMMUNICATIONS INDUSTRY IN 2010

The following section sets out a snapshot of the key aspects of New Zealand's telecommunications industry in 2010. It largely draws on information published under the New Zealand regulator's telecommunications industry monitoring regime that was implemented as part of the 2006 reforms. There is, unfortunately, limited reliable industry information available for years prior to 2006/07, as the regulator had limited information disclosure powers.

5.1 Key Industry Facts & Figures

5.1.1 Technical statistics

Figure 2: Telecommunications Key Statistics 2005/06 to 2008/09¹⁰

Telecommunications Key Statistics ¹	2005/06	2006/07	2007/08	2008/09
Fixed telephone voice services revenue (\$bn) ²	2.09	2.03	1.98	1.91
Total mobile services revenue (\$bn)	1.93	1.97	1.98	1.92
Business fixed line data services revenue (\$bn)	0.47	0.48	0.46	0.43
Fixed network internet access revenue (\$bn)	0.43	0.42	0.45	0.48
Total retail telecommunications revenue (\$bn) ³	4.92	4.90	4.88	4.74
Total wholesale revenue (\$bn) ⁴	-	-	-	1.3
Non-chargeable fixed voice call minutes (bn)	-	-	5.31	4.67
Chargeable local call minutes (bn)	2.56	2.31	2.04	1.85
National call minutes (bn)	3.09	2.89	2.83	2.94
Fixed-to-mobile call minutes (bn)	0.94	1.00	0.99	0.95
International call minutes (bn)	0.81	0.81	0.84	0.92
Total fixed line chargeable minutes (bn) ⁵	7.41	7.00	6.71	6.67
Mobile voice call minutes (bn)	2.76	3.17	3.66	4.24

1. Retail statistics from aggregated survey responses unless otherwise specified. 2008/09 numbers are those collected from the same parties as earlier years, as shown in from column H of relevant sheet.

2. 'Other fixed line revenue' has been removed from 2008/09 because all 'other' telecommunications revenue was aggregated and shown separately in earlier years.

3. Excludes 'other' telecommunications revenue as some wholesale revenue may have mistakenly been included in this category in earlier years.

4. Collection of wholesale revenue only started in 2008/09. Wholesale services are an input used by retailers to generate retail sales so retail and wholesale revenue should not be aggregated.

Only the aggregate of mobile and fixed line revenue is disclosed to protect the confidentiality of mobile wholesale revenue.

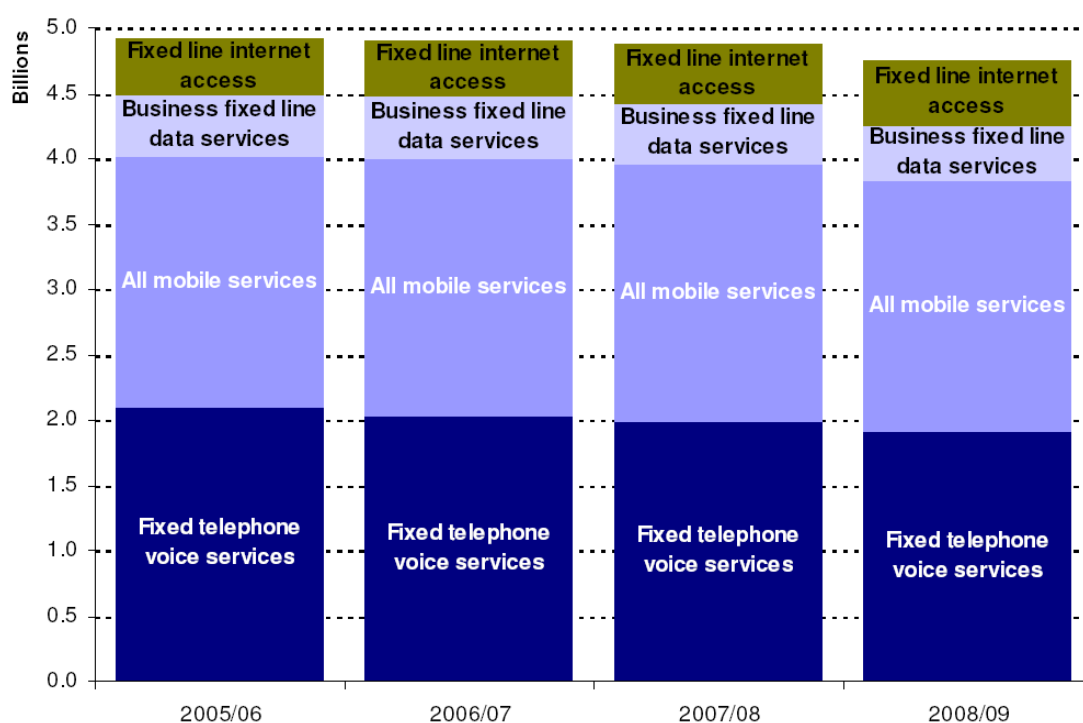
5. All TelstraClear chargeable minutes have been estimated for for first two years of series.

¹⁰ Commerce Commission, *Annual Telecommunications Monitoring Report, 2009*.

5.1.2 Telecommunications industry revenues

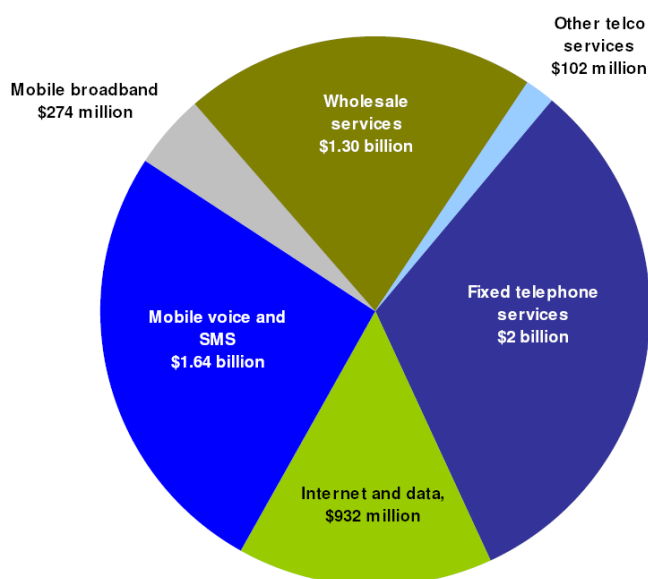
Telecommunications industry revenues in New Zealand have generally followed international trends, with declining overall revenues driven predominantly by decreasing fixed telephone voice revenues. A gradual increase in fixed line internet access and data services has been insufficient to offset the decline in fixed voice revenues.

Figure 3: Total Retail Telecommunications Revenues by Service 2006 to 2009¹¹



Fixed wholesale service revenues have increased rapidly with the implementation of the 2006 reforms and now, as shown in the figure below, make up a substantial portion of total telecommunications revenues. Internet and data remain smaller contributors to industry revenue, despite the increased focus on broadband by the industry and policy-makers.

¹¹ Commerce Commission, *Annual Telecommunications Monitoring Report, 2009*. Please note Annex 2 contains illustrations of ARPU trends in data and mobile services for comparison.

Figure 4: Total Telecommunications Revenues (retail and wholesale) by Service 2008/09¹²

5.2 New Zealand's Key Telecommunications Networks

The New Zealand broadband map is a useful resource for understanding the extent and types of New Zealand's telecommunications networks.¹³ The following table summarises the key telecommunications networks currently deployed in New Zealand.

Figure 5: New Zealand's Key Telecommunications Networks

TYPE	DETAILS
Fixed Networks	TelecomNZ's ubiquitous copper network. FTTN to 84% of the population.
	TelstraClear's DOCSIS hybrid fibre coaxial cable network in Wellington, Kapiti and Christchurch (approximately 14% of the national population footprint). TelstraClear also has a limited copper FTTN network in Wellington and Christchurch.
	Wireless network operators, such as Woosh Wireless, primarily in main centres.

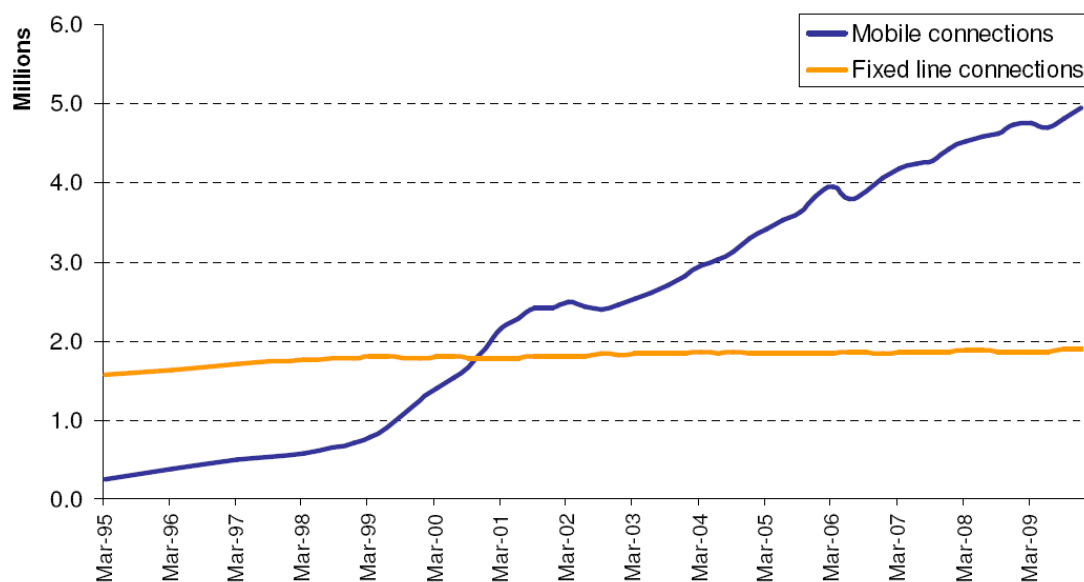
¹² Commerce Commission, *Annual Telecommunications Monitoring Report, 2009*.

¹³ The National Broadband Map exists to complement demand aggregation strategies of central and local government and provide a comprehensive view of New Zealand's Broadband landscape and is available at: <http://www.broadbandmap.govt.nz/map/>. In 2009, the New Zealand Broadband Map won a World Summit Award for creativity and innovation in ICT.

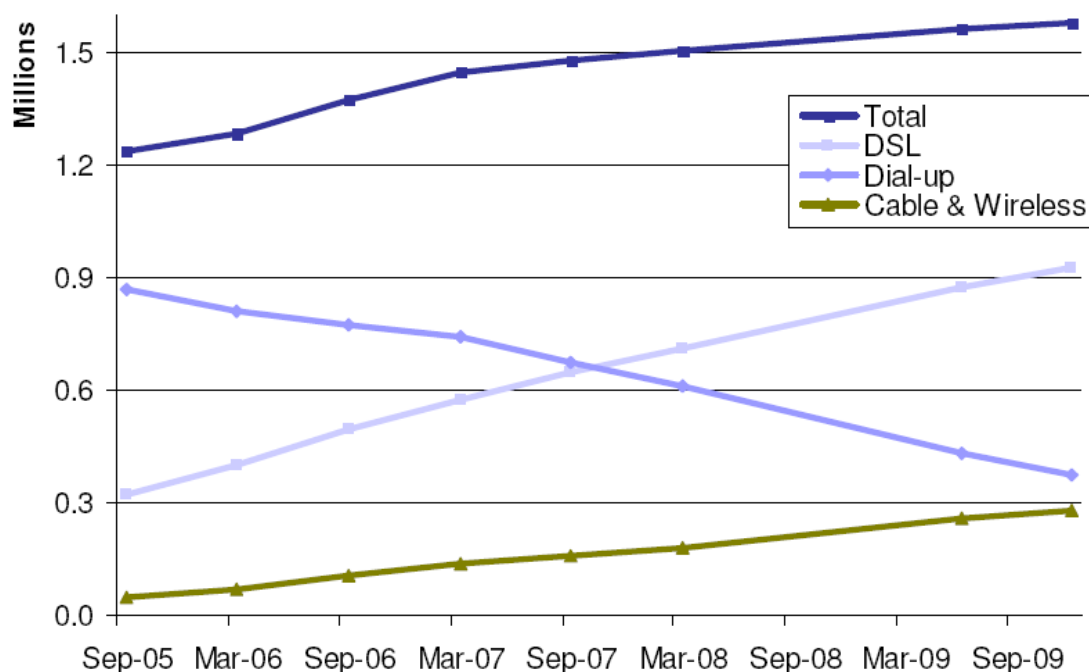
	Small regional fixed network operators in some cities.
	Competing fibre access networks in most Central Business Districts.
	TelecomNZ and WorldxChange trialling 7000 FTTH connections.
	Competing national backhaul (mainly TelecomNZ, TelstraClear and FX Networks) serving most main centres.
Mobile Networks	Two competing GSM networks (Vodafone to 97% of the population, and 2degrees in Auckland, Wellington, Christchurch and Queenstown) and TelecomNZ's CDMA network to 97% of the population.
	Three competing WCDMA networks (TelecomNZ and Vodafone to 97% of the population, and 2degrees in Auckland, Wellington, Christchurch and Queenstown).

Since 1995, mobile connections have increased rapidly to eclipse fixed connections, which are largely provided over TelecomNZ's copper network. Mobile penetration has continued to increase after passing the 100% mark.

Figure 6: Mobile Connections versus Fixed Line Connections 1995 to 2009¹⁴



¹⁴ Commerce Commission, *Annual Telecommunications Monitoring Report, 2009*.

Figure 7: Retail Internet Subscriber Connections¹⁵

5.3 Key market trends

The key market trends identified by the New Zealand telecommunications regulator since the 2006 reforms, are set out below.

Figure 8: Key Telecommunications Market Trends¹⁶

Key market trends and observations	
▪	Increased total investment in telecommunications over time from \$917 million in 2005/06 to \$1.693 billion in 2008/09.
▪	Sustained growth of fixed broadband connections from 480,000 in 2005/06 to more than 1,000,000 by the end of 2009.
▪	Increasing broadband performance with most customers on full speed plans.
▪	Constant retail revenue across the telecommunications industry as a whole.
▪	Increasing revenue from fixed line monthly charges and decreasing revenue from fixed line calling.
▪	Decreasing revenues from mobile voice services and increasing revenues from mobile data services.
▪	Early signs of fixed-to-mobile substitution with total mobile call minutes growing strongly while fixed line voice minutes are decreasing.

¹⁵ Commerce Commission, *Annual Telecommunications Monitoring Report, 2009*. Please note, Cable and Wireless category includes cellular connections.

¹⁶ Commerce Commission, *Annual Telecommunications Monitoring Report, 2009*.

6 MOTIVATIONS FOR CHANGE

Despite relying on deregulatory policies for longer than most comparable jurisdictions, the 2006 regulatory reforms appeared to set New Zealand on a positive trajectory. Competition and service uptake increased in key service markets, and prices and service quality improvements were evident. Correspondingly investment by both competing service providers and TelecomNZ increased significantly.

While the industry was focusing on implementation of the reforms, however, the political debate moved on to strategies to achieve a more dramatic step change in New Zealand's broadband policy outcomes.

Although the current Government's actual ultra-fast broadband and rural broadband policies were developed in the political discourse surrounding the 2008 general elections, arguably these policies evolved in response to two key underlying themes of ongoing public concern:

- the perceived failure of regulatory interventions to drive the level of investment in broadband infrastructure required to keep pace with public expectations and international trends; and
- the growing “digital divide” between New Zealand's urban and rural regions and the resultant impacts on key productive sectors of the economy.

The next two chapters examine the origins and increasing influence of these factors on New Zealand's broadband policy.

7 THE NEW ZEALAND REGULATORY REGIME

7.1 The Regulatory Regime

The 2006 reforms to the Telecommunications Act brought an end to well over a decade of light-handed regulation. Aimed at driving a step change in New Zealand's telecommunications sector the reforms introduced a new approach to wholesale access regulation, greatly strengthened the telecommunications sector regulator's powers and introduced the operational separation of the incumbent TelecomNZ.

7.1.1 Access regulation

The 2001 reforms had introduced a limited regulatory regime focused on interconnection, number portability and resale services.

The more intrusive 2006 reforms were driven by:

- the desire of the Government for greater infrastructure competition;
- the continuing weakness of wholesale competition over TelecomNZ's network; and
- the perception that TelecomNZ was continuing to under-invest in both the access and core network.

The key elements of the 2006 reforms of copper access services are addressed below.

A Ladder of Investment Access Regime

A central facet of the 2006 reforms was the introduction of a suite of new regulated wholesale access services, targeted toward implementing a "ladder of investment" (LOI) access strategy. Drawing on new regulatory theories evolving in Europe¹⁷ to explain the development of wholesale competition on incumbent networks, the approach entailed regulating a "ladder" of wholesale access products, from resale to unbundled network elements, and crafting incentives for access seekers to climb the ladder by progressively investing in replicable network elements.

Under this theory, the price of each service reduces as the access seeker moves up the LOI. This is a consequence of the pricing principle applicable at each rung and recognises the increasing additional value that the access seeker is required to add. In the diagram reproduced below, MED set out the key elements of the ladder of investment theory it relied on in considering reforms in 2006.¹⁸

¹⁷ See, for example, Cave, *Making the ladder of investment operational*, November 2004.

