Report for the Wellington Regional Strategy Office

Business case for UFB uptake in the Wellington region

Supporting the Wellington Regional Strategy: Stage 1

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NETWORK STRATEGIES
• Telecommunications Strategy •

0 Executive summary

With the deployment of New Zealand's Ultra Fast Broadband (UFB) network proceeding rapidly, the focus for regions is now on the application of broadband technologies as a driver for innovation. With initial UFB uptake appearing to be relatively modest, this study analyses key uptake drivers and barriers amongst firms. This project is designed to identify ways in which the Greater Wellington Regional Council can assist in overcoming those barriers, and, in its second stage, will present a rational business case as a tool to achieve this.

Fibre technology can act as an engine for regional growth through the promotion of innovation and improved competitiveness, enabling regions to attract and retain more businesses and investment. Fibre services drive the knowledge economy and the deployment of fibre networks creates jobs. ICT services and applications are an important input for many businesses and as such new fibre services promote income growth in diverse sectors and offer the potential for transformative change in business processes and models.

So is there empirical evidence of the impact of fibre on economic growth? Studies are now emerging which indicate that there are linkages between fibre uptake and improvements in socio-economic conditions at both the regional and national level. For example historical evidence from several Swedish municipalities indicated that fibre uptake had led to savings of approximately 30% of total municipal data and telecommunications costs, through increased efficiency and competitive service offerings from multiple retailers. In comparing municipalities with higher fibre uptake against those with lower fibre uptake the study observes a 'nearly proportional relationship between fibre penetration and savings rate'. Additionally there is evidence of positive employment effects and increases in the number of firms locating in regions with fibre.

Such findings have implications for the potential impact of UFB in Wellington. In 2010 economic research for Grow Wellington predicted an annual boost to GDP due to UFB of 0.67% in the Wellington urban area compared to 0.55% for New Zealand. These results were derived using pre-2004 indicators from overseas research which did not capture the impact of high-speed broadband services, but the more general impact of ICT uptake. More recent empirical research using later data for broadband uptake implies that the economic impact may be higher than the underlying assumptions of the 2010 Wellington study. Accordingly the economic impact of UFB in Wellington could potentially be even greater than predicted in the 2010 study.

Nevertheless both internationally and locally the likely pattern and uptake of fibre services is uncertain, with huge variations being experienced in different regions and projects. Common themes emerge from a review of international and local experience – namely that the inhibitors of UFB uptake by businesses include:

- lack of education / knowledge about the transformational potential of the technology
- institutional resistance to change
- perceived inability to afford UFB services
- difficulties associated with installation
- limited requirements for high bandwidth due to a paucity of applications and content.

As at 31 December 2012, nationally 134 912 end users were able to connect to UFB and 131 366 premises were passed. However, only 3 806 users had subscribed to UFB. Our view of the main drivers and barriers of UFB uptake, based on both local and overseas information, is illustrated in Exhibit 0.1.

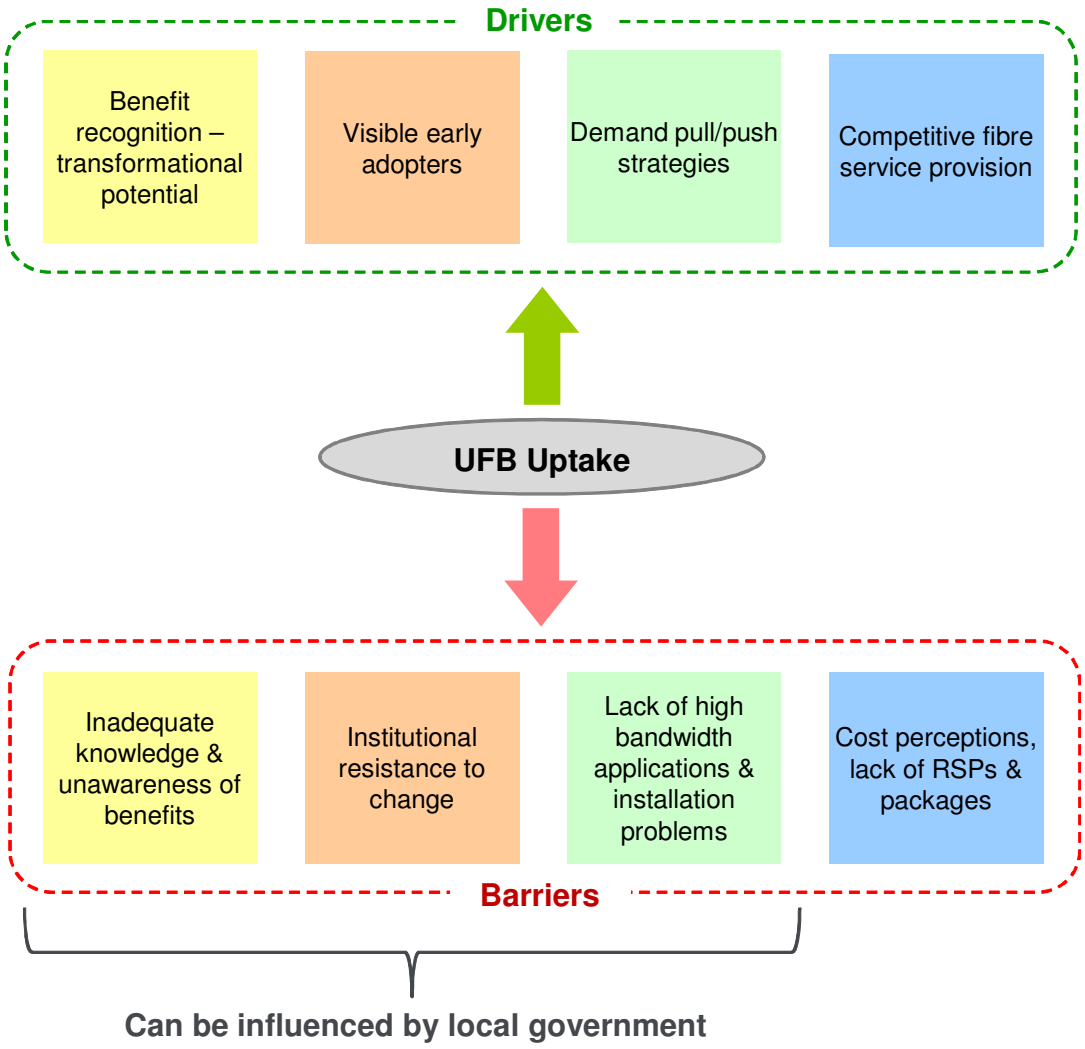

Exhibit 0.1: *Drivers and barriers to UFB uptake [Source: Network Strategies]*

In New Zealand the UFB initiative is based on an open access model with competing retail service providers (RSPs) providing fibre offerings to the market. As such over time we would expect the business market in Wellington to enjoy a choice of fibre service providers with a growing number of product offers tailored to local business. Nevertheless international evidence indicates that uptake may be accelerated by local government via a mixture of strategies, policies and interventions, including demand pull and push strategies (Exhibit 0.2).