¹⁸ MED, *Promoting competition in broadband markets*, June 2010.

Figure 9: Ladder of Investment Access Regime

	Pricing principle applicable to the service	Indicative estimate of price for the service (for illustrative purposes only)	Pricing principle applicable to the migration of customers up to the next rung
Own infrastructure	Based on access seeker's costs	Not applicable	Based on access seeker's costs
LLU	Based on Telecom's costs as determined by the Commission	\$19 ³¹ \$22 ³²	Determined by Commission if requested
UBS	Based on retail price (imputed by Commission) minus avoided costs	\$28 ³³	Migration charge currently \$36 (commercial UBS) and \$21 (UBS determination)
Resale	Based on retail price (modal average of Telecom's retail prices) minus avoided costs	\$49 ³⁴	Reassignment charge currently set by Telecom
Retail	Set by Telecom	\$60 ³⁵	

³¹ Based on the EU average price at Oct 2005 of 11.3 euros. This would be equal to NZ\$19.10 using the PPP measure (based on 2005 OECD data) of 1euro=NZ\$1.69.

³² Based on the EU average price at Oct 2005 of 11.3 euros. This would be equal to NZ\$22.45 using the average exchange rate over the ten years to March 2006 of 1euro=NZ\$1.9875.

³³ Based on the Commission's determined price which assumed Homeline service was included (i.e. not naked DSL)

³⁴ Based on Telecom's Adventure plan (3.5M/128k plus calling service) to be introduced in April, less 18%

The New Zealand approach to the ladder of investment services included legislating the regulation of unbundled copper local loops (UCLL), unbundled sub-loops, and unbundled bitstream services including "naked DSL"¹⁹. The UCLL family of access products were price regulated using a forward-looking cost-based pricing methodology, while bitstream and resale services were priced at retail-minus to preserve the incentives of competing service providers to move up the 'ladder' to UCLL and TelecomNZ's incentives to invest in FTTN.

¹⁹ Regulated bitstream services include both clothed (a bitstream service tied to a POTS voice service) and naked (a standalone bitstream service) bitstream services.

REGULATED SERVICE FAMILY	EXAMPLE OF REGULATED PRODUCT	METHOD OF REGULATED PRICING	ADDITIONAL VALUE ADDED BY ACCESS SEEKERS
UCLL	e.g. UCLL	Forward Looking Cost-based (TSLRIC)	DSLAMs, backhaul links, PSTN emulation
Bitstream/UBA	e.g. EUBA + POTS	Retail minus imputed costs	National and International connectivity, Layer 3+
Resale	e.g. resold broadband	Retail – x%	Retailing

Enhanced Regulatory Processes and Powers

The new access regime was supported by amendments to the regulator’s powers and process, most notably the introduction of a new Standard Terms Determination process, which empowered the Commission to set industry wide ‘Standard Terms’ for all regulated services. Rather than waiting for parties to bring their disputes, the Commission could initiate and make standard terms determinations for all regulated services. The Commission responded rapidly to the task of implementing the new regime, with standard terms determinations for nine new regulated copper access services determined over the following two years.²⁰

7.1.2 Operational separation

In addition to bringing the New Zealand access regime into closer alignment with comparable jurisdictions, the 2006 reforms also imposed the operational separation²¹ of TelecomNZ. Drawing heavily on the recent operational separation of BT in the UK²², the Minister for Communications issued a statutory determination requiring TelecomNZ to operationally separate its business into at least three separate business units.²³

After intense and protracted negotiations, TelecomNZ submitted its final “Separation Undertakings” on 25 March 2008²⁴. The Minister accepted them on 30 March, just before the statutory deadline for ‘separation day’ of 31 March 2008.

²⁰ These Standard Terms Determinations are available on the Commerce Commission website at <http://www.comcom.govt.nz/standard-terms-determinations/>.

²¹ The term Operational Separation is equivalent to the term Functional Separation that is used in some other jurisdictions.

²² The BT Undertakings are available at: <http://stakeholders.ofcom.org.uk/telecoms/policy/bt-undertakings/>.

²³ Telecommunications (Operational Separation) Determination, 26 September 2007. The Determination is available at <http://www.med.govt.nz/upload/51886/sig.pdf>.

²⁴ Telecom Separation Undertakings, 25 March 2008. The Undertakings are available at <http://www.med.govt.nz/upload/56465/separation-undertakings.pdf>.

The regime required Telecom to operationally separate into at least three business units:

- Chorus, TelecomNZ’s access network business, including the copper access network, regional fibre backhaul and most exchange buildings – Chorus’ key product is UCLL;
- TelecomNZ Wholesale, the provider of all other regulated and commercial wholesale services (such as bitstream and resale services); and
- TelecomNZ Retail, which includes the retail and mobile parts of the company.

New Zealand’s operational separation regime additionally:

- applied an Equivalence of Inputs (EOI) standard²⁵ to all regulated fixed access services;
- set out timelines for the migration of legacy services to EOI; and
- required that TelecomNZ not discriminate in providing non-regulated fixed telecommunications services to competing service providers.

To support these measures, the operational separation undertakings specified a series of behavioural restrictions on Telecom. In particular, Chorus was established as a standalone business unit with a separate CEO and “arms-length” interactions with the rest of TelecomNZ. A less stringent set of restrictions was imposed on TelecomNZ Wholesale.

In designing this approach, New Zealand policy-makers drew heavily on the UK model of operational separation applied to BT; notably in respect of the separation between Layer 1 UCLL and Layer 2 bitstream services. Alternative models without this layer of separation were considered in New Zealand, but were rejected in favour of an operational separation focused on the equivalent provision of Layer 1 UCLL services by a separate access network unit business. This was primarily to ensure that the model supported the ladder of investment regulatory model that incentivised access seekers moving to UCLL by investing in DSLAMs.

The implementation of TelecomNZ’s operational separation has been largely successful, although, as in the UK, TelecomNZ has asked for a number of variations to its Separation Undertakings. These variations may be an indication that the cost and complexity of complying with the Separation Undertakings proved to be more significant than TelecomNZ expected.²⁶

	DESCRIPTION OF VARIATION
Variation 1	Approval of the first variation to the Undertakings on 17 June 2009 allowed Telecom to build EOI operational support system capability as a whole as opposed to building it in stages. This significantly reduced system build costs and project implementation risk, but delayed consumption of some key regulated services by Telecom Wholesale on an EOI compliant basis by six to twelve months. The rescheduling enabled Telecom to deliver improved fault management and service restoration three months earlier.

²⁵ EOI essentially requires TelecomNZ to “self-consume” the same upstream products that access seekers purchase using the same business systems and on the same terms.

²⁶ Details of the four variations requested by TelecomNZ are available at: http://www.med.govt.nz/templates/ContentTopicSummary_42270.aspx.

Variation 2	Approval of the second variation to the Undertakings on 20 November 2009 allowed Telecom to postpone the implementation of customer confidential information (CCI) EOI requirements by nine months to 30 September 2010, because Telecom did not have the necessary IT system integration testing capability to deliver all six major Undertakings programmes, including CCI, at an earlier date.
Variation 3	Approval of the third variation to the Undertakings on 20 May 2010 allows Telecom to decide whether to complete the required operational support system (OSS) “building blocks” using either existing systems (enhanced current mode of operation or CMO) or new systems (i.e. future mode of operation or FMO) to achieve the levels of equivalence required by the Undertakings in 2010. This provides Telecom with the time to make more informed decisions about how to design the next wave of systems and processes to build OSS capability to support fibre-based local loop access that would be provided under the Government’s UFB initiative.
Variation 4	<p>Telecom proposed the following changes to the Undertakings:</p> <ul style="list-style-type: none"> • Suspend the forced bulk migration of broadband customers being served by the old wholesale broadband service onto the new wholesale broadband service; • Remove the requirement for Telecom to build a new set of wholesale operational support systems that are not consistent with the industry structure implied by UFB; and • Remove the requirement for Telecom to migrate 17,000 customers onto a new VoIP over copper service by December 2010. • The key reasons for Telecom’s request for the variations is to address high risks of disruption, high implementation costs and unnecessary investment in systems that it says will become redundant as the UFB initiative proceeds. In the body of Telecom’s proposed Undertakings variations, Telecom also requested a more far reaching rethink, re-examination or a reassessment of the above referenced Undertakings.

7.1.3 PSTN migration and FTTN investment

Alongside requiring TelecomNZ’s operational separation, the Separation Undertakings also included significant commitments to:

- migrate its PSTN customers to a new voice platform, with 17,000 customers using a new VoIP solution by the end of 2010 and all customers migrated off the PSTN by 2020; and
- invest in rolling out FTTN²⁷ to 84% of New Zealand’s population by December 2011.

²⁷ Fibre-to-the-node or FTTN refers to the replacement of copper in the feeder cable with optical fibre backhaul allowing the DSLAM to be located closer to the customer (in a cross-connect cabinet for example). The broadband service provided by DSLAM equipment is dependent on short copper loops of less than 5 kilometres. Higher speed DSL equipment, such as VDSL (Very High Speed DSL), requires substantially shorter copper loops (e.g. ~300 metres).

When completed in December 2011, TelecomNZ's FTTN investment will reduce the average length of 80% of TelecomNZ's copper loops to approximately 2.5 kilometres, ensuring that those lines will be technically capable of 10 Mbps or better.²⁸

The FTTN commitments did not, however, propose to shorten the loops in TelecomNZ's copper network sufficiently to optimise the network for VDSL (Very High Speed DSL) services. These services require much shorter copper loops to perform significantly better than ADSL2+.

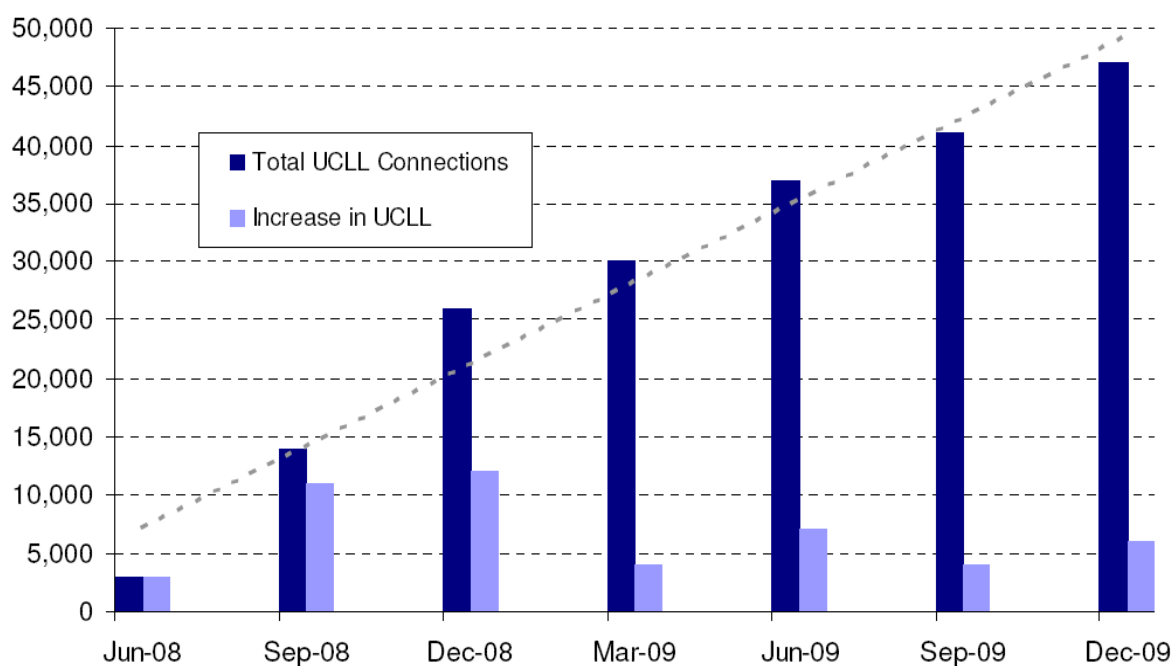
7.1.4 The success of the 2006 reforms

The 2006 reforms largely met the aspirations that drove their introduction, delivering through 2007/08 increasingly competitive retail markets based on wholesale access to TelecomNZ's network and a significant uplift in network investment.

Competition Advances

Wholesale access-based competition in key markets increased with the successful roll-out of UCLL by competing providers including TelstraClear, Vodafone New Zealand and Orcon.

Figure 10: Growth in UCLL uptake 2008 to 2009²⁹

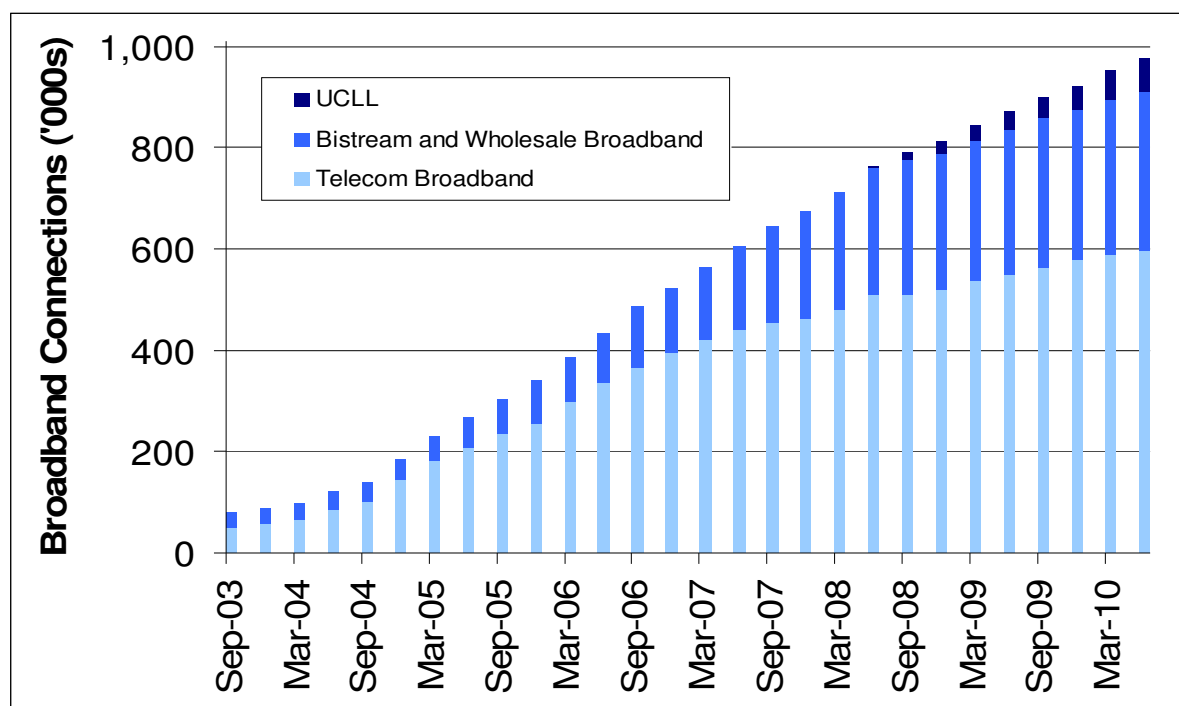


This contributed to a sharp increase in wholesale connections as competitors also moved customers from resold TelecomNZ broadband connections to bitstream services.

²⁸ The exact commitment is to engineer 80% of TelecomNZ PSTN lines to have a maximum line loss of 60db measured at 1024kbps at the external termination point. *Telecom Separation Undertaking*, 25 March 2008.

²⁹ Commerce Commission, *Annual Telecommunications Monitoring Report*, 2009.

Figure 11: Broadband Connections 2003 to 2010³⁰



The increasingly fierce competition in retail markets in turn drove improvements in service quality and pricing.

Investment Trends

The 2006 reforms drove a significant increase in network investments.

TelecomNZ committed to investing in a Next Generation Network (NGN) work programme, at a projected cost of \$1.5 billion, including:

- the rollout of a FTTN access network that would cover 84% of the New Zealand population; and
- development of a NGN core network³¹.

Competing service providers began increasing investment levels, taking advantage of the new regulated access services such as UCLL, which require investment in replicable network elements. In particular the larger competing service providers, TelstraClear, Orcon, and Vodafone NZ, have significant UCLL rollout programmes in major cities and some provincial centres.

³⁰ Data sourced from Commerce Commission, *Annual Telecommunications Monitoring Report, 2009*.

³¹ TelecomNZ's progress toward achieving this objective is continuing, albeit with extended milestones in some cases.