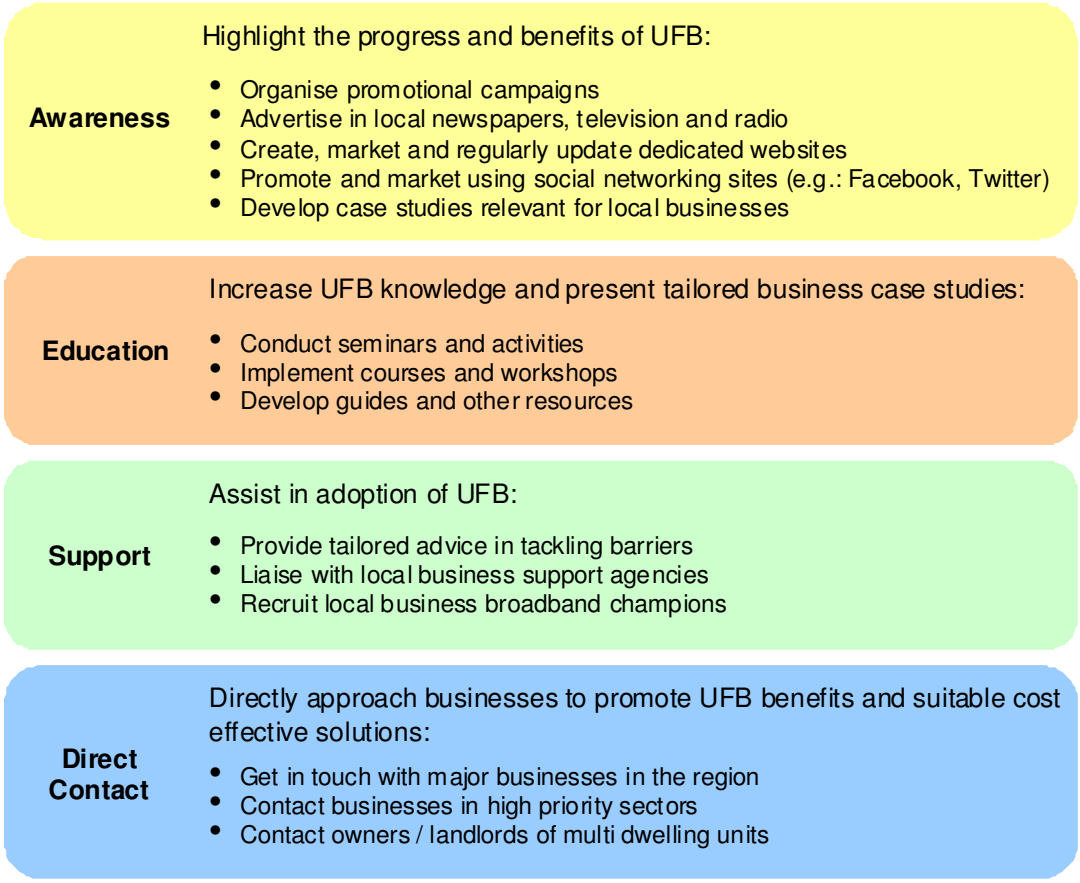

Exhibit 0.2: *Suggested local government initiatives to increase business UFB uptake [Source: Network Strategies]*

While it appears that New Zealand firms in general are aware of UFB, there are significant gaps in understanding of potential business advantages (beyond simply improving current Internet performance). Councils have a unique stakeholder role in relation to UFB. With no direct vested interest in UFB, firms regard councils as independent trusted advisors. Consequently councils are well positioned to develop awareness and educational initiatives. To this end, local case studies appear to be a very useful tool to demonstrate the benefits of fibre-based services, including increased productivity, more efficient use of existing and emerging applications, and possibilities for innovative and transformative change. Naturally such studies should also evaluate the costs of service uptake to establish whether the costs might outweigh the potential benefits. However, our research to date indicates that attractive commercial offerings are becoming available, and as such for many businesses perceptions of the high cost of fibre may in fact be misplaced.

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1 Introduction

Local government has a recent history of working with central government and the private sector to promote the deployment of telecommunications infrastructure. With the government-sponsored rollout of an Ultra Fast Broadband (UFB) network proceeding rapidly, the focus for regions has now shifted to the application of broadband technologies. Initial UFB uptake appears to be relatively modest, by both businesses and consumers.[1] Research undertaken by the Commerce Commission has highlighted business barriers to uptake, including costs, a lack of appreciation of the benefits of UFB (economic and otherwise) applications and future business practices. This project is designed to identify how the councils in the Wellington region can overcome such barriers, as well as present a rational business case as a tool to achieve this.[2] The project is a component of the Wellington Regional Strategy (WRS)[3] and will help determine the roles of councils in the Wellington region in advocating the rollout and uptake of faster urban and rural broadband services, regional partnerships and connections to drive IT innovation.

The scope of the project is based on two different audiences and separate purposes:

- Councils in the Wellington region:
  - to inform their planning processes and help identify where additional resources might be required

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1 Ministry of Business, Innovation & Employment (2012), *Broadband Deployment update 1 October – 31 December 2012.*

2 Wellington Regional Strategy Office (2012) *Project – Business case for UFB uptake in the Wellington region*, Request for Proposal, WRS / 10 / 02 / 11, 21 November 2012.

3 Wellington Regional Strategy (2012), *Wellington Regional Strategy 2012 – Growing a sustainable economy*, available at http://www.wrs.govt.nz/assets/WRS/Publications/Wellington-Regional-Strategy-2012.pdf.

  - to promote the case for collective action in promoting UFB uptake and technologies – this would include a leadership role.

- The business and community sectors:
  - to explain the potential financial benefits of UFB uptake and applications
  - to provide business examples of cost-benefit factors involved in UFB uptake
  - to review future technology applications and how this may influence business-to-business and business-to-customer transactions.

The project involves two stages:

- Stage 1 includes the following elements:
  - an overview of UFB and developments in the New Zealand marketplace
  - an explanation and evidence of the correlation between UFB uptake / technologies and regional growth / performance – including national and international material
  - an explanation of the barriers and enablers to uptake in New Zealand and the types of required interventions that local government may influence.

- Stage 2 will include the following elements:
  - the business case for UFB uptake and technologies in the Wellington region
  - the business case at a company level for UFB uptake and technologies.

This report presents the results of Stage 1 and is structured as follows:

- background information relating to Wellington (Section 2)
- lessons from international experience (Section 3)
- an overview of the current state of UFB in New Zealand (Section 4)
- conclusions and recommendations (Section 5).

The annexes contain local and international case studies as well as a bibliography.

Although this report was commissioned by the Wellington Regional Strategy Office, the views expressed here are entirely those of Network Strategies.

2 Background

2.1 The Wellington region

The Wellington region covers the lower part of New Zealand's North Island with a population of just over 490 000 people as at 30 June 2012[4] and an area of 813 000 hectares[5]. The region encompasses nine local districts (Exhibit 2.1) with the following nine local authorities:[6]

- Kāpiti Coast District Council
- Porirua City Council
- Upper Hutt City Council
- Hutt City Council
- Masterton District Council
- South Wairarapa District Council
- Carterton District Council
- Wellington City Council
- Greater Wellington Regional Council.

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4 Statistics New Zealand website, *Subnational population estimates tables,* available at http://www.stats.govt.nz/.

5 Grow Wellington website, *About Us*, available at http://www.growwellington.co.nz/page/about-us.aspx.

6 Wellington Regional Strategy (2012), *Wellington Regional Strategy 2012 – Growing a sustainable economy*, available at http://www.wrs.govt.nz/assets/WRS/Publications/Wellington-Regional-Strategy-2012.pdf.

Exhibit 2.1:
Map of the Wellington region [Source: Statistics New Zealand]

Over the past ten years, the annual population growth in Wellington has been below the national average (Exhibit 2.2). Annual population growth in Wellington averaged 1.0% between 2001 and 2012 compared with the national average of 1.2%.[7] This trend is expected to continue over the next two decades, and indeed projected population growth in Wellington is lower than that of Auckland, Waikato, Bay of Plenty, and Canterbury (Exhibit 2.3).[8]

7 Statistics New Zealand website, *Subnational population estimates tables,* available at http://www.stats.govt.nz/.

8 *Ibid.*

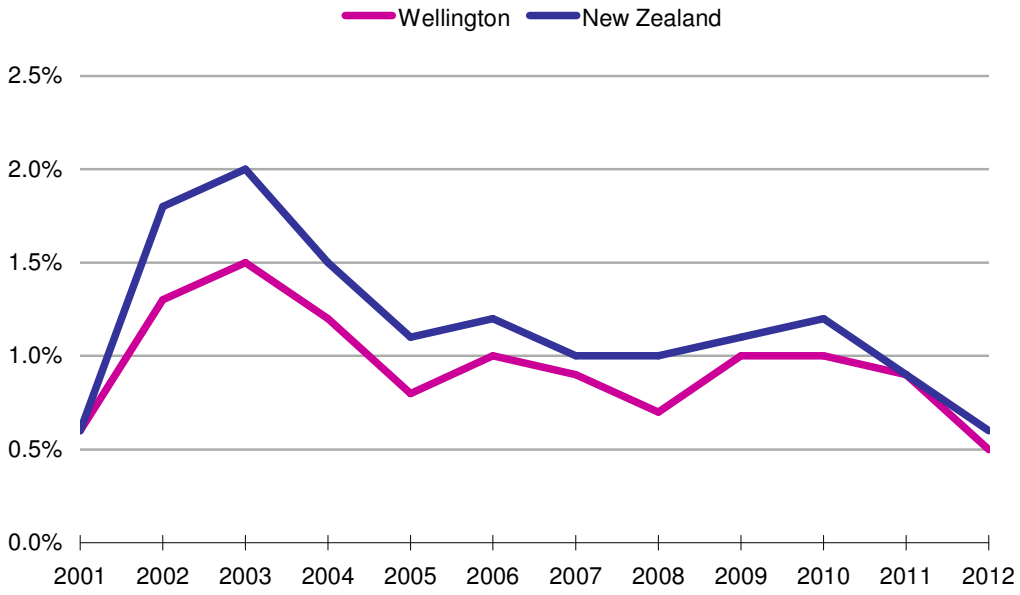

Exhibit 2.2: *Annual population growth [Source: Statistics New Zealand]*

Regional council area	*Projected average annual population growth (%)*
New Zealand	0.9%
Auckland	1.5%
Waikato	0.7%
Bay of Plenty	0.7%
Canterbury	0.7%
Wellington	**0.6%**
Otago	0.6%
Manawatu-Wanganui	0.2%

Exhibit 2.3: *Projected average annual population growth, 2011–2031 [Statistics New Zealand]*

The Wellington region accounted for 12% of all goods and services (Gross Domestic Product or GDP) produced in New Zealand in 2011[9] (an increase of 0.8% from 2010)[10].

9 Wellington Regional Strategy (2012), *Wellington Regional Strategy 2012 – Growing a sustainable economy*, available at http://www.wrs.govt.nz/assets/WRS/Publications/Wellington-Regional-Strategy-2012.pdf.

10 Infometrics (2011), *2011 Annual Economic Profile for the Wellington Region,* available at http://www.growwellington.co.nz/document/6-21/Wellington_Region_-_Economic_Profile_March_2011.pdf.

However annual GDP growth in Wellington has been slightly higher than the national average (Exhibit 2.4). The annual employment growth in Wellington averaged 1.5% between 2001 and 2011, comparable to the national average of 1.6%.[11]

Overall, Wellington fares well as a region but appropriate strategies and actions can improve its position in the New Zealand economy. This is the main driver behind the Wellington Regional Strategy (WRS).[12]

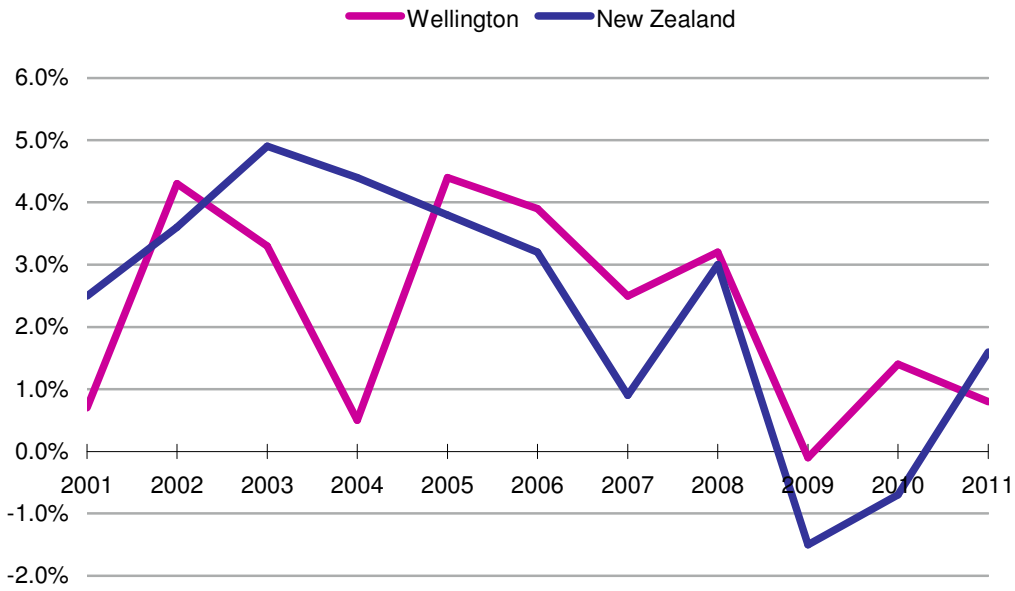

Exhibit 2.4: *Annual GDP growth [Source: Infometrics]*

Wellington has a higher percentage of households with broadband access than for New Zealand overall.[13] The region has been leading in digital technology use with access to fibre services for over 15 years.[14] CityLink, formed as part of the Info City strategy[15] in

11 *Ibid.*

12 Wellington Regional Strategy (2012), *Wellington Regional Strategy 2012 – Growing a sustainable economy*, available at http://www.wrs.govt.nz/assets/WRS/Publications/Wellington-Regional-Strategy-2012.pdf.

13 See http://www.gpiwellingtonregion.govt.nz/outcomes/social/connected-community/broadband-access.

14 See http://wn016-ws1.clnz.net/news/news/nr1225422053.html.

1995, launched one of the first fibre optic broadband networks in the world.[16] CityLink is now part of TeamTalk and offers a range of services including WiFi solutions and fibre networks.[17] In addition, TelstraClear (now known as Vodafone Fixed Limited) operates a Hybrid Fibre Coaxial (HFC) cable network in Wellington city providing high speed Internet to businesses.[18] Also, a number of other companies including Vector Communications[19] and SmartLinx3[20] offer fibre broadband services in the region.[21]

2.2 Wellington Regional Strategy

The WRS is an economic development strategy that was established to enhance the economy of Wellington, assisting in the development of a globally competitive region.[22] The Wellington Regional Strategy (2012) aims to:

> … build a resilient, diverse economy – one that retains and creates jobs (especially high value jobs), supports the growth of high value companies and improves the region's position in relation to the national GDP and national employment.

The WRS Committee governs WRS activity on behalf of the Wellington region. The Committee includes a representative of each of the eight local councils, the Chair of the

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15 Wellington City Council (2007), *ICT policy – enabling economic transformation through broadband*, available at http://wellington.govt.nz/~/media/your-council/projects/files/broadband-spcreport.pdf.

16 See http://www.citylink.co.nz/services/connect-my-business.

17 See http://computerworld.co.nz/news.nsf/news/67EB66EDBDC88086CC257230000E40F6.

18 See http://www.nbr.co.nz/article/crown-fibre-nothing-telstraclear-launches-100mbits-cable-service-ck-117007.

19 Vector Communications website, available at http://vectorfibre.co.nz.

20 See http://www.smartlinx3.co.nz.

21 See http://www.istart.co.nz/index/HM20/PC0/PVC197/EX245/AR28036.

22 *Ibid.*

Wellington Regional Council and five non-local government representatives who represent established networks in within the region.[23]

Grow Wellington was established as a result of the WRS and aims to grow existing businesses and attract new ones.[24] The work of WRS and Grow Wellington focuses on particular sectors for growth, and business scale. Priority sectors are information and communications technology (ICT), high-end food production and design / innovation led manufacturing.[25]

To achieve the WRS's aim, six new focus areas were developed in the 2012 refresh of the WRS: [26]

- commercialisation of innovation
- investment mechanisms for growth
- building world-class infrastructure
- attracting business, investment and talent to the region
- education and workforce development to service regional economy needs
- being open for business.

These focus areas set out potential activities of the councils, Grow Wellington and other parties to support economic growth and to build a resilient and diverse economy in the Wellington region. Focus Area 3 'Building world-class infrastructure' recognises that a constraint on growth is the region's level of connectedness at a national and international level. Therefore there are gains to be made from building world-class infrastructure and facilitating improved broadband and other services for the region.[27]

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23 *Ibid.*

24 Grow Wellington website, *About Us*, available at http://www.growwellington.co.nz/page/about-us.aspx.

25 Wellington Regional Strategy Office (2012) *Project – Business case for UFB uptake in the Wellington region*, Request for Proposal, WRS / 10 / 02 / 11, 21 November 2012.

26 Wellington Regional Strategy (2012), *Wellington Regional Strategy 2012 – Growing a sustainable economy*, available at http://www.wrs.govt.nz/assets/WRS/Publications/Wellington-Regional-Strategy-2012.pdf.

27 Wellington Regional Strategy Office (2012) *Project – Business case for UFB uptake in the Wellington region*, Request for Proposal, WRS / 10 / 02 / 11, 21 November 2012.

> The WRS identifies broadband as a key enabler of economic growth, particularly around innovation and productivity benefits. High quality broadband infrastructure can also transform the delivery of education and health services and facilitate new forms of community engagement and participation in public life.[28]

The Wellington Region Broadband Operational Group (BOG) has been working to ensure fast broadband is made available and deployed in the region in the most efficient way possible. In addition, the BOG is planning initiatives to promote fibre broadband uptake. The BOG has also been liaising with the councils in the region and providing advice to the government on drafting the Optical Fibre Standards.[29] The BOG consists of a cross-section of representatives from each of the Wellington region councils, Grow Wellington, New Zealand Transport Agency and Local Government New Zealand.[30]

2.3 Economic benefits of UFB in Wellington

A study of potential economic benefits of UFB deployment[31] found that the annual boost of GDP due to UFB would be 0.67% in the Wellington urban area compared to 0.55% for New Zealand as a whole. The study indicated that by 2026 (assuming full UFB deployment in Wellington by 2014) 8.8% would be added to Wellington GDP growth or around $2.94 billion. The analysis in the report used information from two overseas studies on the impact of ICT investment[32] and broadband[33] on labour productivity by industry. The improvement in labour productivity is then translated into an impact on GDP. The largest impact is observed in industries for which ICT is a key input. As such the higher GDP

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28 Wellington Regional Strategy website, *Activities – world-class infrastructure*, available at http://www.wrs.govt.nz/world-class-infrastructure/.