Figure 12 – Telecommunications Industry Investment 2005/06 to 2008/09³²

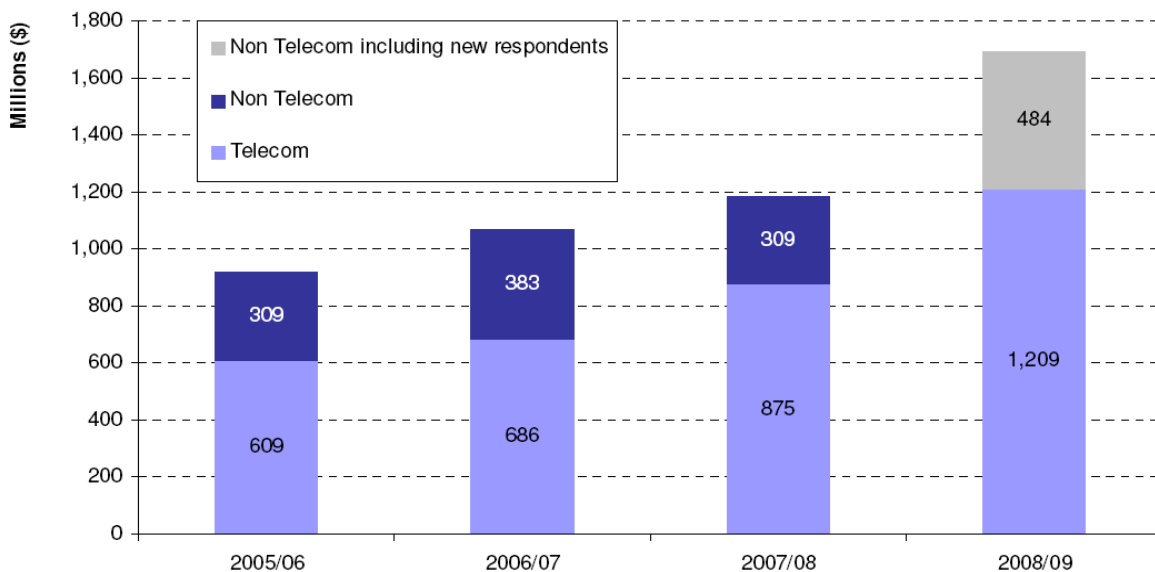


Figure 13: TelecomNZ’s FTTN Programme 2008 to 2010³³

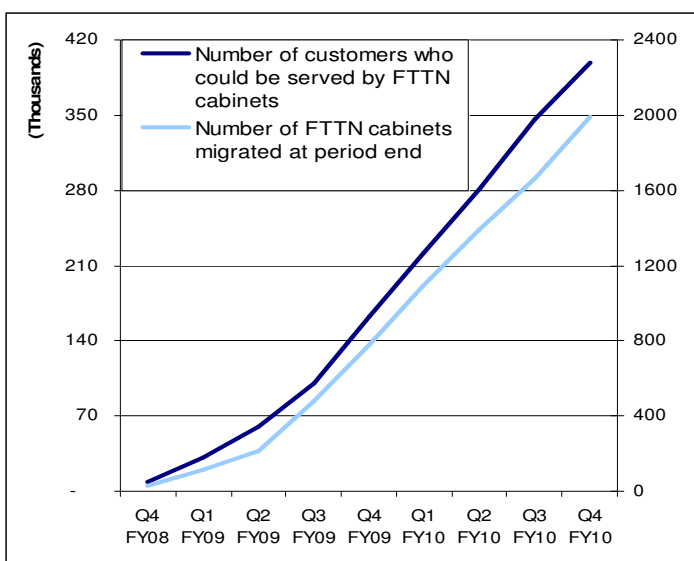
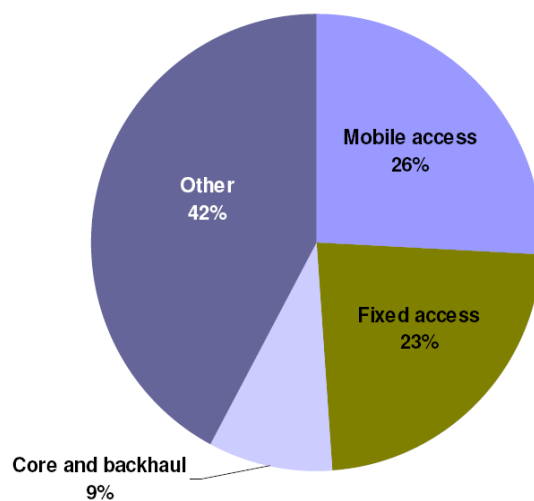


Figure 14: Investment breakdown by network component 2008/09



7.2 The Shortfalls of the Regulatory Approach

7.2.1 Increasing public aspirations

If the 2006 reforms delivered to the aspirations of the day, political and public aspirations remained on the move. Increasingly, public debate and political thought focused on the benefits and costs of a national FTTP network and how to realise it.

³² Commerce Commission, *Annual Telecommunications Monitoring Report*, 2009.

³³ TelecomNZ FTTN roll-out statistics.

In 2008, the New Zealand Institute published an influential report describing a pathway to FTTP for New Zealand.³⁴ Later that year, two leading industry analysts produced FTTP cost studies. The findings of these reports are examined in more detail later in this paper, but they clearly articulated the vision of a fibre future, and the investment it was going to take to get there.

One thing, however, was clear – the current regulatory and political settings were unlikely to deliver a fibre future in the timeframes being discussed.

7.2.2 Difficulties in implementing operational separation

Although largely successful, the 2006 reforms failed to deliver on some of their core objectives. Most notably, TelecomNZ found that a number of the commitments it had signed up to in its Separation Undertakings proved more difficult and costly than expected.

On 24 May 2010, TelecomNZ submitted its fourth proposed variation to the Undertakings, requesting that the Minister for Communications:³⁵

- suspend the forced bulk migration of broadband customers onto the new wholesale bitstream services;
- remove the requirement for TelecomNZ to migrate 17,000 customers onto a new VoIP service by 31 December 2010; and
- remove the requirement for TelecomNZ to build new wholesale operational support systems.

This variation request, and those that preceded it, is indicative of the inherent challenges both TelecomNZ and regulators faced in implementing the new regulatory intervention of operational separation.³⁶

The key challenges experienced by TelecomNZ in implementing operational separation appear to have been:

- the cost and implementation difficulties in migrating legacy services to their EOI equivalents were underestimated (for example, the requirement to migrate bitstream services from the commercial service to the regulated EOI bitstream service);
- the migration to new platforms, such as VoIP infrastructure, has proved more complicated than anticipated;
- generally, TelecomNZ has experienced much greater implementation costs than anticipated; and

³⁴ The New Zealand Institute, *Delivering on the Broadband Aspiration: A Recommended Pathway to Fibre for New Zealand*, April 2008. The Report is available at:

http://www.nzinstitute.org/Images/uploads/Delivering_on_the_broadband_aspiration.pdf.

³⁵ The Variation and submission received on it are available at:

http://www.med.govt.nz/templates/MultipageDocumentTOC_43918.aspx?&MSHiC=65001&L=o&W=variation+4+&Pre=%3cb%3e&Post=%3c%2fb%3e.

³⁶ New Zealand implemented operational separation very shortly following the operational separation of BT in the UK and ahead of similar moves in Italy and Sweden. Accordingly the scope to learn from implementation challenges experienced in other jurisdictions was limited.

- the development of internal compliance systems which, in some cases, were not clearly focused at competitive outcomes for access seekers and end-users.

A robust variation process, which allows the undertakings to be varied over time, has proved to be a valuable way for the Crown and TelecomNZ to adapt the obligations to reflect the experience of implementing in the real world, as well as to deal with overly optimistic initial expectations of both parties.

7.2.3 The “Digital Divide”

While the 2006 reforms did drive significant gains in market competition and investment, the resultant benefits largely accrued to urban consumers. For example:

- TelecomNZ’s FTTN roll-out did not reach the last, predominantly rural, 16% of consumers;
- UCLL access seekers, faced with a significantly higher de-averaged rural price³⁷, did not invest outside urban areas;
- rural end-users were likely to be amongst the last to be migrated off TelecomNZ’s PSTN; and
- there was little evidence to indicate that the industry would increase investment in the rural network.

It is also important to note that, while New Zealand had two widely accessible mobile networks provided by TelecomNZ and Vodafone NZ, upgrades to 3G for these networks were only initiated in 2004/5 and began in larger population centres with progressive rollouts to rural areas. Today these networks extend to approximately 97% of the population.

Set against the backdrop of universal service policies focused on legacy services, the digital divide was, by 2008, back to the fore of New Zealand’s political debate.

³⁷ The Commerce Commission set the regulated price of urban UCLL at \$19.84, and the price of rural UCLL at \$36.63. The UCLL STD is available at: <http://www.comcom.govt.nz/assets/Telecommunications/STD/UCLL/Final/Final-UCLL-Standard-Terms-Determination-Decision-609.pdf>.

8 UNIVERSAL SERVICE OBLIGATIONS AND RURAL BROADBAND POLICY

8.1 Introduction

In line with other OECD countries, successive New Zealand governments have recognised the social and economic importance of ensuring universal access to key telecommunications services.

Unsurprisingly perhaps, given the economic and cultural importance of New Zealand's rural areas, recent Governments have increasingly looked to extend the reach of broadband services in these areas to match their narrowband counterparts. Paired with controversial arrangements for Universal Service, the story of rural telecommunications plays an important part in explaining recent developments in New Zealand telecommunications policy.

This chapter traces the evolution of universal service obligations and policy objectives in New Zealand, from the privatisation of TelecomNZ in 1990 to the present day.

8.2 Origins – the Kiwishare and Privatisation of TelecomNZ

Aware of the sensitivity inherent in privatising the national telecommunications network, the Government negotiated a retained interest in the newly privatised company – the *Kiwishare*.

The Kiwishare was created as a special class of share, held and registered in the name of the Minister of Finance on behalf of the Crown, which secured a number of distinct rights for the Crown.

8.2.1 Standard Residential Telephone Service Obligations

The most notable of the Kiwishare rights were a set of obligations on TelecomNZ, intended to maintain the widespread availability of basic telephony services. The specific obligations were that TelecomNZ would be required to *provide ordinary residential telephone service* according to the following terms:

- a free local area calling option would continue to be made available to all residential customers;
- TelecomNZ would charge no more than *the standard residential line rental*, as at 1 November 1989, and would not increase that rate in real terms unless the overall profitability of its business was unreasonably impaired;
- the line rental for residential customers in rural areas would be no higher than the standard residential line rental; and

- TelecomNZ would continue to make ordinary telephone service as widely available as it was at 11 September 1990.³⁸

The practical effect of these obligations was to require TelecomNZ to make available ordinary telephony services at the CPI-0% price-capped *standard residential line rental* to all residential customers who had access to this service in 11 September 1990.

8.3 Establishment of the Local Service Telecommunications Service Obligation

Following a decade of reliance on general competition law, the Government decided in February 2000 to establish a Ministerial Inquiry (the Fletcher Inquiry) into the New Zealand telecommunications services regulatory environment to examine whether the existing arrangements were best suited to achieving the Government's objectives in the sector. This process was to culminate in the establishment of a new sector-specific regulatory regime and the passage of the Telecommunications Act 2001.

8.3.1 The Fletcher Inquiry

In conjunction with its broader review of the regulatory arrangements for the telecommunications sector, the Ministerial Inquiry investigated the operation of the Kiwishare arrangements.

Reporting to the Government, the Inquiry concluded that "ordinary residential telephone service" included narrowband data services, such as dial-up access to internet services. It dismissed many of the arguments made by TelecomNZ and recommended that the Kiwishare obligations should be reconstituted in a legislative form.

The Inquiry also concluded that TelecomNZ should not receive additional funding from the Crown or the industry for meeting the obligations of the Kiwishare. In reaching this view, the Inquiry noted that:

- line rental charges in New Zealand were high by international standards and provided an above-cost-of-capital return to TelecomNZ across most access lines;
- an "out clause" had been negotiated at the time of TelecomNZ's privatisation, allowing it to seek an additional increase in the standard residential line rental price cap if the overall profitability of its business was unreasonably impaired; and therefore
- to provide further compensation to TelecomNZ for the Kiwishare absent evidence of such an impairment of overall profitability would constitute a windfall gain to TelecomNZ shareholders.³⁹

³⁸ Telecom NZ, *Constitution of Telecom Corporation of New Zealand*, last amended 4 October 2007. Available at: <http://www.telecom.co.nz/content/0,8748,200653-1548,00.html>

³⁹ *Ministerial Inquiry into Telecommunications – Final Report*, 27 September 2000. Available at: http://www.med.govt.nz/templates/MultipageDocumentTOC_16484.aspx

To the contrary, TelecomNZ argued that the Kiwishare obligations were contractual in nature and that any amendments to them should be negotiated between the Crown and TelecomNZ. It indicated a willingness to support some of the Inquiry's proposals but specified that its support would require dispensations to allow TelecomNZ to:

- recover some of the net cost of providing the ordinary residential telephone service to commercially non-viable customers directly from other service providers, rather than through an uplift on interconnection rates; and
- impose an origination charge on free internet calls to ISPs providing dial-up internet services.

While the first of these dispensations was addressed by Government, the latter was not. Instead TelecomNZ instituted a new practice of requiring ISPs to use a specific numbering range. This policy led to a long-standing competition law suit by the Commerce Commission, which was only resolved (in TelecomNZ's favour) in 2010.

8.3.2 Establishment of the Local Service TSO Deed

Following the final report of the Fletcher Inquiry, the Kiwishare recommendations emerged as a key point of contention within the Industry.

Under pressure from TelecomNZ and its supporters (including the powerful rural lobby, Federated Farmers), the Government declined to follow the Inquiry's recommendation to legislate new Kiwishare arrangements and instead decided to negotiate a new set of local calling requirements with TelecomNZ. The product of these negotiations was signed in December 2001 as the *Telecommunications Service Obligation (TSO) Deed For Local Residential Telephone Service* (the **Local Service TSO**).

The new agreement clarified the standards expected for standard residential telephone services and extended the network coverage obligation to match the coverage as at December 2001. It also explicitly included narrowband data services within the standard residential telephone service, requiring:

- 95% of all existing residential lines meet the 14.4 kps connect speed; and
- 99% of all existing residential lines meet the 9.6 kps connect speed.

Finally the TSO retained a similar "out clause" to that included in the original Kiwishare; namely that TelecomNZ could seek an additional increase in the standard residential line rental in the event that the overall profitability of its "fixed business" was impaired.

8.3.3 A statutory framework for the Telecommunications Service Obligations

Alongside negotiating the Local Service TSO, the Government prepared the Telecommunications Act 2001 which, in addition to establishing a new sector-specific regulatory regime, provided a statutory framework to support the new Kiwishare arrangements.

This new framework required the newly established Telecommunications Commissioner to:

- determine *the unavoidable net incremental costs to an efficient service provider* of providing the service required by the TSO instrument to commercially non-viable customers; and
- allocate that net cost to *liable persons* (defined as telecommunications service providers who interconnected with TelecomNZ's PSTN) in proportion to their share of associated revenue.

Most commentators at the time saw the introduction of this new Kiwishare funding mechanism as a trade-off with TelecomNZ in return for its acceptance of a transition to cost-based interconnection pricing, in practice removing the ability to include an access deficit charge. The resulting regulated interconnection charge was set by the Commission at 1.13c per minute, compared with the prevailing rates that TelecomNZ had proposed at the time of 2.65c.⁴⁰

Rather than resolving the matter, however, the reforms introduced by the Government set the stage for nearly a decade of intra-industry dispute and legal challenges.

8.4 A Decade of Contention

The implementation of the new Local Service TSO framework proved as fraught as its introduction.

A key point of contention across the industry during the passage of the Telecommunications Act 2001 was whether the gains TelecomNZ realised from commercially viable customers should be used to offset the losses made on non-viable customers. In its 2001 Cornerstone Issues discussion document, the Commerce Commission noted:

"16. The Act requires that the service that is costed be that of "... providing the service required by the TSO instrument to commercially non-viable customers"... ...Other approaches sometimes used internationally, such as calculation of the revenue deficit across all of the customers (both commercially viable and non-viable) cannot be used."⁴¹

This conclusion, inevitably, led the Commission to calculate substantial net losses for the Local Service TSO in the years following.

8.4.1 Calculating the cost of universal service

Over the period of Kiwishare reform, TelecomNZ produced a wide array of figures for the "net cost" of meeting the Kiwishare obligations.

⁴⁰ Commerce Commission, *Determination on the TelstraClear Application for Determination for Designated Access Services*, 5 November 2002

⁴¹ Commerce Commission, *TSO Discussion Paper and Practice Note – Cornerstone Issues Paper*, 22 March 2002. Available at: <http://www.comcom.govt.nz/telecommunications-service-obligation-determinations/>

In its submission to the Fletcher Inquiry, TelecomNZ estimated its losses at \$100 million per annum, with a range of \$80 million to \$120 million.⁴² By contrast the Commission's own modelling of net cost and the charges determined to be shared across industry participants proved somewhat lower. The following table summarises the final Local Service TSO net losses determined by the Commission and the allocation of these net losses across the Industry.

Figure 15 – Summary of Local Service TSO Net Cost Calculations

Figures in NZ\$m ⁴³	01/02 (part Year)	02/03	03/04	04/05	05/06	06/07	07/08	08/09 (draft)
Net Cost	34.72	56.77	63.78	52.01	58.24	61.36	72.07	69.72
Charged to Industry	8.37	15.42	19.46	16.16	18.32	18.38	23.52	23.44
Met by Telecom	26.35	41.35	44.32	35.85	39.92	42.98	48.55	46.28

8.4.2 Legal challenges

The industry's disputes over the calculation of TSO net cost continued through the decade, with five separate legal challenges lodged with the High Court. These challenges continued in 2010 with a High Court decision in favour of Vodafone, concerning the Commission's approach to including alternative technologies in its modelling of the net cost of the Local Service TSO. Pending appellate decisions, and the results of other related challenges awaiting resolution before the High Court, this judgement may require the Commission to revise its determinations of net cost for 2004/2005, 2005/2006 and potentially its subsequent determinations.⁴⁴

8.5 The Rise of Rural Broadband

While the industry struggled to find common ground, in and out of court, over implementation of the 2001 TSO framework, the concerns of rural voters and lobby groups grew louder. In response, the Labour Government increasingly sought direct solutions to improving rural telecommunications infrastructure and began elucidating clear objectives for the sector's development.

8.5.1 Project PROBE

Responding to these concerns and recognising the increasing importance of broadband as an educational asset, in May 2002 Economic Development Minister, Jim Anderton, Education Minister, Trevor Mallard, and Communications Minister, Paul Swain, announced the launch of a new initiative: Project PROBE (Provincial Broadband Extension).

⁴² Telecom NZ, *Ministerial Inquiry into Telecommunications: Submission in Response to the Draft Report*, 24 July 2000. Available at: <http://www.med.govt.nz/upload/29925/d050.pdf>

⁴³ All figures are taken from Commission Determinations available at www.comcom.govt.nz

⁴⁴ Sarah Putt, *Techday.co.nz*, *ComCom ordered to reconsider TSO*, 8 April 2010. Available at: <http://www.techday.co.nz/telecommunicationsreview/news/comcom-ordered-to-reconsider-tso/16087/>

In some respects a harbinger of later Government approaches to extending rural broadband availability, Project PROBE was a \$39 million (later raised to \$45 million) government tender programme with the objective of ensuring all 900 isolated rural schools in New Zealand had access to broadband services, while maximising spill-over benefits to communities at large.

Completed in 2005, the programme connected 891 schools across the 14 tender regions, predominantly via DSL, wireless and satellite connections. TelecomNZ was the successful tender participant for 10 of these 14 regions.⁴⁵

8.5.2 The Digital Strategy

Building on the success of Project PROBE, the Government released “*The Digital Strategy: A Draft New Zealand Digital Strategy for Consultation*” in June 2004. While the Digital Strategy did not of itself propose substantial new initiatives in telecommunications development, it was notable as an explanation of Government thinking and actions across the ICT sector, organised thematically across “connect”, “content”, and “capability”.

Perhaps most notable in light of recent policy developments, the Digital Strategy also presented the first set of Government targets for broadband availability and quality across New Zealand.

Figure 16 – Digital Strategy Targets for Broadband Speed by 2010⁴⁶

User group	Businesses in main centres, other specialised users outside main centres	Medium-sized businesses in provincial towns	Residential and SME customers in 85% of New Zealand	Residential and SME customers in remaining 15% of New Zealand (rural)
Typical applications	Grid computing Real-time virtual reality Synchronised astronomy	Remote CAT scans High-definition consultation	Video on demand Security systems Multiple business or entertainment processes	Video on demand Security systems Multiple business or entertainment processes
Benchmark	40Gbps	1Gbps (fibre) 100Mbps(wireless)	50Mbps	10Mbps
Available on demand	n x 100Gbps	n x 40Gbps	100Mbps	100Mbps
Likely delivery technology	Fibre	Fibre or wireless	Fibre/copper and wireless	Fibre/copper and wireless

8.6 Contestability and a Broadband TSO?

The 2005/06 major reforms to the telecommunications regulatory regime largely passed over the TSO framework, instead focusing on bolstering the access regime and the operational separation of TelecomNZ.

⁴⁵ E-Govt.nz, *Project PROBE Case Study*, 11 January 2006. Available at: <http://www.e.govt.nz/plone/archive/resources/research/case-studies/project-probe/index.html>

⁴⁶ MED, *Digital Strategy: A Draft New Zealand Digital Strategy for Consultation*, June 2004. Available at: http://www.med.govt.nz/templates/MultipageDocumentTOC_16285.aspx

In 2007 the Minister for Communications, David Cunliffe, turned his focus to the ongoing difficulties experienced with the Local Service TSO and announced a broad ranging review of the existing arrangements. On 20 August 2007 the Government released a discussion document canvassing a wide range of reform options, notably:

- providing for contestable tendering of Local Service TSO obligations;
- amending the funding arrangements for the Local Service TSO by—
 - moving to a fixed sum payment;
 - removing industry cost-sharing and instead relying on cross-subsidy between TelecomNZ's viable and non-viable customers; or
 - linking funding directly to actual investments in TSO-related infrastructure and facilities;
- amending the price cap arrangements for standard residential telephone service by—
 - rebalancing / de-averaging standard residential line rental rates; and/or
 - including fixed tariff connection charges within the Local Service TSO

The discussion document also raised the possibility of introducing a new broadband TSO.

Apparent behind many of these proposals was the concern in Government that, despite the substantial sums received by TelecomNZ over the years via the statutory TSO framework, TelecomNZ's actual investments in rural and isolated areas appeared to be minimal. In particular the discussion document cites evidence that TelecomNZ's investment in rural areas equated to less than half the amount provided for in the Commission's modelling of Local Service TSO net costs. Thus the gap was growing between the increasing aspirations of Government for telecommunications services (particularly broadband) in rural New Zealand, and the practicality of achieving substantial improvements in these areas.⁴⁷

While the 2007 TSO review ultimately foundered, lost in the wake of the 2008 general election, the same concerns were evident to the incoming National Party Government and new Minister for Communications Stephen Joyce.

8.7 Broadband Ascendancy Affirmed

Entering the portfolio with a strong mandate for change, Minister Joyce quickly released a discussion document proposing major amendments to the Local Service TSO regime. Drawing on the evidence presented in the 2007 review, the 2009/10 TSO Reforms proposed—

- amending the method of calculating the net cost of the Local Service TSO to focus on the total net cost from serving all customers, rather than the incremental net cost of serving commercially non-viable customers; and

⁴⁷ MED, *Telecommunications Service Obligations (TSO) Regulatory Framework: Discussion Document*, August 2007. Available at: http://www.med.govt.nz/templates/MultipageDocumentTOC_29610.aspx

- establishing a new Telecommunications Development Levy of service providers to collect \$50 million per year for six years and \$10 million per year thereafter (note: no end date has been proposed for the continuing \$10 million levy obligation).⁴⁸

Alongside the 2009/10 TSO reforms, the Government proposed a landmark change in rural broadband policy, introducing a new “Rural Broadband Initiative” to disburse \$300 million⁴⁹ through a competitive tender process to improve broadband services and availability in rural areas.

⁴⁸ These reforms were affirmed as Government policy in June 2010, and are expected to be introduced via an amendment Bill in 2010/11.

⁴⁹ \$252 million from the new levy and \$48 million from Government appropriations.

9 INTRODUCTION TO THE UFB, RBI AND COMPLEMENTARY MEASURES

Fuelled by the increasing expectations of the New Zealand electorate for improved universal broadband services, and cognisant of the limitations of existing regulatory and policy approaches, the political discourse of 2007/08 rapidly drove New Zealand telecommunications policy in a new and bold direction.

9.1 The Foundations of a National Ultra-fast Broadband Policy

9.1.1 The New Zealand Institute Report

In April 2008, the New Zealand Institute published a report that was to become influential in the development of broadband policy in New Zealand.⁵⁰ The Institute found that:

- national economic benefits from broadband were in the range of \$2.7-4.4 billion per year with further upside potential possible;
- capturing many of these economic benefits increasingly requires high speeds and so New Zealand's policy focus should shift from encouraging penetration to increasing the broadband speeds by investing in a fibre network;
- there is a significant cost to waiting – the longer that New Zealand waits, the more economic value it will forego; and therefore
- New Zealand should approach the investment in fibre with urgency.

The Institute's report became a seminal and influential document in the development of New Zealand broadband policy. Leader of the National Party, John Key, quoted the benefits the Institute estimated as a key motivator behind the development of the National Party's broadband policy.⁵¹

In particular, the Report recommended features that were to become key elements of the National Party Government's UFB Initiative, including:

- a focus on FTTP networks;
- roll-out to 75% of New Zealand's population;
- achieved within 10 years;

⁵⁰ The New Zealand Institute, *Delivering on the Broadband Aspiration: A Recommended Pathway to Fibre for New Zealand*, April 2008. The Report is available at:

http://www.nzinstitute.org/Images/uploads/Delivering_on_the_broadband_aspiration.pdf.

⁵¹ 2008: Achieving a Step Change – Better Broadband for New Zealand, 22 April 2008. Available at: <http://www.national.org.nz/Article.aspx?ArticleID=12143>.

- creation of a price regulated investment vehicle offering open access “dark fibre” wholesale services (referred to as “FibreCo”);
- a mix of Government (\$1 billion) and private (\$3.5 billion) funding; and
- a recommendation for the structural separation of TelecomNZ and Government investment in Chorus.

9.2 The Broadband Investment Fund

In May 2008, the Labour Government announced a quite different approach with a new Broadband Investment Fund (the **BIF**), comprising grants of up to NZ\$325 million operating and NZ\$15 million capital funding over five years. The BIF was designed to facilitate high speed broadband connections to businesses in urban centres and key users in health and education sectors, to extend the reach of broadband into underserved regions, and to improve the resilience of New Zealand’s international connections.⁵²

The BIF, however, did not survive the change of Government later that year, being immediately replaced by the incoming National Party Government with its own plans for a national broadband network.

9.3 Urban and Rural Broadband Initiatives & Complementary Measures

By December 2008, the National Party Government had been swept to power promising to implement three key broadband initiatives:⁵³

- 1) *“to contribute an investment of up to \$1.5 billion in Crown capital over six years to accelerate the roll-out of a fibre-to-the-home network for New Zealand... [o]ur initial goal is to ensure the accelerated roll-out of fibre right to the home of 75% of New Zealanders.”*
- 2) *“additional steps to accelerate the roll-out of high-speed broadband services to rural and remote areas.”*
- 3) *“work with local government to ensure it is doing everything it can to facilitate the roll-out of the fibre network.”*

9.3.1 The Ultra-Fast Broadband Initiative

The Ultra-fast Broadband (**UFB**) Initiative was the first initiative to be set in motion. The goal of the UFB was to roll-out FTTP access networks to 75% of the population in 10 years, with Government contributing an investment of up to \$1.5 billion. The UFB was not aimed at supporting the development of core networks or national backhaul links, which the Government considered would be deployed commercially in response to the demand created by the new access networks.

⁵² MED, *New Zealand’s Digital Pathway: A Fast Broadband Future – Broadband Investment Fund: Draft Criteria and Proposed Process for Consultation*, May 2008.

⁵³ John Key, Speech to the Wellington Chamber of Commerce: Achieving a Step Change – Better Broadband for New Zealand, 22 April 2008.

9.3.2 Reducing fibre deployment costs

The Government also moved to consult on a range of regulatory and non-regulatory measures that would support the roll-out of both the Government's UFB initiative and the Government's rural broadband strategy.

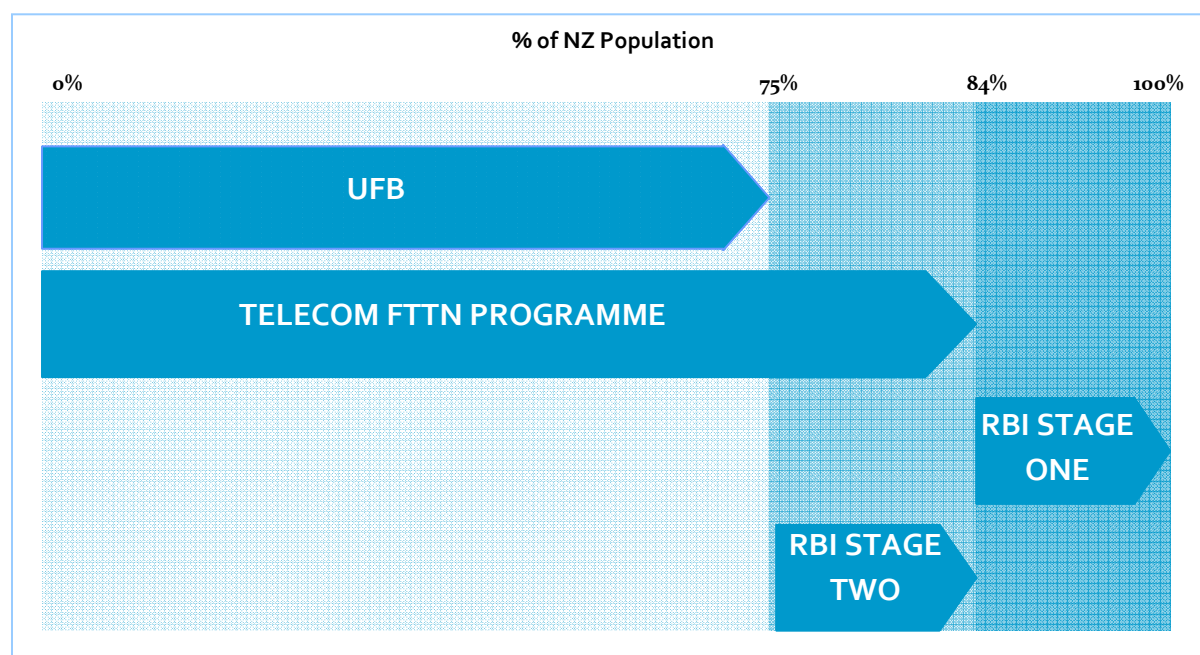
An initial discussion document, *Facilitating the Deployment of Broadband Infrastructure*, was issued in October 2009 covering a wide range of measures. This was followed in June 2010 by a Proposal for Comment on a number of specific measures.⁵⁴

9.3.3 The Rural Broadband Initiative

In his April 2008 speech, Mr Key promised that “[a National Party Government] will also take additional steps to accelerate the roll-out of high-speed broadband services to rural and remote areas.”⁵⁵

This promise became the basis of the Government's rural broadband strategy with the announcement of the Rural Broadband Initiative (RBI) on 10 December 2009. The relative coverage of UFB, RBI and TelecomNZ's FTTN programme is demonstrated in the diagram below.

Figure 17 – Coverage Targets for New Zealand Broadband Initiatives



⁵⁴ These two documents are available on the MED website at:

http://www.med.govt.nz/templates/StandardSummary_42022.aspx.

⁵⁵ John Key, *Speech to the Wellington Chamber of Commerce: Achieving a Step Change – Better Broadband for New Zealand*, 22 April 2008.

10 THE ULTRA-FAST BROADBAND INITIATIVE

10.1 The Origins of the UFB

In November 2008, a new National Party Government was elected bringing an end to a decade of rule by the fifth Labour Government. In a speech to the Wellington Chamber of Commerce on 22 April 2008⁵⁶, Mr Key, the Leader of the National Party, announced his vision for broadband in New Zealand. The next National Party Government, said Mr Key, will:

“contribute an investment of up to \$1.5 billion in Crown capital over six years to accelerate the roll-out of a fibre-to-the-home network for New Zealand...”

Our initial goal is to ensure the accelerated roll-out of fibre right to the home of 75% of New Zealanders.

In the first six years, priority will be given to business premises, schools, health facilities, and the first tranche of homes...

Mr Key noted that ultra-fast broadband for all New Zealanders is:

“[the] one modern technology that stands out in its terms of its ability to:

- *Draw us closer to our trading partners.*
- *Put Kiwis at the forefront of technological innovation.*
- *Greatly enhance the way we do business and the way we communicate.*

I want New Zealand to be linked by a network of fibre that ensures almost all premises – be they small businesses, schools, or households – can be linked into the main fibre grid with fibre right to their door. And when Kiwis can't get fibre connected to their home or place of work, I want them to have access to other high-speed broadband technologies, like those afforded by satellite and mobile.

With a fibre network like the one I aspire to, New Zealanders would be able to download and upload data from the Internet at lightning-fast speeds. Workers would be able to telecommute with ease. Video-conferencing could happen between seven people in seven parts of the country at once.

Achieving a ‘fibre to the home’ aspiration of that sort would truly future-proof New Zealand.

Fibre right to the home promises huge gains in productivity, innovation, and global reach for New Zealand. Those are the things that will make our economy richer. Those are the things

⁵⁶ John Key, *Speech to the Wellington Chamber of Commerce: Achieving a Step Change – Better Broadband for New Zealand*, 22 April 2008. Mr Key’s speech is available at: <http://www.national.org.nz/Article.aspx?ArticleID=12143>.

that will ensure New Zealand families have incomes that keep up with the cost of living in the world of the future.”

Mr Key brought his vision of a national FTTP network into power with him, setting the wheels of Government into motion.

10.1.1 The reasons for ultra-fast broadband

As identified by this paper, the UFB Initiative is the culmination of a public debate in New Zealand since 2006. Supporters of a national fibre optic ultra-fast broadband network argued that:

- ultra-fast broadband is important national infrastructure, especially for a country with the geographical challenges of New Zealand:
 - an enabler for growth across the economy;
 - increasing access to international markets;
 - key to accelerating New Zealand’s transition to a knowledge-based economy; and
 - the key to enhanced deliver of education and health services.
- fibre is the leading technology option for urban areas because it has:
 - the highest symmetrical speeds;
 - with wave division, the greatest speeds of any technology;
 - low interference and distance limitation.