29 Wellington Regional Strategy website, *Broadband*, available at http://www.wrs.govt.nz/broadband/.

30 *Ibid.*

31 BERL (2010), *GDP benefits of early UFB rollout to Wellington*, Report to Grow Wellington and GWRC, November 2010.

32 OECD (2003), *ICT and economic growth – evidence from OECD countries, industries and firms,* 2003.

33 ACIL Tasman (2004), *Economic impacts of broadband adoption in Victoria*, June 2004.

growth result for Wellington, compared to the whole of New Zealand, is explained by the region's ICT-favourable industry profile.

3 International evidence

3.1 What are fibre uptake rates overseas?

In 2012 there were over 260[34] fibre projects in Europe and nearly 1 000 providers of FTTH in the United States.[35] In both cases the majority of providers are not (former) incumbent telecommunications operators. In 2012 average take-up rates of homes passed was approximately:

- 42.2% in North America[36]
- 44.2% in the United States[37]
- 18.6% in the European Union (EU)[38]
- 26.2% across the Commonwealth of Independent States (CIS).[39]

At the national level average take-up rates in Europe also vary substantially, for example in 2012 the take-up rate in Norway was 67.1%, in Sweden 40.3%, Italy 12.7% and Switzerland 4%[40] (Exhibit 3.1).

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34 IDATE (2012) *Inventory of FTTH/B in Europe*, 18 October 2012.

35 RVA (2012) *2012 North American FTTH deployment update*, May 2012.

36 RVA (2012) *FTTH progress and impact in North America*, September 2012.

37 *Ibid.*

38 IDATE (2012) *Inventory of FTTH/B in Europe*, 18 October 2012.

39 CIS nations include Russia, Ukraine, Kazakhstan and Belarus. FTTH Council Europe (2012) *Creating a brighter future,* Press Conference – BBWF Amsterdam, 16 October 2012.

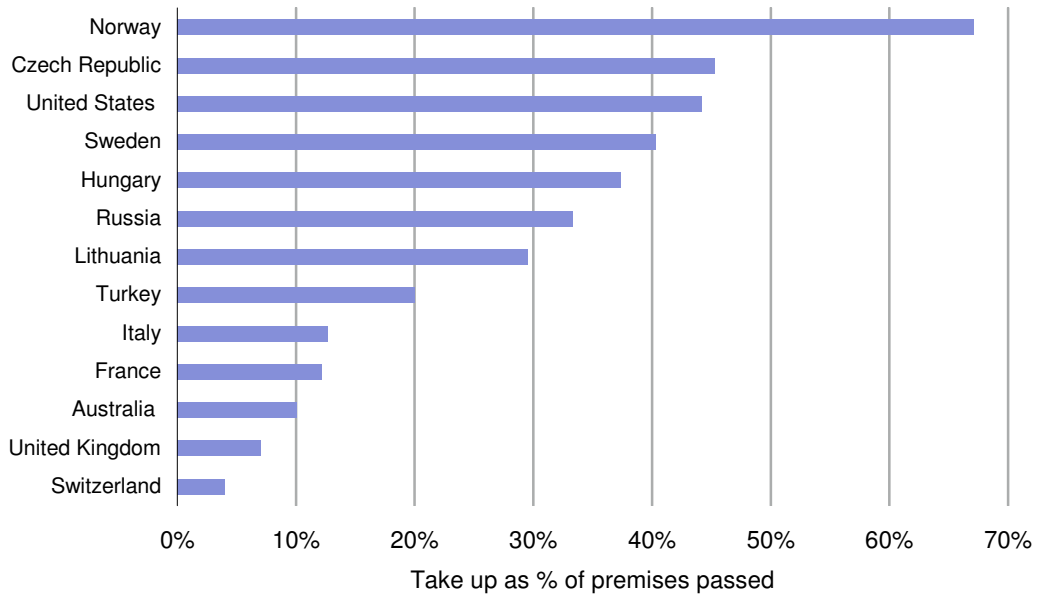

Exhibit 3.1: *Fibre take-up rates 2012, as a percentage of premises passed for selected countries [Source: IDATE for FTTH Council Europe, RVA for FTTH Council Americas, NBN Co]*

The experience of Scandinavian countries is particularly useful as these countries have many similarities with New Zealand in terms of population, geographical and demographic features, and as such represent highly relevant and useful telecoms market comparators. There is also a relatively long history of fibre deployment in these countries. In Sweden, for example, fibre was first available in 1994, and in Norway in 2001. Furthermore in Scandinavia local municipalities are major players in the fibre broadband market with some very successful regional initiatives.

It is important to note that huge variation is observable in the fibre uptake rate from region to region and from project to project (Exhibit 3.2).

40 IDATE (2012) *Inventory of FTTH/B in Europe*, 18 October 2012 and IDATE (2012) *FTTx Worldwide Panorama*, 14 November 2012.

Country	*Region / project*	*Date*	*Uptake in region (%)*	*National uptake (%)*
France	Pau-Pyrénéés[41]	2010	17.6	8.0
Norway	ATB-Nett[42] (rural districts of Agder, Telemark & Buskerud)	2011	23.3	60.0
Russia	ER-Telecom (31 Russian cities)[43]	2011	62.5	37.0
Sweden	City of Västerås - MälarEnergi Stadsnät project (note: uptake is of residential homes passed)[44]	2010	46.8	39.5
United Kingdom	Hull and East Yorkshire (KC)[45]	2012	20.0	7.0

Exhibit 3.2: *FTTH/B uptake as a percentage of premises passed across selected regions / projects [Source: FTTH Council Europe, KC]*

At the end of January 2013 NBN Co reported that 34 500 Australian homes and businesses (10.1% of premises passed) were using the NBN (including fibre, fixed wireless and satellite services). In comparison 6.4% of premises passed were activated as at June 2012 and 0.4% as at June 2011.[46]

In 2011 the uptake of FTTH/B in the UK was 2% of premises passed. The Ofcom 2012 UK Infrastructure Report[47] notes that superfast broadband (which includes fibre and some high-speed copper-based technologies) is now available to 65% of UK premises and 7% of premises are subscribing to superfast broadband services (one in ten broadband connections are to a fibre network). The overall uptake of broadband services in general is around 71% of UK premises with almost 100% availability. However regional differences

41 FTTH Council Europe (2011) *Pau Pyrenees,* FTTH Case Study, April 2011.

42 FTTH Council Europe (2011) *ATB Nett*, FTTH Case Study, July 2011.

43 FTTH Council Europe (2011) *ER-Telecom,* FTTH Case Study, April 2011.

44 FTTH Council Europe (2010) *MälarEnergi Stadsnät – Pioneer open network in Sweden*, FTTH Success Story, September 2010.

45 KC (2012) *KC hails success of first phase of fibre broadband roll-out*, media release.

46 NBN Co (2013) *34,500 Australian homes and businesses now using the NBN*, 29 January 2013.

47 Ofcom (2012) *Infrastructure Report – 2012 update*, 16 November 2012 (updated 20 December 2012).

in the uptake of superfast broadband services[48] (providing a line speed of at least 30Mbit/s) are clearly visible (Exhibit 3.3). The report acknowledges that the delivery of superfast broadband in the "final third" of the UK will depend on targeted public funding as well as the activities of commercial operators. For example in Northern Ireland a DETI[49] funded programme has resulted in 95% availability and 11% uptake of superfast broadband services.

Local authority	*Superfast availability (% of premises)*	*Superfast take-up (% of premises)*	*Uptake as % of premises passed*
Aberdeen City	24.5	0.8	3.3
Cornwall	48.5	2.9	6.0
City of Southampton	90.4	7.4	8.2
Liverpool District	82.4	7.9	9.6
Newry and Mourne	96.1	10.4	10.8
Buckinghamshire County	70.6	8.0	11.3
London	86.1	10.6	12.3
City of Brighton and Hove	89.9	13.6	15.1

Exhibit 3.3: *Superfast broadband uptake by local authority region in the United Kingdom, 2012 [Source: Ofcom[50]]*

In Asia some very high take-up rates are observable, with South Korea at 59% in 2011 and Japan at 45%.[51] However we believe that experience in highly urbanised Asian markets is less relevant to New Zealand than some of the European markets due to very different local

48 Defined in Ofcom's Infrastructure Report (*ibid*) as services providing a line-speed of at least 30Mbit/s. Ofcom notes that approximately 3% of VDSL lines in the UK operate between 24Mbit/s and 30Mbit/s and therefore applying a definition of 24Mbit/s as Ofcom has previously done in some reports would not make a large difference. The report also notes that not all broadband connections delivered over superfast broadband networks will achieve speeds of 30Mbit/s or more – speeds achieved on a FTTC/VDSL line will depend on the length of the copper connection to the consumer's premises. Ofcom's analysis indicates that over 88% of current FTTC/VDSL connections have modem sync speeds of 30Mbit/s or more and therefore the superfast broadband take-up reported is only based on these lines.