Supporters also argued that the reluctance of the private sector to make widespread investment in FTTP was due to:

- the high deployment costs;
- New Zealand’s geography, geology and dispersed population; and
- the risk of low uptake in the face of established copper-based competition.

The UFB model adopted by Government sought to attract private investment by addressing these key risks with Government funding to lower deployment costs and an innovative commercial model that reduced the uptake risk.

10.2 UFB Cost Studies

The New Zealand Institute estimated that “FibreCo” could deliver FTTP to 75% of the population for NZ\$4-5 billion. The New Zealand Institute’s simple bottom up analysis was followed by two more substantial cost studies by Dr Murray Milner⁵⁷ and Network Strategies⁵⁸.

Dr Milner concluded that for a G-PON deployment to cover 75% of premises located within urban New Zealand:⁵⁹

The fixed passive cost per home passed can be expected to lie in the range of \$1700 to \$2400

The variable passive cost per home connected can be expected to lie in the range of \$800 to \$1200

The variable active cost per premise connected can be expected to lie in the range of \$1200 to \$2400

The fixed passive investment required for coverage of urban New Zealand premises (75% of NZ premises) can be expected to lie in the range of \$2.6B to \$3.3B

The total investment required for connection of urban New Zealand premises with a take-up of 100% within the coverage area can be expected to lie in the range of \$5B to \$7.5B

The total investment required for connection of urban New Zealand premises with a take-up of 50% within the coverage area can be expected to lie in the range of \$3.5B to \$5.5B

Network Strategies used “techno-economic modelling” to estimate the required investment to roll-out FTTP to 75% of the population in 10 years under a number of different technology, business and market scenarios, modelling:

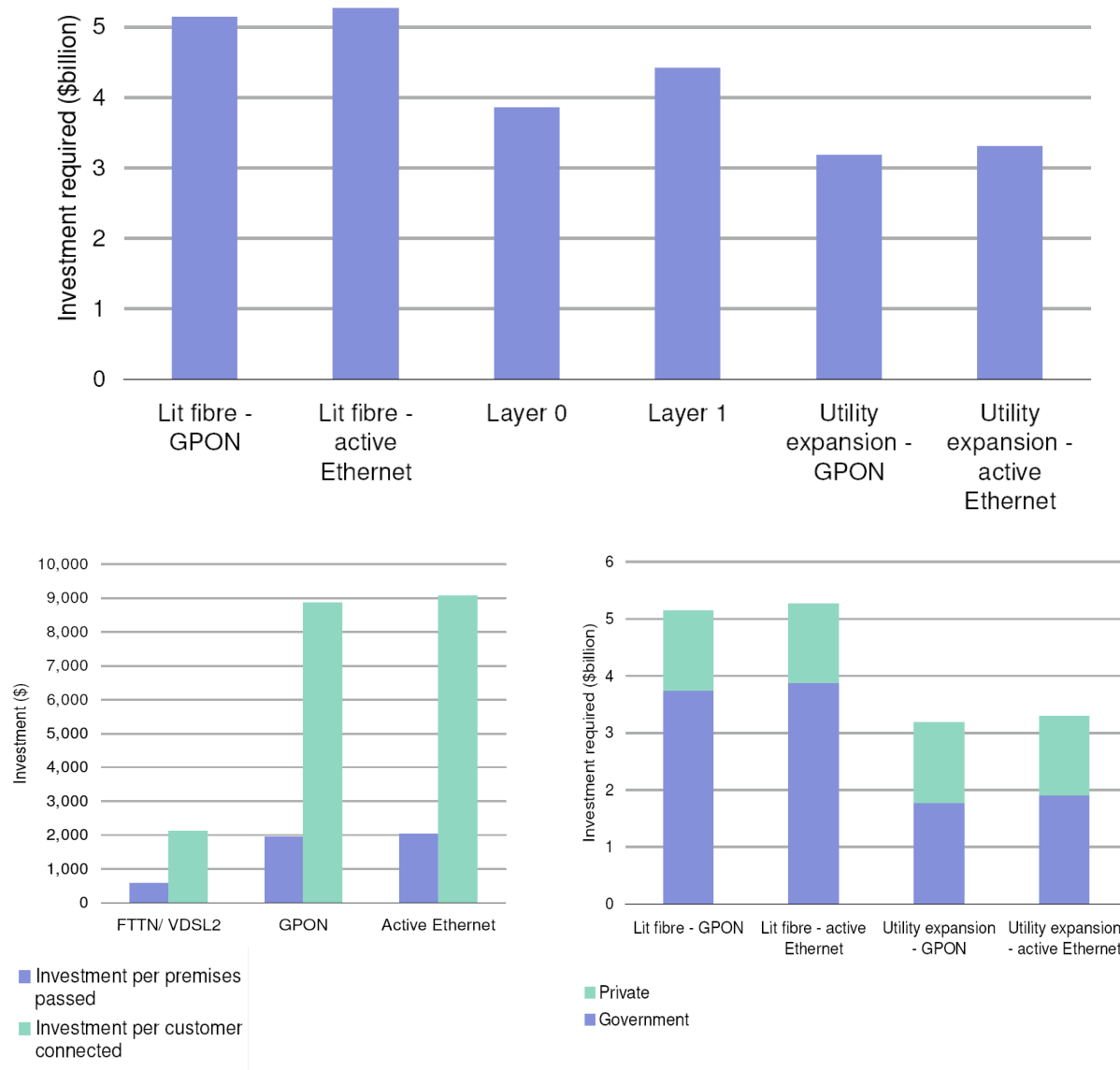
- total investment required, by business model;
- investment per premise passed; and
- Government investment required, by business model.

⁵⁷ Milner, *Fibre-to-the-Premise Cost Study*, 2 February 2009. Dr Milner’s Cost Study is available at: <http://www.med.govt.nz/upload/63958/FTTP-Cost-Study-Public-Version.pdf>.

⁵⁸ Network Strategies, *Broadband and Strategy Options for New Zealand*, 20 September 2008 and 10 December 2008. The Network Strategies’ Stage One and Stage Two reports are available at: <http://202.46.176.33/issues/newzealand/broadband-strategy-options-for-new-zealand>.

⁵⁹ Dr Milner also modelled the costs of deploying Active Ethernet over Fibre, which he estimated to be similar to G-PON deployment except for: 5% higher fixed passive infrastructure costs and 10% higher active infrastructure costs.

Figure 18 – Results of Network Strategies’ Techno-economic FTTP Cost Modelling⁶⁰



The Government relied on these independent cost studies and the adoption of a competitive tender process to ensure that the Government would obtain the best network coverage for the money it was investing.

10.3 The Castalia Report

There were however, alternative views on the best approach to promoting the rollout of enhanced broadband infrastructure. The largest three industry participants, TelecomNZ, TelstraClear and Vodafone New Zealand, published a report they had commissioned from the strategic consultancy firm, Castalia. The report critiqued the new Government's broadband policies, concluding that:

⁶⁰ These three graphs are sourced from: *Network Strategies, Broadband and Strategy Options for New Zealand – Final Stage 2 Report*, 10 December 2008.

- the widespread roll-out of fibre-to-the-home would deliver only a small improvement in the ability of New Zealanders to use existing and emerging Internet application;
- given the likely speed requirements of consumer applications, the costs of the Government's policy would likely exceed its benefits;
- instead, much of the economic benefit of FTTP could be obtained through targeted deployment of fibre to businesses, schools and hospitals, rather than through full deployment to residential users.
- the Government should rather focus on addressing key market failures, such as:
 - the low willingness to pay for high speed broadband;
 - user wiring and equipment;
 - the cost of international data capacity
 - services for rural users.

The Castalia report represents a different vision of the industry's future, with fibre deployed to non-residential users in response to demand and ability to pay, as well as recommending a focus for the Government on demand-side issues and non-economic areas. The reports conclusions and recommendation were, however, not accepted by the incoming Government, and the document played little further role in New Zealand's broadband story.

10.4 The UFB Policy

The Government issued an Overview of the UFB Initiative⁶¹ in September 2009 and Invitation to Participate in the UFB Initiative (ITP)⁶² a month later in October. The ITP sought commercial parties willing to partner with the Government in rolling out ultra-fast broadband networks to New Zealanders.

10.4.1 Objectives and principles

The Government's overall objective for the UFB Initiative was:

“To accelerate the roll-out of ultra-fast broadband to 75 percent of New Zealanders² over ten years, concentrating in the first six years on priority broadband users such as businesses, schools and health services, plus greenfield developments and certain tranches of residential areas (UFB Objective).”

The UFB Objective was to be supported by Government investment of up to \$1.5 billion, which was expected to be at least matched by private sector investment and directed to open-access

⁶¹ New Zealand Government Ultra-Fast Broadband Initiative: Overview of Initiative, September 2009.

⁶² New Zealand Government Ultra-Fast Broadband Initiative: Invitation to Participate in Partner Selection Process, October 2009. The Initiation to Participate is available on the MED website at: <http://www.med.govt.nz/upload/70609/Invitation-to-Participate.pdf>.

infrastructure. The Government indicated that it would seek to achieve this objective consistent with the following principles:

- making a significant contribution to economic growth;
- neither discouraging, nor substituting for, private sector investment;
- avoiding ‘lining the pockets’ of existing broadband network providers⁶³;
- avoiding excessive infrastructure duplication;
- focusing on building new infrastructure, and not unduly preserving the ‘legacy assets’ of the past; and
- ensuring affordable broadband services.

10.4.2 Defining the UFB

Ultra-fast broadband was defined in the ITP as a “*minimum unconstrained bit-rate of 100 Mbps downlink and 50 Mbps uplink.*”⁶⁴

The Government also identified the 33 “candidate” urban centres for UFB networks.⁶⁵ A table of the candidate areas is set out in Annex 1. These candidate areas were selected on the basis of population (using population projections for 2021 to ensure the UFB Initiative achieved the coverage objective at completion) and included population centres as small as 10,000 people. Respondents to the ITP were able to submit proposals for:

- single candidate areas;
- part of a candidate area;
- any combination of candidate areas; or
- all candidate areas.

To provide flexibility the boundaries of candidate areas were loosely described, allowing Respondents to propose sensible variations to those boundaries.

10.4.3 Crown Fibre Holdings

In December 2009, the Government established a Crown-owned company, Crown Fibre Holdings (CFH)⁶⁶, to:

- manage the competitive tender process for the UFB Initiative and recommend preferred UFB partners to shareholding Ministers of the Crown; and

⁶³ In other words the Government indicated that it was keen to ensure that the UFB funding did not provide windfall gains for existing telecommunications providers.

⁶⁴ ITP, p. 1.

⁶⁵ ITP, p. 28.

⁶⁶ Crown Fibre Holding’s website is: <http://www.crownfibre.govt.nz/>.

- following the establishment of UFB networks, manage the Crown's investments.

Consistent with this dual-purpose, CFH was established with a constitution allowing it to initially operate toward achieving the Government's UFB policy objectives and, based on specified criteria, later switch to a purely commercial focus.

Soon after it was established, a CFH board was selected, comprising a group of highly regarded technical experts, business people and legal professionals. Simon Allen, founder of ABN AMBRO New Zealand and former Chair of the New Zealand Stock Exchange, was appointed to Chair the CFH board.

CFH took over management from MED of the competitive tender process that had been initiated by the release of the ITP.

10.4.4 Competitive tender process

The competitive tender process initially had the key milestones set out in the table below:

Activity/milestones	Date/timeframe
Issue ITP	October 2009
CFH operationally functional, and Board appointed	October 2009
Proposals received	December 2009
Initial partner selection process completed and contracted completed	Subject to CFH decisions, but expected to be in the June quarter of 2010
Further investment rounds conducted (if required)	As soon as practical after completion of previous rounds.

Under the terms of the ITP, proposals were required to set out:

- proposed network coverage;
- build prices for communal infrastructure; and
- monthly prices for wholesale services.

In doing so they were required to submit a proposal that complied with a preferred UFB model for the UFB. Respondents were also permitted, at their option, to put forward non-compliant proposals as alternatives.

10.5 The Initial Preferred UFB Model

10.5.1 Introduction

The initial preferred UFB model was set out in the ITP, and governed the following key aspects of the tender process:

- the criteria for assessing proposals;
- the structure of the Crown's investments via a private-public partnership company, referred to as a Local Fibre Company (LFC);
- the specific wholesale services that the LFCs would be required to supply;
- open access requirements with which LFCs would be required to comply;
- an innovative commercial model that reduced the uptake risk on the private partners;
- limitations on the ability of retail providers to participate; and
- the regulatory framework that would apply to UFB networks.

10.5.2 ITP assessment criteria

Appendix 5 of the ITP set out the eligibility criteria respondents to the ITP needed to meet, including:

- technical/commercial ability to execute;
- financial capability;
- minimum technical specifications for network; and
- open access requirements.

Following assessment of eligibility proposals assessed against the specified evaluation criteria which, in summary were⁶⁷:

- the proposed coverage (in terms of premises passed);
- cost of network build and the price of services to be provide by the LFC;
- proposed build schedule;
- competitive benefits; and
- the degree of duplication of existing networks.

⁶⁷ ITP, section 19, pp. 33-34. & Appendix 6

The evaluation process was confidential to CFH and the respondents involved, so no public information exists on how the evaluation criteria were applied or the relevant merits of the proposals.

10.5.3 UFB service level specifications

The ITP specified that LFCs would, at a minimum, provide the wholesale products set out in the table below on contractually agreed price and non-price terms.

PRODUCT TYPE	CHARACTERISTICS/DETAILS
Layer 1	Must provide a dark fibre service from central office/exchange to premises
	Can choose P2P or PON, but if PON is selected a credible passive unbundled product must also be provided.
Layer 2	May provide Layer 2 services at the LFC's election.
	If the LFC chooses to do so it must: <ul style="list-style-type: none"> • provide an ALA-like⁶⁸ service • ensure equivalence of Layer 1 supply

The LFC was also required to provide a co-location service and access to exchanges. The provisions of these services by the LFC would be subject to open access requirements.

10.5.4 Open access

A key principle underlying the UFB Initiative was that the infrastructure funded by the Government would be open access. The open access requirements were set out in section 13 of the ITP with a detailed description of the equivalence and non-discrimination requirements in Appendix 4. The open access guiding principles were:

- *any to any connectivity*: allowing different networks to interoperate and interconnect over each service layer and between service layers;
- *any network technology*: technology choices are market choices are market driven and the open access framework should be designed to outlive the technology choices;
- *low cost of change providers*: consumers are easily able to switch between content and service providers; and

⁶⁸ Ofcom's Ethernet Active Line Access (ALA) product is designed to enable the provision of innovative services to customers through a wholesale bitstream product that is as close as possible to access at the physical layer of the network. More information about ALA can be found on the Ofcom website at: <http://stakeholders.ofcom.org.uk/telecoms/policy/next-generation-access/ethernet-active-access/ethernet-active/>.

- *equality of access*: services provided by LFCs should be offered to all wholesale customers on the same terms and conditions and provisioned to all wholesale customers using the same processes.

Where an LFC provided only Layer 1 services, it would need to do so on non-discriminatory terms. However, where the LFC decided to additionally provide Layer 2 services, the Layer 1 services would have to be provided both to its own layer 2 business and its wholesale customers to an “equivalence of inputs” standard. The Layer 2 service would need to be provided on non-discriminatory terms.

10.5.5 An innovative commercial model

A key innovation of the UFB ITP was a tailored commercial model which addressed the underlying commercial risks of FTTP investments—

- the high fixed costs of initial deployment;
- the risk of commercially unviable service uptake following deployment; and
- the risk of build cost overruns and mismanagement.

The Concept

The UFB commercial model attempted to address these risks by allocating them to the parties (the Crown and the private partner(s)) best able to manage them:

- the Crown accepts a reduced return on its investment for the first 10 years;
- the Crown takes on the majority of the uptake risk; and
- the private partner takes on the network deployment and business execution risks.

The UFB Commercial Model

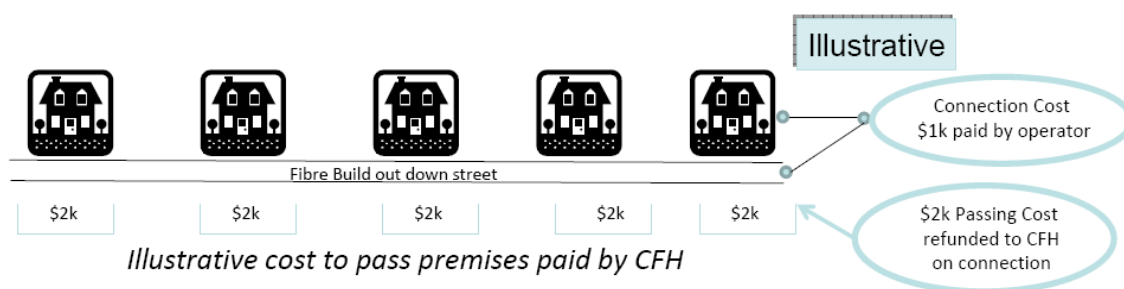
The Crown pays the commercial party the agreed amount for the fixed cost of the communal infrastructure, (i.e. the “fibre down the street”) and receives A-shares, which have voting but no distribution rights.