49 Department of Enterprise, Trade and Investment.

50 Ofcom (2012) *Fixed broadband map*, available at http://maps.ofcom.org.uk/broadband/.

51 FTTH Council Europe (2011) *Creating a brighter future*, Press Conference – BBWF, Paris, 27 September 2011.

circumstances. As such the case studies in this report focus on European and North American examples.

3.2 The impact of fibre uptake on regional growth

Fibre technology is considered an important economic driver for regional growth by the FTTH Council[52]. There are direct employment effects as the actual deployment process creates jobs. New fibre-based services support the knowledge economy which in turn promotes income growth. This growth is not limited to just the ICT industry, but to all those industries that use (or could potentially use) ICT services. The ability of fibre services to promote innovation and improved competitiveness is of particular significance for regional development as this enables regions to attract and retain more businesses and investment, and offer cost-efficient public services to the community. More efficient operations and less travel have a positive impact on the environment by reducing pollution and congestion, allowing people to find more time for recreational activities. The improved quality of life attracts more skilled employees to the area.

So is there empirical evidence of the impact of fibre uptake and economic growth? The FTTH Council Europe notes that quantifying the benefits of fibre services in isolation is difficult, and that evidence-based studies have not yet been conducted as the technology is relatively new. Nevertheless, studies are now emerging which indicate that there are linkages between fibre uptake and improvements in socio-economic conditions at both the regional and national level.

A 2011 Swedish study examined data from municipalities with established fibre networks in an attempt to identify and quantify the economic impact of fibre (Exhibit 3.4).[53]

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52 FTTH Council Europe (2012) *Annual Report April 2011 – April 2012*. and FTTH Council Europe (2012]) *FTTH: Shaping the future of a content-based world*, Content & Applications Committee. The FTTH Councils (Europe, Americas, Asia Pacific and Middle East & North Africa) are industry organisations designed to promote the availability of fibre broadband to consumers and businesses.

53 Acreo AB (2011) *Socio-economic return of FTTH investment in Sweden, a prestudy*, Acreo AB, a part of Swedish ICT Research, October 2011.

Positive impact on employment of fibre in Swedish municipalities	A statistical analysis was undertaken using municipal economic, employment, population and fibre data from 1998 to 2007. The results indicated that fibre had a positive impact on employment. In particular a change of up to 0.2% in employment correlated to a 10% increase in the proportion of the local population with access to fibre over a 2.5 year time-period.
Cost savings from fibre uptake in Swedish municipalities and regions	Historical evidence from several Swedish municipalities indicated that fibre uptake had led to savings of approximately 30% of total municipal data and telecommunications costs, through increased efficiency and competitive service offerings from multiple retailers. In comparing municipalities with higher fibre uptake against those with lower fibre uptake the study observes a 'nearly proportional relationship between fibre penetration and savings rate'. Furthermore at the regional level higher savings due to fibre uptake were observed with reductions in data and telecommunications costs of 50%.
Overall socio-economic benefit in Sweden from fibre	An overall socio-economic benefit of fibre was calculated as an investment of SEK1[54] over four years would return a minimum of SEK1.5 in five years' time. This calculation encompasses cost savings, employment changes, direct economic effects from fibre network construction and consumer benefit.

Exhibit 3.4: *Economic benefits of fibre services in Sweden [Source: Acreo AB]*

Another study in Northern Sweden[55] considered the town of Hudiksvall, on the eastern cost of the Baltic Sea with 15 000 inhabitants, finding a clear link between fibre-optic installation and the increase in new businesses in the area. A fibre network was deployed in Hudiksvall in 2004 to attract businesses and provide services. Prior to this the region was facing a population decline. Since the deployment there has been an annual increase of 6% to 14% in the number of new businesses in area. The study results also indicated that fibre services had a positive impact on health, education and other public services through greater efficiency, the development of new services and reduced telecommunications costs.

54 Swedish Krona (currency of Sweden).

55 FTTH Council (2011) *FTTH – bridging the rural digital divide*, 11 October 2011.

A German study[56] considered the economic impact of broadband technology on national employment and output and found that over a ten year time horizon (from 2010 to 2020) an additional 0.6% annual GDP growth could be expected as a result of national investment in broadband (including ultra-fast broadband). Note that the study included statistical analysis using national historical data from 2000 to 2006 which indicated a significant impact of higher broadband uptake on GDP growth but not on job creation. However on replacing national data with regional data it was clear that the impact of broadband varied across regions, with the highest impact on income and employment observable in those regions with relatively high broadband penetration. This suggests that broadband drives innovation and business growth, as the employment rate is increasing, despite gains in productivity which might in some circumstances lead to the substitution of labour for capital.

A report[57] for the South West Development Commission (Western Australia) examined the socioeconomic benefits that could be derived from the Australian National Broadband Network (NBN). The report noted that the three key functions of the NBN (increased Internet speed, increased Internet reliability and reduced Internet costs) would lead to the following business effects:[58]

- improved efficiency and business productivity
- increased uptake and use of new / existing technologies by businesses
- reduced capital expenditure and maintenance costs.

These effects in turn, over the course of the 10-year NBN implementation period, would lead to a 21% increase in revenues, 5% increase in employment and 6.3% increase in business productivity in the region.[59] The study forecasts that between 2010 and 2030 the South West region will enjoy, as a result of NBN:

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56 Katz, Vaterlaus, Zenhausern, Suter and Mahler (2010), *The impact of broadband on jobs and the German economy*, Intereconomics 2010.

57 South West Development Commission (2011) *National Broadband Network – Impact assessment on the South West region of WA*, April 2011.

58 South West Development Commission (2011) *National Broadband Network – Impact assessment on the South West region of WA*, April 2011.

59 *Ibid.*

- annual increased output growth of 0.9%
- annual increased Gross Value Add (GVA)[60] of 0.8%
- annual increased employment growth of 0.6%.

Research[61] for BT (British Telecom) has found that business impacts of fibre services could yield an annual increase in GVA of between 0.3% to 0.5%. BT is currently investing GBP2.5 billion in its fibre network aiming to provide two-thirds of UK premises access to fibre services by the end of 2014. The predicted potential impacts of superfast broadband in rural areas, towns, cities and in London are presented in Exhibit 3.5.

	Rural area[62]	*Town*[63]	*City*[64]	*London*[65]
Annual increase in GVA per annum over 15 years (%)	0.3%	0.5%	0.4%	0.5%
Number of business start ups as a result of cloud computing	1 470	140	320	6 600
Increased support for home workers (number of workers)	7 780	1 030	1 580	73 000
Number of jobs created	1 810	225	436	26 200

Exhibit 3.5: *Potential business impacts of fibre services in the United Kingdom [Source: BT]*

Econometric analysis by Ericsson, Arthur D. Little and Chalmers University of Technology found that doubling broadband speed may lead to a one-off increase in GDP of 0.3%. This

60 The value of goods and services less the value of the inputs used to produce these goods and services. Note that GDP is the sum of Gross Value Added plus taxes less subsidies.

61 BT (2012) *Superfast Broadband – Boosting business and the UK economy.*

62 The areas of Norfolk and Suffolk were used for the study with a population of 1.6 million collectively with an average of 1.7 residents every hectare. An estimated 23 200 firms are expected to be reached by the deployment.

63 The town of Caerphilly was used in the study with a population of 173 000 people. An estimated 2 300 firms are expected to be reached by the deployment.

64 The city of Sunderland was used in the study – an estimated 5 310 firms are expected to be reached by the deployment.

65 In London, an estimated 356 000 firms are expected to be reached by the deployment.

growth is a result of both direct, indirect and induced (such as the creation of new services / businesses) effects.[66] The analysis used data for OECD countries from 2008 to 2010.

So what implications may be drawn for the potential impact of UFB in Wellington in the light of recent research? Earlier economic research for Grow Wellington (Section 2.3) predicted an annual boost of GDP due to UFB of 0.67% in the Wellington urban area compared to 0.55% for New Zealand. These results were derived using indicators from overseas research: namely, an impact of ICT on average annual productivity of 0.23% and 0.27% on annual GDP. As the underlying data for these indicators pre-dates 2004, it does not capture the impact of high-speed broadband services, but the more general impact of ICT uptake (and not necessarily even lower bandwidth broadband services). More recent empirical research that applies a similar methodological approach (input-output analysis) using data for broadband uptake implies that the economic impact may be higher than the underlying assumptions of the 2010 Wellington study (Exhibit 3.6). Accordingly we would expect the economic impact of UFB in Wellington to be greater than predicted in the 2010 study.

Study	*Region*	*Years (data)*	*Average annual GDP gain*
Berl (2010)	Wellington	1990 to 2003	0.27%
European Commission (2008)[67]	European Union	2000 to 2006	0.47% to 0.89%[68]
Katz et al.(2010)[69]	Germany	2000 to 2006	0.60%
South West Development Commission (2011)[70]	Western Australia (South West region)	2001 to 2010	0.90%

Exhibit 3.6: *Economic impact of ICT / broadband [Source: various]*

66 Ericsson (2011) *New study quantifies the impact of broadband speed on GDP*, press release, 27 September 2011.

67 European Commission, DG Information Society and Media (2008) *The impact of broadband on growth and productivity*, MISCUS Management Consulting GmbH.

68 The study found that European countries with more developed infrastructure and knowledge economies (e.g. Scandinavia) take more advantage of broadband than less developed countries (e.g. Bulgaria, Greece, Latvia).

69 Katz, Vaterlaus, Zenhausern, Suter and Mahler (2010), *The impact of broadband on jobs and the German economy*, Intereconomics 2010.

70 South West Development Commission (2011) *National Broadband Network – Impact assessment on the South West region of WA*, April 2011

3.3 The role of local government

Overseas local government involvement in fibre deployment has been primarily driven by:

- a recognition of the potential benefits that fibre services could offer the region (and therefore the desire to avoid widening the national / international digital divide that would put the region at a disadvantage)
- the desire to offer superfast broadband at affordable prices
- the desire to improve the delivery of public services.

Globally, the extent of local government involvement in high-speed broadband initiatives has varied. In some cases local authorities have played an active role on the supply side by providing FTTH (fibre-to-the-home) connections. The FTTH Council Europe has predicted that by 2016 14% of FTTH connections in Europe will be provided by municipal local authorities or by a power utility (Exhibit 3.7).[71]

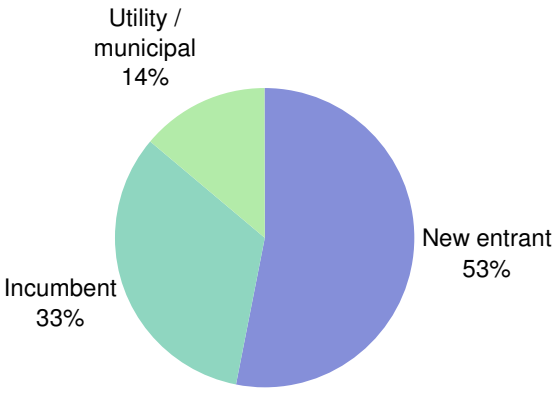

Exhibit 3.7: *European FTTH connections by the type of builder, 2016 [Source: FTTH Council Europe*

71 FTTH Council Europe (2012) *European FTTH Forecast, 2011 – 2016,* Presentation to the FTTH Council Europe Conference by Graham Finnie, Chief Analyst, Heavy Reading, 16 February 2012.

Often deploying fibre in rural and remote regions is perceived by operators and service providers as an unattractive commercial investment. In these circumstances, in the absence of local government intervention, some communities may miss out on access to fibre services. High costs, limited government funding, engineering challenges and weak business cases hinder network deployment.[72] This is in contrast to the situation in New Zealand where the UFB Initiative and Rural Broadband Initiative (RBI) are public-private partnerships with an investment of NZD1.5 billion by the New Zealand central government.

A review of local government participation in fibre broadband initiatives in France, Sweden, the United Kingdom and the US (see Annex C) reveals that involvement has ranged from the actual deployment of a fibre network, to the development of policies and plans to encourage broadband deployment and uptake, in addition to other promotional and educational activities to stimulate active demand. In all cases there is recognition of the benefits that can be derived from fibre broadband use by local authorities in the region. As such fibre services have been regarded as a means to:

- future-proof technology
- enhance regional competitiveness and economic growth
- attract businesses and new talent to a region
- improve quality of life (reducing the need to travel / relocate for work and increasing the amount of spare time available to spend with family / friends)
- deliver positive environmental effects
- improve public services (for example, via tele-education, tele-health, e-government)
- reduce telecommunications costs
- allow / enhance opportunities for business innovation, growth and promote efficient business practices.

The ITU highlights a number of ways in which the uptake of broadband services can be promoted by central and local government (Exhibit 3.8):[73]

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72 Connecting Cheshire (2011) *Transforming your business and community.*

73 ITU (2012) *Impact of broadband on the economy,* Regulatory & Market Environment, Broadband Series, Telecommunication Development Sector, April 2012.

Coordinating demand for access from public entities	Local government can coordinate demand for broadband access by public administration, public safety, educational and healthcare facilities. This would mean negotiating a wholesale rate and long-term contract with a broadband service provider.
Stimulating demand from the private sector	Broadband centres and library access / demonstrations can be used to provide information and training to, and develop interest among private sector organisations that do not currently use broadband.
Encouraging deployment of ICT infrastructure	Stimuli and incentives for the purchase / installation of products and services are important alongside the deployment of basic broadband infrastructure.
Creating an enabling environment for SMEs	Limited access to investment capital, comparatively high technology costs and a lack of training affect uptake of ICT services by enterprises. Entrepreneurs (outside the ICT field) often have limited technological training which may lead to fear of using technology and a lack of understanding of its ability to increase economic growth. Governments must therefore actively contribute to technology training and education. Participatory applications and social networks would also allow collaboration between businesses and promote best practices.
Linking broadband deployment to industrial policy objectives	An industrial policy linking the development of the telecommunications sector and the creation of export-oriented IT services and software needs to be developed in order to align broadband deployment with industrial policy objectives.
Developing e-government services	E-government services can provide incentives for consumers and businesses to become part of the information society. These can include e-procurement for SMEs, platforms for tele-commuting as well as development of portals that allow e-business transactions between government and enterprises. These initiatives can be complemented by digital literacy programmes.

Exhibit 3.8: *Promotion of broadband services by government [Source: ITU]*

3.4 Fibre uptake by businesses: key drivers and barriers

Both internationally and in New Zealand the likely pattern and uptake of fibre services is uncertain, with huge variations being experienced in different regions and projects. Naturally local conditions have a significant impact on fibre uptake by businesses, but a number of key drivers and barriers are apparent from international evidence.

3.4.1 Key drivers

Recognition of the potential of fibre services & applications for innovation

ICT is becoming widely recognised as a driver of innovation[74]. This recognition in turn drives the demand for ICT services and high speed broadband access by small and medium enterprises (SMEs). Fibre services promote improved competitiveness allowing businesses to expand their markets and supply products and services both locally and offshore. In addition, fibre services support many applications that improve efficiency and reduce cost.

For example, cloud services allow cost-effective remote access to applications, supporting working from home as well as allowing global interaction between workers. Similarly video-conferencing allows employees and contractors to communicate with multiple parties in various locations globally. Such applications promote new ways of working, resulting in reduced travel and office rental costs, and allow better time management.

The visibility of early adopters

Early adopters of DSL broadband will be early fibre adopters and as such should serve as fibre champions. The Australian Industry (Ai) Group Review report notes that early adopters will influence the more risk averse businesses.[75] Clearly, however, the success of

74 European Commission (2012) *Industrial innovation – ICT and other key technology enablers.*

75 Innovation Review Steering Committee Australia (2010)_*Innovation – New Thinking > New Directions*, a report to the Australian Industry Group by the Innovation Review Steering Committee, October 2010.

the ventures of these early adopters must be visible. To that end case studies for publicity may be a valuable tool.

NBN Co in Australia provides some examples. These include Glow Networks' – an IT enterprise based in Melbourne – access to fibre enabling it to develop and test products without the help of expensive data centres.[76] Also, the Willunga Farmers Market – in Adelaide, South Australia – the not-for-profit organisation committee now has spare time to focus on promotion and logistics due to efficiency benefits from switching to a fibre broadband connection. Previously the committee could have potentially spent hours trying to upload content online – now they are able to allow virtual farm tours on their website for consumers.[77]

Competitive fibre service provision

Given that many smaller businesses are very price-sensitive, it follows that competitive fibre service offerings may encourage early uptake. In this respect local market and regulatory conditions are important. If we consider the United States, fibre has been available since 2004 yet in general uptake has been modest over time. Some commentators have suggested that a more competitive access regime (as opposed to the policy of regulatory forbearance which was introduced in 2003) would have led to more attractive service pricing and quality, and hence greater take-up. For example, a 2010 study published by the Berkman Center for Internet and Society reviewed the effectiveness of unbundling on telecommunications market outcomes (price / quality) and concluded that the international evidence weighed in favour of open access policies.