When the LFC first connects a premise, the commercial partner:

- pays for the customer connection (the lead-in, etc), and receives B-shares (distribution rights but no voting rights); and
- reimburses the Crown one customer’s worth of fixed cost by buying one customer’s worth of A-shares.

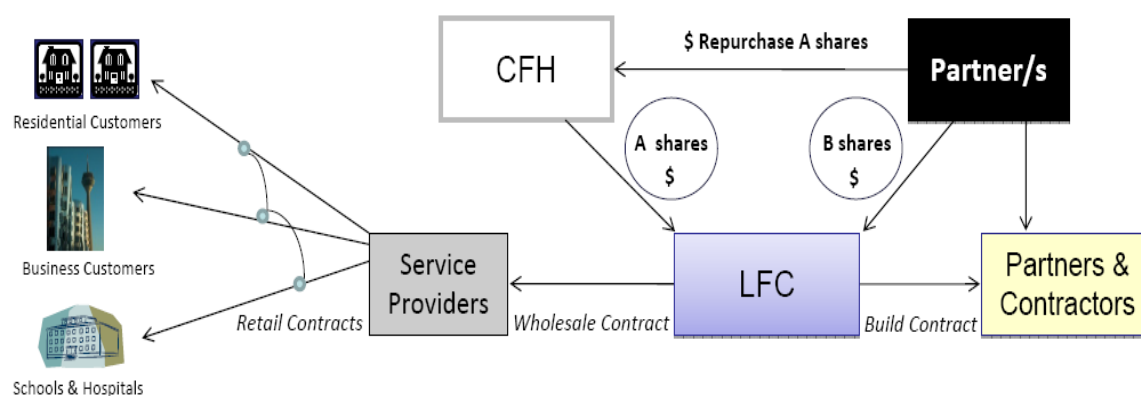
Therefore, the Crown starts with 100% control and is progressively bought out by the commercial partner as uptake occurs – the capital returned to the Crown through this process can then be reinvested in UFB networks.

Figure 19 – Illustrative costs of rollout and allocation between partners⁶⁹



The commercial partner receives 100% of distributions from the LFC during the first 10 years of operation, after which both A and B shares convert to ordinary shares with both voting and distribution rights. After these first 10 years, there would be no further Crown funding.

Figure 20 – UFB investment mechanism⁷⁰



The Benefits of the Commercial Model

The Government considered that, from the perspective of the Crown, the UFB commercial model would:

- direct Crown investment at the key economic problem;
- cap total Crown investment; and
- provide a recycling mechanism, allowing Crown capital to be spent more than once.

From the perspective of the commercial partner, the Government considered that the model would:

⁶⁹ Funston, *National Broadband Deployment Approach: New Zealand*, Presentation at WIK Conference, Berlin 26 – 27 April 2010. The presentation is available at: http://www.wik.org/fileadmin/Konferenzbeitraege/2010/National_Strategies/FUNSTON_Commerce_Commission_NZ_WIK_Ultrabroadband_Conference_2010.pdf

⁷⁰ *ibid.*

- drive economics much like a network that is fully utilised at all times – the commercial partner would only have to pay for the infrastructure that is in use and would receive all profits from that infrastructure in the first 10 years; and
- progressively increases the commercial partner’s proportion of voting shares as uptake occurs.

10.5.6 Restrictions on LFC involvement in retail services

A key motivator of the UFB investment was ensuring that FTTP networks would not have the vertically integrated monopoly characteristics of the legacy copper network. The ITP stated that LFCs would be prohibited from providing retail services and commercial parties with a retail arm would not be able to control, or own a majority of, UFB networks. In practice, an integrated retail provider seeking to build/own a UFB network would need to divest its retail operations to meet the terms of the ITP.

10.5.7 The UFB regulatory framework

Importantly, the ITP specified that there would not be a regulatory holiday for UFB networks. Section 13.3 of the ITP noted that the obligation to meet the equivalence and non-discrimination requirements set out in Appendix 4 would be in addition to, rather than substitutes for, the Commerce Act 1986, the Telecommunications Act 2001, or any other applicable legislation or regulation.

10.6 Significant Proposals Emerge

Early indications for the UFB tender were positive with interest from TelecomNZ and a number of regional operators. The regional operators, a mixture of electricity lines companies and smaller regionally-based telecommunications companies, banded together to form the New Zealand Regional Fibre Group (NZRFG), dividing the 33 candidate areas amongst themselves.

One key member of the NZRFG, the Auckland-based electricity lines company, Vector, started running advertisements on television to highlight what it saw as the inability of the existing legacy network to meet the broadband aspirations of the people of New Zealand.⁷¹

At the close of the first stage of the tender, CFH announced that it had received 33 UFB proposals from 18 respondents, covering all of the 33 UFB candidate areas.

The responses included two national proposals, from TelecomNZ and the AXIA Netmedia respectively, and a number of regional proposals from an assortment of regional electricity lines companies and smaller regional telecommunications providers coordinated under the auspices of the New Zealand Regional Fibre Group.

⁷¹ Vector’s advertisement is available on the you tube website at: http://www.youtube.com/watch?v=mMhOde7-M_I.

10.7 Refinements to the UFB Concept

Based on its assessment of the first round of UFB proposals and discussions with key industry participants and service providers, CFH advised the Government that the policy objective of achieving 75% coverage would be challenging without some refinements to the UFB model.

In particular CFH identified that the original terms for the UFB—

- limited the ability of LFCs to offer differentiated products and to meet the requirements of a range of service providers;
- were sub-optimal in terms of cost and complexity;
- created a risk of competition bottlenecks emerging at layer 2 and in downstream retail markets; and
- didn't provide sufficient regulatory certainty given the scale of investment sought from tender participants.

The Government responded to these concerns by announcing a set of amendments to the UFB concept and to the regulatory framework that would apply to UFB networks.

10.7.1 Amendments to the UFB business model

The original UFB ITP required that LFCs—

- provide specified layer 1 services; and
- in the event that they choose to provide specified layer 2 services, make available to third parties the layer 1 input to the LFC's layer 2 service on an equivalence of inputs basis.

The key change made to the UFB concept was to introduce the following reformed set of service requirements—

- the LFCs would be required to provide specified layer 2 services across all parts of their networks;
- the LFCs would be required to provide specified point-to-point layer 1 services to any end-user on the network seeking premium quality services; and
- for an interim period through to 31 December 2019, the LFCs would not be required to provide unbundled access to layer 1 input services; but
- from 1 January 2020, the LFCs would be required to provide unbundled access to layer 1 input services to an equivalence of inputs standard.

The overall effect of these amendments to the UFB business model was to require LFCs to be layer 1 & layer 2 service providers rather than just Layer 1 service providers. The rationale for this change was two-fold:

- *Product differentiation is needed to drive UFB uptake:* requiring LFCs to provide layer 2 services would increase their ability to offer differentiated products to retail service providers, enhancing their ability to drive service uptake and making them more competitive with existing networks.
- *Competition in Layer 2 service markets is likely to be limited:* it was argued that, due to the scale economics of layer 2 service provision, competition bottlenecks were likely to emerge at layer 2 if the LFCs provided only Layer 1 services. Requiring the LFCs to provide specified layer 2 services in accordance with contractually-controlled price and non-price terms would mitigate this concern.

10.7.2 Amendments to the UFB regulatory framework

Alongside the changes to the UFB business model, the Government announced its decision to amend the Telecommunications Act 2001 to establish a targeted regulatory framework for UFB networks.

In developing an approach to regulating UFB networks the Government identified a number of key considerations, unique to the UFB Initiative, which warranted specific regulatory treatment:

- the UFB network service prices and terms would be set upfront through a commercial tender process and controlled through contracts signed with the successful bidders;
- the UFB networks would need to compete for wholesale customers with existing networks, including TelecomNZ's regulated copper network; and therefore
- the UFB networks' ability and incentives to set market prices and extract surplus rents were likely to be limited over the short and medium terms.

Consistent with these conclusions, the Government proposed a targeted regulatory framework with the following key features:

- the LFCs would be required to enter into binding undertakings with the Crown, which would be monitored and enforced by the Commerce Commission, addressing the following requirements:
 - LFCs would be required to provide all FTTP network access services on a non-discrimination basis; and
 - LFCs would be required to design and build the UFB networks and operational systems to support the provision of unbundled layer 1 services to an equivalence of inputs standard from 1 January 2020;
- provided that the LFCs had entered into appropriate undertakings, the Commerce Commission would be barred from recommending the regulation of their UFB network services until 31 December 2019; and
- the Commerce Commission would be empowered to require the regular disclosure of UFB network cost and network information, in order to build an evidentiary basis for any future regulatory interventions.

The Government's view in proposing this regime was that the combination of "regulation by contract", behavioural undertakings and information disclosure would suitably and proportionately address any UFB competition concerns over the short and medium terms. Consequently the Government considered it reasonable to provide additional certainty to UFB tender participants by limiting the Commerce Commission's ability to impose regulated service prices and terms for an initial period.

The Government and CFH considered that, in combination, the refinements to the UFB model and regulatory framework would increase the potential for attaining the Government's UFB objectives.

Based on the Government's policy announcements, CFH released an amended ITP on 2 July 2010 and requested that the parties who had submitted initial proposals submit refined proposals in line with the new UFB requirements. Refined proposals were received from all of the original respondents, though with some consolidation of proposals amongst the smaller members of the NZRFG.

10.8 Structural Separation?

When TelecomNZ submitted its Refined Proposal on 2 August 2010, it included a proposal to structurally separate the company, by de-merging to form a stand-alone access network business based on the existing operationally separated access network business, Chorus, and a stand-alone retail business.⁷² TelecomNZ had first indicated publicly in May 2010 that it was considering structural separation so it could participate in the UFB Initiative.

TelecomNZ had previously proposed structural separation in 2006 as an alternative to the operational separation proposed by the Government. This approach was not implemented at the time due to the assumptions of regulatory change inherent in it.

On 15 September 2010, in response to TelecomNZ's proposal, the Government issued a discussion document, *Regulatory Implications of Structural Separation*⁷³. The discussion document dealt with the implications of structural separation for the key elements of the regulatory regime:

- the copper regulated service access regime;
- the operational and accounting separation of TelecomNZ; and
- the Local Service TSO.

The discussion document provided the Government's preliminary views and sought public feedback by 15 October 2010. In all, 17 submissions were received from a mix of telecommunications providers, consumer representatives and interest groups. A common theme across many of the submissions received was that the impact of structural separation

⁷² www.chorus.co.nz.

⁷³ MED, *Regulatory Implications of Structural Separation*, September 2010.

was likely to be complex and substantial and therefore warranted extensive consultation and a broader analysis of policy issues.

The Government has subsequently requested cross-submissions be provided by 5 November 2010, focusing on several key issues:

- geographic averaging of regulated access service pricing;
- cost-based pricing methodologies for regulated bitstream services; and
- universal service arrangements under a structural separation.

10.9 Implementation

Alongside the policy changes to the UFB commercial and regulatory model, and the investigation of structural separation issues, the commercial UFB Initiative tender has been progressed by CFH. On 9 September 2010, CFH announced that it had selected three parties for prioritised negotiations:

- Alpine Energy (bidding for Timaru);
- the Central North Island Fibre Consortium (bidding for population centres in the central north island, including Hamilton, Tauranga, New Plymouth and Wanganui); and
- Northpower (bidding for Whangarei).

CFH Chairman Simon Allen indicated that these parties had been selected because their proposals represented the best combination of “*access prices, funding provisions, industry experience and financial backing*”, and that CFH was on-track toward its goal of concluding final agreements to allow for the implementation of the UFB rollout to commence before the end of 2010.⁷⁴ The three parties proposals represent approximately 18 percent of New Zealand premises.

CFH also indicated that it had decided to shortlist all of the remaining bidders, except for Axia Netmedia whose proposal included certain elements that were not part of the Government's UFB policy. CFH indicated that it was continuing to work with the shortlisted parties to identify preferred suppliers for the remaining UFB tender regions.

⁷⁴ CFH's media release is available at: <http://www.crownfibre.govt.nz/news/press-releases/cfh-announces-shortlist-and-negotiations-for-first-stage-roll-out-of-ufb.aspx>

11 THE RURAL BROADBAND INITIATIVE

11.1 Introduction

It is perhaps unsurprising that rural broadband policy has gained increasing impetus in New Zealand. The combination of a large, widely-distributed and economically important rural population, and the perceived failures of New Zealand's universal service and regulatory policies for telecommunications has resulted in a "digital divide" that has encouraged more direct political initiatives over recent years.

This chapter examines the Government's Rural Broadband Initiative (RBI), tracing:

- the reasons for Government for intervention in rural broadband;
- the evolution of its Rural Broadband Initiative policy;
- the key features of the Initiative; and
- the experience thus far in its implementation.

11.2 The Reasons for Rural Broadband Intervention

11.2.1 Economic importance of rural New Zealand

The economic importance of New Zealand's rural regions, and the industries that have developed there, has been a key driver of an increasing emphasis on rural telecommunications sector performance.

Although New Zealand is a highly urbanised country by international standards, the degree of urbanisation varies considerably throughout the country, with population density (people per square kilometre) ranging from over 500 in main urban areas to less than five in remote rural areas.⁷⁵ Approximately 13.5 percent (585,000 people or some 200,000 households) of New Zealand's population lives in rural regions.⁷⁶ About eight percent of the population lives in remote rural areas, which constitute approximately 86 percent of New Zealand's land area.⁷⁷

The rural regions contribute significantly to the New Zealand economy and, in particular, its export industries. For the year ended 31 March 2009, approximately 64 percent of New Zealand's total merchandise exports were from the agriculture, horticulture and forestry sectors, which are predominantly based in rural areas. Significant elements of New Zealand's tourism industries are also based in rural and remote areas.

⁷⁵ Statistics New Zealand 2006

⁷⁶ Statistics New Zealand, June 2007 estimate

⁷⁷ Statistics New Zealand 2006

11.2.2 Current state of telecommunications in rural New Zealand

Juxtaposed with the economic success of many of New Zealand rural and remote regions, the availability and quality of telecommunications services in these areas has been relatively poor. While New Zealand has approximately 100 percent broadband coverage through satellite technology, the telecommunications sector has been slow to invest in bringing higher quality services to many regional areas.

The Government's discussion document on the Rural Broadband Initiative identified that while the characteristics of 87 percent of rural fixed copper access lines could potentially support DSL-based broadband speeds (with at least 1 Mbps downstream speeds), only 30 percent of these lines had been DSL enabled.

The discussion document postulated that the low percentage of lines upgraded for DSL broadband was due to the following factors—

- Copper local loops in rural areas are generally longer than loops in urban areas and are often conditioned with repeaters to optimise long lines for voice services.
- DSL technology is more effective at short distances, and ineffective at distances beyond seven kilometres. Further, ADSL₁ technology, which is significantly slower than ADSL₂₊ or VDSL, is generally deployed in rural exchanges. Rural lines are also often affected by rural specific sources of interference, such as electric fences.
- Backhaul from exchanges, cabinets and cell sites in rural areas is often via copper or radio rather than optical fibre.

The document therefore concluded that:

“The key constraint is that it is not commercially viable (mostly owing to low population density) to augment backhaul capability for broadband service provision in many rural areas.”

The dearth of backhaul capacity in these rural regions was also identified as inhibiting the realisable data speeds over both Vodafone and TelecomNZ's 3G mobile networks, which cover 97 percent of the population.

Based on this analysis the Government concluded that services to rural users could, therefore, be improved by:

- Building out optical fibre backhaul to rural exchanges, cabinets, and cellular and wireless sites.
- Shortening the copper loops in rural areas by rolling-out fibre to cross-connect cabinets, installing later generation DSL equipment in the cabinet (or a new cabinet), and removing the repeaters on the, now shorter, copper loops.⁷⁸

⁷⁸ MED, *Proposal for Comment: Rural Broadband Initiative*, September 2009, Available at: http://www.med.govt.nz/templates/MultipageDocumentTOC____41971.aspx

11.3 A Dynamic Policy on Rural Broadband Emerges

11.3.1 Increased Government funding for rural broadband

Alongside announcing the National Party's \$1.5 billion Ultra-fast Broadband Initiative in the run up to the 2008 election, the soon to be elected Mr Key announced an intention to double the funding available via an existing government-run competitive funding vehicle, the Broadband Challenge⁷⁹, from \$24 million to \$48 million. The focus of this funding would be to "...accelerate high-speed broadband roll-out to rural and remote areas"⁸⁰.

Though the new National Party-led Government's commitment to rural broadband funding was a notable increase over past initiatives, it soon became evident that the rural electorate felt short-changed by a commitment representing a mere 3% of the funding made available for urban broadband. While this was perhaps an unfair comparison given that the rural commitment was grant funding while the urban funding was a Crown investment that would need to be repaid, the influential rural lobby group, Federated Farmers, noted that.