A 2011 OECD paper on fibre access also noted that markets with more access competition in traditional broadband networks (such as xDSL and cable television networks) tend to deliver better results and are also leading in terms of FTTH/B investments. In Sweden

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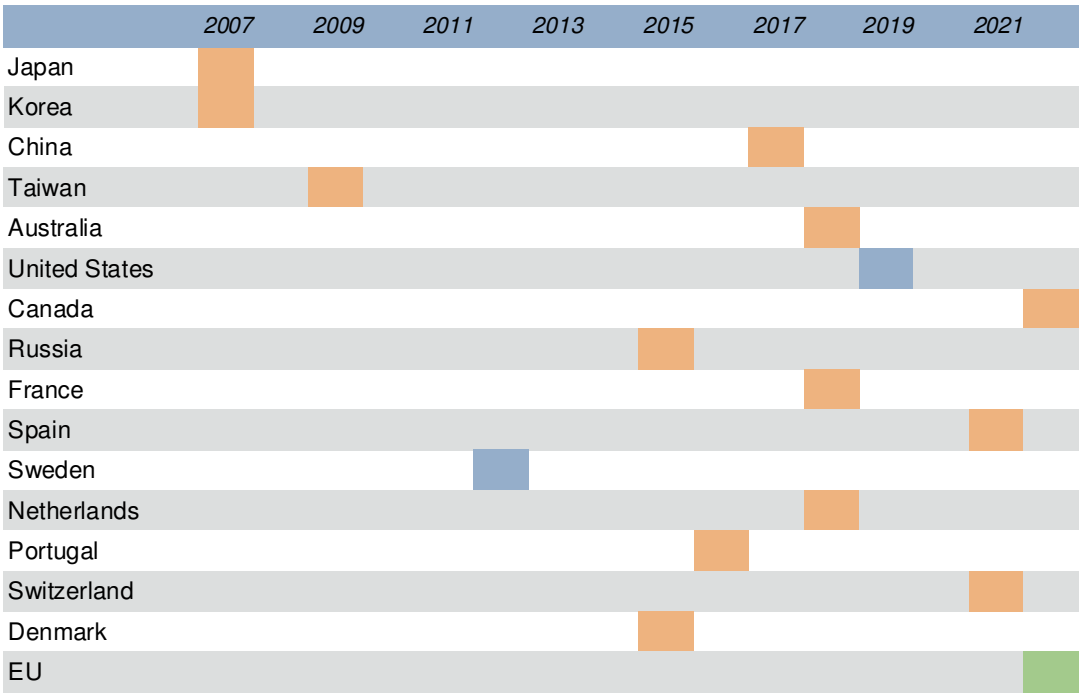
76 NBN Co, *Case Study – Glow Networks*, available at http://www.nbnco.com.au/getting-connected/business/case-studies/brunswick-it-company.html.

77 NBN Co, *Case Study – From the farm to the plate, via the NBN*, available at http://www.nbnco.com.au/assets/documents/business-case-study-willunga-farmers-market.pdf.

multiple fibre retailers commonly compete for market share (see Section 3.2), not only against other fibre retailers but against alternative technologies (such as cable and DSL), and the fibre market appears to be flourishing. Research for the FTTH Council Europe shows that Sweden has already reached fibre maturity (20% of the homes become FTTH/B subscribers) and predicts that the US will not reach this stage until 2019 (Exhibit 3.9), lagging behind a number of countries including Australia which only commenced fibre deployment in 2010.



Coloured cells shows the year in which each territory is expected on current trends and plans to achieve "FTTH maturity" (20% household penetration of FTTH or FTTB)

Exhibit 3.9: *Race to fibre maturity [Source: FTTH Council Europe]*

Demand pull policies

Public sector engagement on the demand side is a means of ensuring an enabling environment is created and barriers to uptake of broadband services are addressed. Apart

from national broadband plans, the ITU encourages the development of detailed "ICT Master Plans" encompassing services, applications and demand promotion policies[78]. Similarly a report by infoDev emphasises the need to augment push strategies with "pull" strategies by government which may include the promotion of digital literacy and encouraging the development of applications and local content[79].

3.4.2 Key barriers

The affordability of fibre services

In countries where the broadband market is approaching saturation fibre affordability will typically be assessed in relation to the price of alternative lower-speed services. If there is a considerable price differential then fibre-based service propositions must be sufficiently attractive to justify the additional required expenditure from businesses. Typically prices in overseas broadband plans exhibit wide variation, as do service features. Service bundles are common particularly in countries with vigorous competition from cable. In such countries (for example, Norway and Sweden) triple play bundles are an important product offering for fibre service providers.

Availability and quality of existing alternative services

If existing ICT services are perceived by businesses as adequate then fibre uptake would be less likely, at least in the short- to medium-term. A BSG report[80] notes that, for example, in Basingstoke (United Kingdom) the uptake of fibre broadband services following deployment in 2009 was 12% to 13% of premises passed within a few months compared to

78 For example, see information on the Swedish Digital Agenda in Section B.1.

79 infoDev (2009) *What role should governments play in broadband development?* September 2009.

80 Broadband Stakeholder Group (2012) *Demand for superfast broadband,* 11 October 2012.

a UK average of 4% at the time. Long line lengths in Basingstoke meant that the existing DSL broadband services were of poor quality, hence fibre uptake was accelerated.

Institutional resistance to change

High-speed broadband access may enable changes in business processes, models and ways of working but this will only occur once business owners and managers are motivated to initiate change. For example, a report[81] by the Economist Intelligence Unit in the United Kingdom argues that technology is not the most significant barrier to the widespread use of telemedicine – instead the biggest challenge is to get healthcare professionals to change the way they work.

Lack of high-bandwidth services and content

There may be a perception that in general there are insufficient services or applications that require fibre broadband. As noted by the BSG report[82] content providers generally develop services that would require the minimum possible capacity in order to cater to the lower broadband speeds.

Lack of knowledge and understanding

Fibre uptake will be inhibited where there is a lack of understanding and appreciation of the existence and benefits of high speed Internet access. The Ai Group Review report in particular highlights the need for a concerted effort to increase awareness of emerging new and innovative business models.[83]

81 Economist Intelligence Unit (2012) *Superfast Britain? – Myths and realities about the UK's broadband future.*

82 *Ibid.*

83 *Ibid.*

Lack of suitably targeted business packages for small businesses

Retail service providers must develop offers that will engage the addressable business market. The FTTH Council Europe found that several fibre service providers in Europe do not have specific offers targeted at small businesses and the existing small business offers were in essence residential offerings with a "business" label. This leaves a significant market unserved.

3.5 Local government initiatives to increase business uptake of fibre

On investigation of local government initiatives for fibre demand stimulation it is apparent that there are four broad categories, namely:

- promote awareness through marketing campaigns and websites
- increase education by conducting seminars and workshops
- provide support through local agencies and broadband champions
- directly approach major businesses which can benefit from fibre.

Examples of local governments and their corresponding initiatives to promote business uptake of fibre are given below (and summarised in Exhibit 3.10).