*"The Government's initial announcement for broadband policy and investment left one quarter of New Zealand's population out in the cold. Clearly that was a poor deal for farmers and a large proportion of New Zealanders. That's why Federated Farmers had to act."*⁸¹

The prospect of a change in Government rural broadband policy was soon foreshadowed by Prime Minister John Key in comments made on the Country Channel on 23 August 2009. Making the case for rural broadband the Prime Minister stated:

*"We need to get fibre out to more farms. The rural sector needs broadband arguably more than a lot of the rest of the country"*⁸²

Describing the Government's previous commitment of \$49 million as "paltry" the Prime Minister went on to say:

*"I think the real number that needs to be in that space needs to be in the hundreds of millions"*⁸³

11.3.2 The Rural Broadband Initiative announced

Closely following the Prime Minister's comments, Minister for Communications Steven Joyce released details of a new Rural Broadband Initiative on 10 September 2009. Emphasising the

⁷⁹ The Broadband Challenge was a Labour Government Initiative, established under the Digital Strategy in 2005 to co-fund the development of municipal fibre networks (MUSH networks) via a competitive tender process.

⁸⁰ John Key, *Step Change – Better Broadband for New Zealand*, 22 April 2008. Available at: <http://www.scoop.co.nz/stories/PA0804/Soo549.htm>

⁸¹ Federated Farmers, *Broadband Unleashed on rural New Zealand*, 10 September 2009. Available at: <http://www.fedfarm.org.nz/n1674.html>

⁸² Chris Keall, *National Business Review*, *Key: 'hundreds of millions' need for rural broadband*, 24 August 2009. Available at: <http://www.nbr.co.nz/article/key-hundreds-millions-needed-rural-broadband-108871>

⁸³ *ibid.*

integral role of rural communities in the national economy, Minister Joyce indicated dissatisfaction with the current state of rural telecommunications:

*“Around half of rural households are coping with dial up speeds currently and that’s not good enough in the 21st century”.*⁸⁴

Continuing, Minister Joyce announced new targets for rural broadband in New Zealand, namely that within 6 years—

- 93% of rural schools would receive fibre, enabling speeds of at least 100 Mbps;
- the remaining 7% of rural schools would achieve speeds of at least 10 Mbps;
- over 80% of rural households would have access to broadband speeds of at least 5 Mbps; and
- the remaining 20% of rural households would have access to at least 1 Mbps broadband.

Minister Joyce announced that the new policy would cost \$300 million, be funded by a mix of public and private funding and, coupled with the Government’s UFB Initiative and TelecomNZ’s rollout of FTTN, would ensure that:

- 97% of New Zealand schools and 99.7% of New Zealand students would have access to broadband speeds of at least 100 Mbps; and
- 97% of New Zealand homes and businesses would have access to broadband speeds of at least 5 Mbps, with 91% having speeds greater than 10 Mbps.⁸⁵

11.4 The Rural Broadband Initiative Concept

Following Minister Joyce’s announcement, the Rural Broadband Initiative was refined by the Ministry of Economic Development with a discussion document released in September 2009 and final policy announced on 16 March 2010.⁸⁶

The key features and concepts of the Rural Broadband Initiative are outlined in the following sections.

⁸⁴ Steven Joyce, Press Release: *Government announces targets for rural broadband*, 10 September 2009. Available at: <http://www.beehive.govt.nz/release/govt+announces+targets+rural+broadband>

⁸⁵ *ibid.*

⁸⁶ These two documents are available at:

http://www.med.govt.nz/templates/ContentTopicSummary_41997.aspx

11.4.1 RBI objectives and priorities

The Government identified the key objectives of the RBI as summarised in the following table.

Table 21: Rural Broadband Targets⁸⁷

Service Standard	To whom	2015/16 Coverage Targets	Technology Options
<i>Fast Broadband</i> 5 Mbps	Households & enterprises	97% of NZ (80%+ of rural)	DSL + terrestrial wireless + satellite (with fibre backhaul)
<i>Super-fast Broadband</i> 10 Mbps+	Remote primary ^j schools	3% of NZ schools ⁱⁱ (7% of rural schools)	DSL + terrestrial wireless (with fibre backhaul)
<i>Ultra-fast Broadband</i> 100 Mbps – 1 Gbps	Schools	97% of NZ schools ⁱⁱ (93% of rural schools)	Fibre ⁱⁱⁱ

11.4.2 Scope of the RBI

The RBI concept was established based on analysis that indicated that the primary barrier to the rollout of commercial viable broadband services in rural areas was the dearth of affordable backhaul links to rural communities.

In line with the Government's objective to connect schools with high quality broadband infrastructure, the RBI is focused on funding:

- upgrades to existing fibre backhaul routes where required to meet the Government's RBI objectives;
- the installation of new fibre backhaul links to rural areas that do not currently have fibre based services for operators of fixed line broadband networks, mobile phone networks and rural wireless operators;
- the installation of fibre connections to schools in the RBI coverage areas; and
- in respect of areas and schools for which the development of fibre-based networks is not cost-effective, alternative proposals to address the Government's RBI objectives.

11.4.3 Open access requirements

Consistent with the UFB policy, the Government was keen to ensure that the RBI projects enable the development of commercially viable and competitive access network rollouts. Consequently, all projects funded under the RBI will be required to operate in accordance with a set of open access principles and will be required to agree binding "non-discrimination" undertakings with the Commerce Commission.

⁸⁷ MED, *Proposal for Comment: Rural Broadband Initiative*, September 2009, Available at: http://www.med.govt.nz/templates/MultipageDocumentTOC____41971.aspx

At a high level these requirements include—

(a) any-to-any connectivity: allowing different networks to interoperate and interconnect over each service layer and between the service layers;

(b) any network technology: technology choices are market driven and the open access framework should be designed to outlive the technology choices;

(c) low cost to change providers: End Users are entitled to competition among Suppliers and other network providers, application and Service Providers, and content providers and are easily able to switch between providers, subject to the commercial terms such End Users have with their existing network providers (i.e. there should be competition at all layers in the IP network allowing for a wide variety of physical networks to be able to interact in an open architecture); and

(d) Non-discrimination: services provided by the Preferred Supplier(s) should be offered to all Access Seekers on the same terms and conditions except where variations can be objectively justified, even if the Access Seeker is a competitor or a downstream arm of a network competitor.⁸⁸

11.4.4 Service standards and specifications

Projects funded under the RBI will also be required to provide a range of specified wholesale services at agreed quality standards and prices. The key service level requirements for the RBI are summarised in the following table.

Table 22: RBI Service Requirements

TYPE	PRICING	SERVICE	DESCRIPTION
Backhaul	Agreed in RBI contract – Can be indexed to Regulated UCLL backhaul pricing.	Layer 1 fibre backhaul	Dark fibre backhaul links between specified regional and local points of presence.
		Layer 2 transport services	Ethernet-based aggregated data transport services between specified regional and local points of presence (incl. 10 / 100 / 1000 Mbps services).
		UCLL (unbundled copper local loop) Backhaul	Backhaul for retail service providers using unbundled access to TelecomNZ's copper network to provide service.
		Mobile & Wireless Backhaul	Backhaul for operators of mobile and wireless networks.

⁸⁸ MED, *Rural Broadband Initiative: Request for Proposals*, 25 August 2010. Available at: http://www.med.govt.nz/templates/ContentTopicSummary_41997.aspx

End-User Connections	Agreed in RBI contract with adjustments to reflect changes in the producer price index.	Priority User Connections	Layer 2 Ethernet connectivity (with multiple VLAN capability, QoS configurability, and multicast functionality) available at least at 10Mbps, 100MBps and 1Gps Peak Information Rate (PIR) to schools and other nominated priority users.
		Community Users	RBI projects must provide a range of wholesale services that support delivery of retail broadband services to community users in accordance with the Government's RBI objectives and are, in all respects, equal to or better than the regulated wholesale bitstream services currently available from TelecomNZ.
POPs and Co-location	Agreed in RBI contract with adjustments to reflect changes in the producer price index. Power may be charged separately and indexed to power prices.	Regional Points of Presence (RPOP) Co-location	RBI projects must establish suitable RPOP and provide RPOP co-location facilities to access seekers.
		Local Broadband Aggregation Points (LBAPS) Co-location	RBI projects must establish suitable LBAPS and provide LBAP co-location facilities to access seekers.

11.4.5 Evaluation criteria

The RBI tender responses will be evaluated against the following criteria—

- (a) the requirement to improve coverage of fast broadband services so that 80 percent of Zone 4 [i.e. rural] households and enterprises are able to access broadband services of 5 Mbps or better, with the remaining 20 percent to achieve speeds of at least 1 Mbps;*
- (b) the requirement to provide a fibre connection to schools;*
- (c) a requirement to provide fibre connections to other Priority Users;*
- (d) level of grant required by the Respondent;*
- (e) proposed wholesale prices;*
- (f) level of community support that the Respondent has obtained by way of grants or other contributions such as the guarantee of demand from Access Seekers;*
- (g) willingness to collaborate with other parties to deliver a solution that improves the contribution to the RBI objectives;*

(h) demonstrated capability of the Respondent to design, build, operate and maintain the proposed networks;

(i) proposed service levels;

(j) proposed project plan; and

(k) additional benefits proposed by the Respondent⁸⁹.

11.4.6 Funding

The Government has indicated that up to \$300 million will be made available over six years to fund RBI projects. This funding will be provided by:

- a \$48 million Government appropriation; and
- \$252 million collected by the new Telecommunications Development Levy of certain telecommunications service providers, which will be established under the 2009/10 TSO reforms.

11.5 RBI Progress

11.5.1 The response of industry

On 22 April 2010, the Government released an RBI Request for Expressions of Interest, outlining at a high level the RBI requirements. The Government received 39 expressions of interest from, amongst others—

- TelecomNZ;
- Axia Netmedia;
- Vodafone;
- a number of electricity lines companies; and
- a number of smaller telecommunications service providers.

Nine of the EOI's received were for national implementations of the RBI, with the remainder proposing regional implementations.

11.5.2 The potential for mobile solutions highlighted by respondents

An interesting facet evident in public statements surrounding the Expressions of Interest phase for the RBI was the emphasis on mobile and wireless access solutions that could leverage off the Government-funded fibre backhaul links.

In particular, Vodafone NZ has indicated in public statements that it is in discussions with many of the RBI respondents and has stated that it “*would harness 4G mobile technology LTE*

⁸⁹ *ibid.* Note: Consistent with New Zealand's usual approach to telecommunications sector policy, the RBI will not constrain retail pricing of services delivered over the Crown-funded infrastructure, but rather will focus on non-discriminatory, price controlled wholesale access.

to meet the Government's objective of providing 5 megabit-per-second broadband to 80 per cent of rural households.”

Additionally it has been reported that fixed-wireless providers such as the state-owned Kordia and Woosh Wireless have also been in discussions with a number of the RBI respondents.⁹⁰

11.5.3 Implementation of the RBI

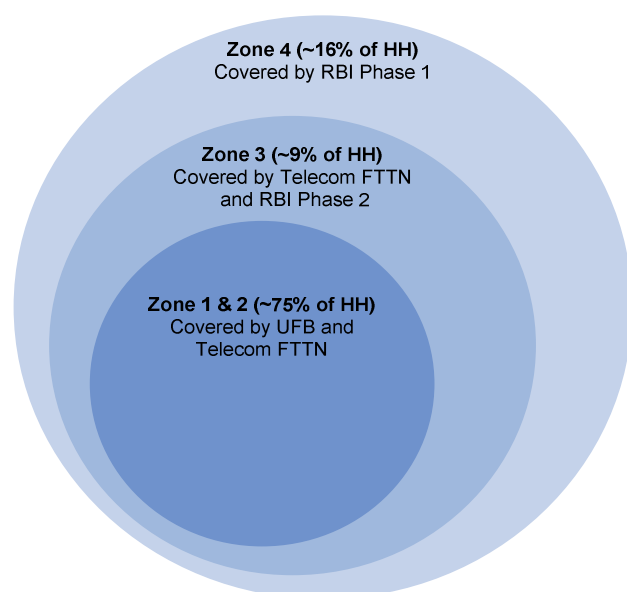
On 25 August 2010 the Government released a detailed RBI Request for Proposals (RFP), seeking final RBI proposals from interested parties by 30 September 2010. The Government also announced that it would only consider national proposals for the RBI, potentially eliminating some interested parties from contention. Most observers expect, however, that the majority of interested parties will engage in consortia proposals to address this requirement.

The Government has also announced an indicative timeline for concluding the RBI tender with:

- Shortlisted proposals agreed and notified on 1 December 2010;
- Heads of agreement negotiated with preferred suppliers by 22 December 2010; and
- Final agreements signed with successful respondents by 28 February 2011.

The RFP requested proposals to address backhaul links in zone 4 areas (representing approximately the most isolated 16% of New Zealand households) and to provide FTTP broadband connections for most zone 4 schools (with the remainder connected using other technologies e.g. satellite). This represents the implementation of phase one of the RBI.

Figure 23 – Network Initiative Coverage by Percentage of Households (HH)



It is anticipated that a proposal for phase 2 of the RBI programme, which will focus on connecting all schools within zone 3 (representing approximately the next most isolated 9% of households), will be finalised once the exact coverage to be achieved under the UFB Initiative.

⁹⁰ Pullar-Strecker, *Vodafone, RFG mull rural pact*, 4 October 2010, Available at: <http://www.stuff.co.nz/technology/digital-living/4194228/Vodafone-RFG-mull-rural-pact>

12 COMPLEMENTARY MEASURES

12.1 Introduction

A key element of the Government’s national broadband network policy is to implement legislative and non-legislative measures that will support the roll-out of urban fibre-to-the-premises networks, and infrastructure to support high-speed broadband services in rural areas.

In New Zealand, many of the support structures that might be useful for deploying broadband infrastructure are managed by local and territorial authorities.⁹¹ John Key had signalled that he was seeking the support of local Government in his April 2009 speech to the Wellington Chamber of Commerce, where he noted that a National Party Government would:

“work with local government to ensure it is doing everything it can to facilitate the roll-out of the fibre network.”

A discussion document, *Facilitating the Deployment of Broadband Infrastructure*, was issued by MED in October 2009 setting out the Government’s preliminary views, and seeking feedback from stakeholders, on a wide range of possible measures to support the roll-out of broadband infrastructure. The ambit of the discussion document was broad with views sought on three main policy areas:⁹²

- access to support structures and services;
- access to land and deployment standards; and
- Resource Management Act 1991 (**RMA**) controls. The RMA governs the use of land and other resources and sets out the rules for district planning by local and territorial authorities.⁹³

The Government is also progressing demand-side measures in support of the UFB Initiative and RBI, including a national education network and public sector demand aggregation,

A few of these complementary measures and demand-side initiatives are discussed briefly below.

⁹¹ A brief description of New Zealand’s local Government structure can be found on the Local Government New Zealand website at <http://www.lgnz.co.nz/lg-sector/>.

⁹² MED, *Facilitating the Deployment of Broadband Infrastructure*, October 2009. The discussion document is available on the MED website at.

⁹³ The Resource Management Act 1991 is available online at <http://www.legislation.govt.nz/act/public/1991/0069/latest/DLM230265.html>. The RMA

12.1.1 Promoting services over fibre networks

The UFB policy originated in an election commitment that built on supply side assessments, made by organisations such as the New Zealand Institute. However, both the UFB Initiative and the RBI did explicitly reference priority users, such as schools, hospitals and businesses.

The Government has placed considerable emphasis on promoting services over the new infrastructure, especially services to schools, although these initiatives are still at relatively early stages of development.

A National Education Network

A National Education Network (NEN) is a collaborative network for education, providing schools with a safe, secure and reliable learning environment and direct access to a growing range of online services and content.

An NEN trial was proposed in New Zealand in early 2008, initially to trial the connection of selected schools, libraries and Wananga⁹⁴ to KAREN⁹⁵. The NEN trial is currently being extended from the initial 23 schools to a broader group of 100 schools.

A key purpose of the NEN is to ensure that E-education services are available to encourage schools to connect to, and make use of, the UFB and RBI networks as they are rolled out. In support of this, the Government has committed to provide the infrastructure for schools to connect to the NEN, including the line drop and significantly subsidised internal wiring upgrades. Over this infrastructure the Government plans to offer a managed network solution along the lines of the excerpt below.⁹⁶

The design and development of the New Zealand NEN drew on comparable institutions that are already well established in a number of other countries, including the UK and the Netherlands.⁹⁷

⁹⁴ A publicly owned tertiary institution that provides education in a Māori cultural context. Māori are the indigenous people of New Zealand.

⁹⁵ KAREN (Kiwi Advanced Research and Education Network) is a data network providing high capacity, ultra high speed connections between New Zealand's universities, polytechnics, Crown research institutes, schools, libraries, museums and archives, and out to the rest of the world.

⁹⁶ See the KAREN website: http://wiki.karen.net.nz/index.php/National_Education_Network.

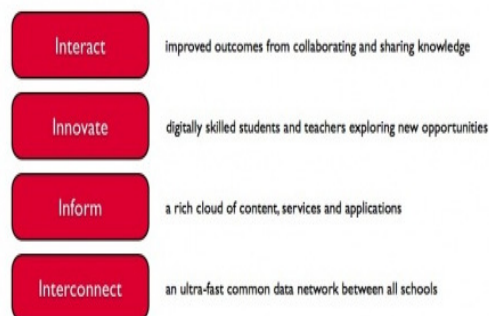
⁹⁷ See, for example, the United Kingdom's NEN: <http://www.nen.gov.uk/>.

What is the National Education Network

Improved learning is the focus of the National Education Network (NEN), based on the underlying principles of participation, engagement, content creation and sharing. The NEN comprises four inter-dependent dimensions, each of which can be characterised by an "i" word - *interconnection, information, innovation and interaction*.

1. **Interconnection** is the physical and logical network that connects schools with each other and to local, national and international communities using ultra-fast broadband (100Mbps+) using optical fibre networks wherever possible. The NEN uses KAREN as its national and international backbone;
2. **Information** is the content carried on the network; the symmetrical bandwidth of the network makes it possible for every connected school to create as much information as it receives. This is a transformative dimension that contrasts strongly with earlier one-way broadcast technologies and even today's Internet where users typically receive much more information than they create; the asymmetrical nature of most internet services today perpetuates this imbalance;
3. **Innovation** is the outcome that results from digitally skilled, literate teachers and students who are confident in exploring the learning opportunities presented by the new digital technologies; and
4. **Interaction** encourages teachers and students to actively engage on the network by collaborating and sharing knowledge with each other.

National Education Network – 4 i's



The National Broadband Map and demand aggregation

The National Broadband Map⁹⁸ was developed in 2008 by the New Zealand State Services Commission (SSC) to comprehensively map New Zealand's broadband landscape and provide information and tools to aid in demand aggregation and infrastructure planning. In addition to network information, the map charts key Government, social and economic aggregation points.

Network suppliers around New Zealand voluntarily provided the SSC with their network coverage. The map was initially designed to support the SSC's broadband aggregation initiative, which was cancelled by the incoming Government in late 2008.

However, demand aggregation remains an important focus for Government. Overseas experience indicates that combining e-government, e-education and e-health initiatives can be a significant contributor to demand aggregation strategies.

The Government is also encouraging local government to influence broadband deployment on a regional basis through aggregating its own demand for broadband services. The Ministry of Economic Development, the industry and Local Government New Zealand have worked together to establish broadband expertise and toolkits to support local government broadband initiatives.⁹⁹

⁹⁸ <http://www.broadbandmap.govt.nz/map/>.

⁹⁹ See, for example, the Broadband Friendly Council Protocol at: http://www.lgnz.co.nz/library/files/store_020/ABroadbandFriendly.pdf.

12.1.2 Greenfields developments

One area where the Government signalled a preliminary view that legislative measures may be appropriate was requiring developers to lay fibre infrastructure to the home or premises in all greenfields developments. This would ensure that houses and premises in new developments would be “fibre ready” and easily able to link into the UFB networks as they were rolled out.

12.1.3 In-house wiring

Another key issue in the roll-out of ultra-fast broadband was the potential for the customer experience of ultra-fast broadband to be hampered by the quality of in-house wiring. Most New Zealand houses and premises have simple copper in-house wiring with no legal requirement in New Zealand for new homes to have any form of structured cabling. The cost of refitting houses and premises with higher quality cabling, therefore, represents a major barrier to the achievement of the Government goal of providing ultra-fast broadband to 75% of the population.

The New Zealand industry has been working towards solutions for this problem. The Telecommunications Carriers Forum (TCF)¹⁰⁰ has developed a *Code of Practice for Residential and Small Office Premises Wiring*¹⁰¹ which was adopted by the TCF board on 5 February 2010. The Code of Practice sets out principles and practices for planning, installing and maintaining a premises wiring system so as to provide an open, flexible platform for the communication and entertainment needs of the modern “intelligent home”.

12.1.4 Infrastructure deployment standards

In June 2010, the Government released a Proposal for Comment on infrastructure deployment standards¹⁰² setting out a proposal to develop nationwide fibre deployment standards and to test those standards through a number of pilot deployments at selected locations, to facilitate the roll-out of broadband infrastructure.

The Government’s preliminary view was that nationwide standards of practice would:

- enable the efficient deployment of a range of non-traditional fibre installation techniques in New Zealand as a deployment option for the roll-out of fibre;
- create consistent rules and processes to be applied by individual local authorities across the country; and
- potentially reduce UFB and RBI roll-out costs and deployment timeframes.

¹⁰⁰ The TCF is New Zealand’s main telecommunications industry body with responsibility, in particular, for the development of industry standards. More information on the TCF is available on their website at: <http://www.tcf.org.nz/content/default.html>.

¹⁰¹ The TCF Code is available online at: <http://www.tcf.org.nz/library/e72d1374-8040-4022-ba79-428d56eb49b.cmr>.

¹⁰² MED, *Proposal for Comment: Deployment Standards Initiative*, June 2010. The Proposal is available on the MED website at: <http://www.med.govt.nz/upload/73113/Deployment-Standards-Initiative-discussion-document.pdf>.

Submitters¹⁰³ generally indicated that the key areas of interest for the development of deployment standards were:

- micro-trenching;
- shallow trenching; and
- new insertion technologies (such as inserting fibre into water and sewer mains or disused gas pipes).

At present, these deployment technologies are not permitted by local and territorial authorities in New Zealand.

12.1.5 Infrastructure sharing and access

In the October 2009 discussion document, MED considered whether the sharing of passive infrastructure should be mandated to support the UFB and RBI roll-outs.

Support structures considered in the discussion document included poles, ducts, and gas and water mains, owned by telecommunications, electricity and gas companies, and local government and Crown entities.

MED's preliminary view in the discussion document was that access to support structures did not need to be mandated. Instead, non-legislative measures were proposed including:

- MED engaging with telecommunications/electricity/gas companies and LFCs to explain the government's expectations in respect of the parties' behaviour;
- the Government encouraging industry players to draft a Code, along the lines of the National Code of Practice for Utilities Access to Transport Corridors;
- measures, such as "best practice" guides to make it easier for LFCs and other telecommunications companies to obtain access to support structures controlled by Local Councils; and
- in respect of support structures controlled by Crown Entities, a whole of Government direction issued under section 107 of the Crown Entities Act¹⁰⁴.

The discussion document also set out MED's preliminary view that legislative measures were not required at this time to provide access for UFB network operators and their wholesale customers to inter and intra-regional backhaul networks.

There has also been speculation about infrastructure sharing in future mobile deployments. Vodafone was recently reported¹⁰⁵ as being in talks with another mobile carrier about building

¹⁰³ Submissions on the Proposal can be found on the MED website at: http://www.med.govt.nz/templates/StandardSummary_44681.aspx.

¹⁰⁴ Under section 107 of the Crown Entities Act, the Ministers of Finance and State Services may jointly issue a "whole of Government direction" to specified categories or types of Crown entities for the purpose of (a) supporting a whole of government approach; and (b) either directly or indirectly, improving public services.

a shared 4G network based on LTE technology by early 2014. This followed an announcement by the Government that spectrum currently used for analogue television transmission will be freed up by November 2013.¹⁰⁶

The sharing of mobile transmission sites is already mandated in the Telecommunications Act 2001, although price terms are commercially set.

¹⁰⁵ See the article at: <http://computerworld.co.nz/news.nsf/news/vodafone-in-talks-on-lte-network>.

¹⁰⁶ See the media release at: <http://www.beehive.govt.nz/release/switchover+digital+television+2013>.

13 CONCLUDING COMMENTS

New Zealand's approach to telecommunications policy

Due to a number of socio-political factors, New Zealand has followed its own path in developing its telecommunications policy over the past three decades. Its experience has been characterised by infrequent, yet significant changes in policy direction, often as a reaction to the policies of the preceding period.

The laissez faire policies of the 1990's, aligned with the more general transformation of economic thought and direction that occurred at the time, can be seen as a response to the perceived shortcomings of New Zealand's state-driven economy in earlier years. Likewise, the staged progression to establish sector-specific regulation in 2001 and 2006 evolved as a response to the perceived gaps in market development under the framework of the 1990s.

Contrary to the approach taken in many comparable jurisdictions, most of the change in New Zealand's telecommunications regulatory environment originated in political and policy interventions, rather than through the administration of a regulatory agency. This approach has allowed New Zealand to rapidly adopt new policy directions, often at the forefront of international trends. It has, however, perhaps resulted in a lesser focus on fine-tuning regulatory settings.

The 2006 Reforms

The 2006 reforms to the New Zealand telecommunications regulatory framework combined a ladder of investment access regime with a robust operational separation of the incumbent, TelecomNZ. This approach has been generally recognised as successful in New Zealand in improving competition and consumer outcomes.

There are some key lessons from New Zealand's experience, including:

- the importance of focusing the design of an operational separation on identified competition concerns (with consideration toward evolving market structures and technology changes); and
- the importance of avoiding blanket solutions with high transaction costs.

New Zealand was fortunate to have the UK model of operational separation to draw on to help avoid potential pitfalls; countries considering such interventions now have the benefit of a broader array of international experience to draw on in designing a model to suit their needs.

New Zealand's experience also demonstrates that even a carefully designed operational separation cannot anticipate all future changes. The New Zealand experience highlights the importance of a robust variation process to address unforeseen eventualities and changes in technology and industry dynamics.

Finally the New Zealand experience indicates the importance of gaining the buy-in of the incumbent telecommunications provider for designing and implementing an effective operational separation regime. Due to the complexity of the task, this support can allow officials and regulators to focus on addressing key competition concerns.

Ultra-fast Broadband

To conclude, New Zealand is once again at the forefront of telecommunications policy developments, with its Government's plan to partner with private enterprise to accelerate the roll-out of national broadband networks focusing on ultra-fast broadband infrastructure. While it is too early to draw many lessons from these initiatives, given their ongoing implementation, some early considerations are provided below.

Clearly the progress New Zealand has made in these initiatives has been assisted to date by broad political support for the overall concept of the UFB and RBI Initiatives, and bi-partisan recognition that accelerating the roll-out of ultra-fast broadband infrastructure is in New Zealand's national interest. While New Zealand's political parties may hold differing views on some important details of the policy, this underlying consensus is important for initiatives which are anticipated to span several electoral cycles and involve significant commitments from private investors.

The innovative model of Public-Private Partnership (PPP) that has been developed for the UFB Initiative shows early promise as a valuable mechanism for accelerating network deployment and allocating different kinds of risk to those parties best able to manage it. The authors do note, however, the importance of considering the following factors in designing such approaches:

- identification of market failures and tailoring of the mechanism to address them; and
- ensuring there is flexibility to adapt PPP models to local industry, market and regulatory structures (this is particularly important where established telecommunications providers are involved, to minimise disruption and transaction cost).

The benefits of having well-developed regulatory and policy settings to provide a strong platform for successful commercial negotiations and implementation are also notable.

14 GLOSSARY OF TERMS

ALA	Active Line Access
ARPU	Average Revenue Per Unit
BIF	Broadband Investment Fund
CDMA	Code Division Multiple Access
CF	Crown Fibre Holdings
Chorus	Telecom New Zealand's operationally separated access network business
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
EOI	Equivalence of Inputs
EUBA	Enhanced Unbundled Bitstream Service
FTTN	Fibre-to-the-Node
FTTP	Fibre-to-the-Premises
GSM	Global System for Mobile Communications
ITP	Invitation to Participate
LAN	Local Area Network
LFC	Local Fibre Company
MED	Ministry of Economic Development
PON	Passive Optical Network
POP	Point of Presence
POTS	Plain Old Telephone System
PROBE	Provincial Broadband Extension
PSTN	Public Switched Telephone Network
P2P	Point-to-Point
RBI	Rural Broadband Initiative
RMA	Resource Management Act
TelecomNZ	Telecom New Zealand Limited, the incumbent telecommunications operator in New Zealand
TCF	Telecommunications Carriers Forum
TSO	Telecommunications Service Obligations
UBS	Unbundled Bitstream Service

UCLL	Unbundled Copper Local Loop
UFB	Ultra-fast Broadband Initiative
VDSL	Very High Speed Digital Subscriber Line
VLAN	Virtual Local Area Network
WCDMA	Wideband Code Division Multiple Access

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ANNEX 1: UFB CANDIDATE AREAS

Urban area	2021 projected population ^[1]	2021 projected population (%)	Cumulative coverage (%)
Auckland	1,587,200	33.269	33.269
Christchurch	417,800	8.757	42.026
Wellington	409,600	8.586	50.612
Hamilton	227,100	4.760	55.372
Tauranga	142,700	2.991	58.363
Napier-Hastings	127,700	2.677	61.040
Dunedin	118,500	2.484	63.524
Palmerston North	88,100	1.847	65.371
Nelson	63,700	1.335	66.706
Rotorua	57,500	1.205	67.911
Whangarei	53,200	1.115	69.026
New Plymouth	52,300	1.096	70.122
Invercargill	45,700	0.958	71.080
Kapiti	45,100	0.945	72.026
Wanganui	38,500	0.807	72.833
Gisborne	34,800	0.729	73.562
Blenheim	31,000	0.650	74.212
Pukekohe	30,900	0.648	74.860
Timaru	26,600	0.558	75.417
Taupo	22,900	0.480	75.897
Masterton	19,800	0.415	76.312
Whakatane	19,400	0.407	76.719
Levin	19,300	0.405	77.123
Ashburton	17,800	0.373	77.496
Feilding	14,950	0.313	77.810
Rangiora	13,750	0.288	78.098
Queenstown	13,100	0.275	78.373
Tokoroa	12,200	0.256	78.628
Oamaru	11,650	0.244	78.873
Hawera	10,500	0.220	79.093
Waiheke Island	10,000	0.210	79.302
Waiuku	9,730	0.204	79.506
Greymouth	9,490	0.199	79.705
Total	3,802,570	79.706	79.705

ANNEX 2: STATISTICS – AVERAGE REVENUE PER USER TRENDS

Figure 24: New Zealand Internet Subscribers Versus ARPU¹⁰⁷

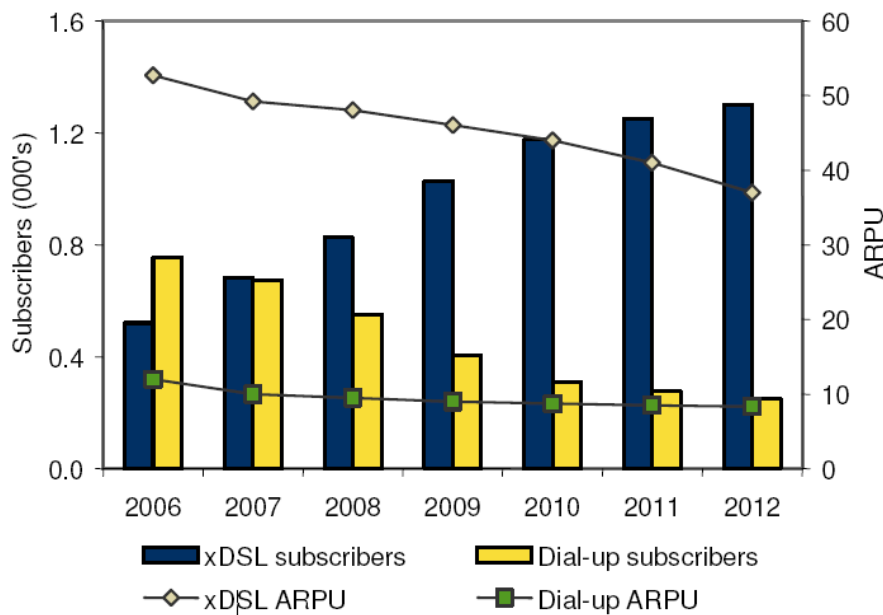
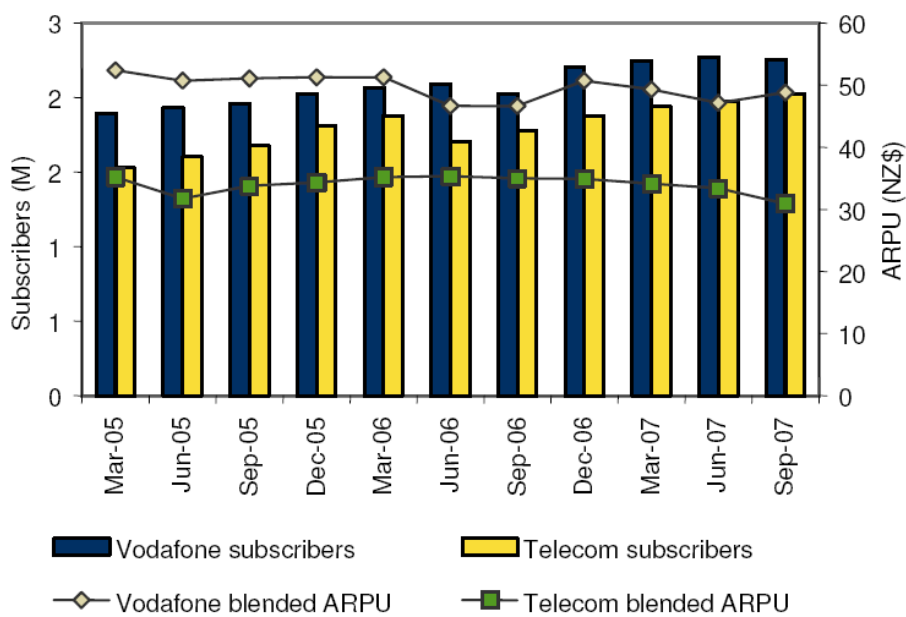


Figure 25: Mobile Subscriber Growth and Blended ARPU



¹⁰⁷ Nelson & Shephard, IDC, *New Zealand Telecommunications Market 2008-2012: Forecast and Analysis*, January 30, 2008