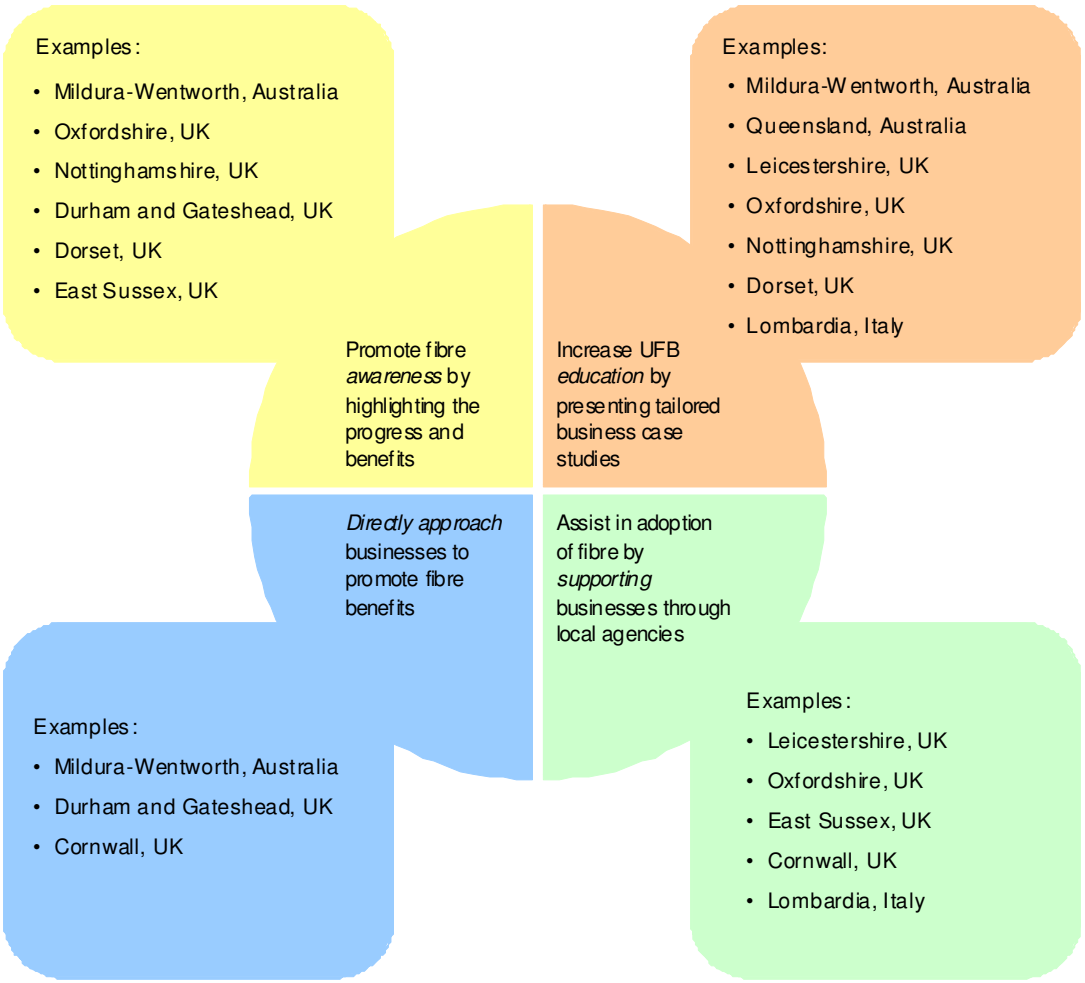


Exhibit 3.10: *Summary of overseas local government initiatives [Source: Network Strategies]*

Mildura-Wentworth, Australia

The Mildura Rural City Council and Wentworth Shire Council plan to educate businesses about the benefits of the Australian National Broadband Network (NBN) by implementing courses on high-speed broadband.[84] The councils also intend to promote the benefits of video conferencing and teleworking as well as run workshops showcasing case studies of

84 NBN4 Mildura-Wentworth Loddon Mallee Committee (2012), *Digital Community Strategy,* available at http://www.milduraregion.com.au/MDCSite/media/events_2012/NBN4-Mildura-Wentworth-Digital-Community-Strtegy---low-res.pdf

businesses that have successfully adopted the NBN. As an example, the local businesses were being encouraged to visit the NBN Co Discovery Truck in Mildura to see the benefits of high speed broadband.[85] In addition, the councils are promoting cost-effective solutions within the food and beverage processing, agricultural and tourism industries to encourage uptake.[86]

Queensland, Australia

Skills Queensland is partly funding an online 12 week programme for businesses, *Get Up To Speed*[87], to increase awareness and application of digital technologies such as the NBN.[88] The online program is flexible and features webinars, a Facebook group, weekly eLessons and other resources.

Leicestershire, United Kingdom

The Leicester & Leicestershire Enterprise Partnership (LLEP) plans promote Super-Fast Broadband (SFBB) for businesses by providing tailored advice and peer-to-peer support using business associations.[89] Further, the LLEP also aims to encourage demand by organising workshops, events and white label promotion campaigns for different sectors.

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85 NBN4 Mildura-Wentworth, *NBN4 Mildura-Wentworth welcomes NBN demonstration truck to Mildura,* available at http://www.milduraregion.com.au/News-and-Events/Latest-News/NBN4-Mildura-Wentworth-welcomes-NBN-demonstration-.aspx.

86 NBN4 Mildura-Wentworth Loddon Mallee Committee (2012), *Digital Community Strategy,* available at http://www.milduraregion.com.au/MDCSite/media/events_2012/NBN4-Mildura-Wentworth-Digital-Community-Strtegy---low-res.pdf

87 Get Upto Speed program website, available at http://www.getuptospeed.com.au/about.

88 Bundaberg Regional Council website, *Get Up To Speed – Digital Skills Training Program,* available at http://www.businessbundaberg.com.au/events/get-up-to-speed-digital-skills-training-program.

89 Leicestershire County Council (2012), *Broadband Leicestershire,* available at http://www.leics.gov.uk/broadbandstrategysummaryapproved.pdf.

Oxfordshire, United Kingdom

The Oxfordshire Local Enterprise Partnership (LEP) proposes to compile a list of business case studies which have benefitted from fast broadband to be highlighted at networking events and support websites.[90] In addition, the LEP intends to organise a marketing campaign with the local media including radio and 'Digital Media Technology for Businesses' week with different seminars and activities. The LEP also plans to develop 'How To' guides for businesses, liaise with business support agencies and hold events and workshops for peer-to-peer support.

Nottinghamshire, United Kingdom

Nottinghamshire County Council plans to encourage high speed broadband by creating a business support programme and developing a supporting website.[91] The website aims to create awareness of the benefits and educate businesses by simplifying the concept of broadband and featuring case studies.

Durham and Gateshead, United Kingdom

Durham County Council and Gateshead Metropolitan Borough Council intend to promote business networking events through local agencies to increase awareness and discuss barriers which affect the local broadband uptake.[92] The major employers and retailers in the region are being contacted directly to highlight the benefits of fast broadband to their businesses. In addition, the awareness programmes are promoted on social networking sites such as Twitter.

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90 Oxfordshire Local Enterprise Partnership (2011), *OxOnline – the Digital Strategy for Oxfordshire,* available at http://www.oxfordshirelep.org.uk/cms/sites/lep/files/folders/documents/meetings/111101item5.pdf.

91 Nottinghamshire County Council (2012), *Nottinghamshire Local Broadband Plan.*

92 Durham County Council and Gateshead Metropolitan Borough Council (2011), *Local Broadband Plan for Durham and Gateshead,* available at https://www.gateshead.gov.uk/DocumentLibrary/Business/Local-Broadband-Plan-for-Durham-and-Gateshead-(PDF-16-MB).pdf.

Dorset, United Kingdom

Dorset County Council (DCC) intends to conduct specialist training programmes to introduce businesses to the benefits of SFBB.[93] In addition, several presentations, workshops and road shows are planned to increase awareness and promote applications of SFBB.

East Sussex, United Kingdom

The East Sussex County Council plans to promote SFBB using the business representative organisations to raise awareness and increase demand.[94] In addition, the council proposes to liaise with the local broadband champions from the business community and use social media such as Twitter to engage businesses. The council also plans to develop its broadband website with extensive material.

Cornwall, United Kingdom

The council is promoting Superfast Cornwall by engaging businesses through direct meetings which are focussed on highlighting benefits and tackling barriers to superfast broadband uptake.[95]

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93 Dorset County Council (2012), *Connecting Dorset Fast,* available at http://www.crownfibre.govt.nz/2011/10/fibre-in-use-business-1/.

94 East Sussex County Council (2012), *e-Sussex Local Broadband Plan,* available at http://www.eastsussex.gov.uk/NR/rdonlyres/318344F3-DBA6-42A6-9C88-D03A6A8A857F/0/esussexlocalbroadbandplan.pdf.

95 European PPP Expertise Centre (EPEC), *Broadband – Delivering next generation access through PPP,* available at http://www.eib.org/epec/resources/epec_broadband_en.pdf.

Lombardia, Italy

Regione Lombardia plans to increase business uptake of BUL (Banda Ultralarga in Lombardia) by developing services and initiatives targeted for businesses.[96] In addition, it aims to promote broadband education for better collaboration between businesses.

96 *Ibid.*

4 UFB – the current state of play in New Zealand

Internet services have enabled widespread access to information and resources throughout the world. New Zealanders use Internet for communicating, educating their children and running their businesses. Recent developments have led to the advent of new applications including video conferencing, cloud computing and teleworking. However, the extent of economic and social benefits to be harnessed by the Internet depends on the speed, availability and reliability of the infrastructure.

Akamai's *State of the Internet* report for Q3 2012 ranked New Zealand 46th in the world in terms of average Internet speed.[97] The report stated that 35% of New Zealand businesses and residences were receiving speeds of more than 4Mbit/s and only 2.4% were receiving speeds of more than 10Mbit/s. A comparison of the Internet speeds and global rankings of selected countries is shown in Exhibit 4.1 and Exhibit 4.2.

97 Akamai State of the Internet report, Volume 5, Number 3, Q3 2013.

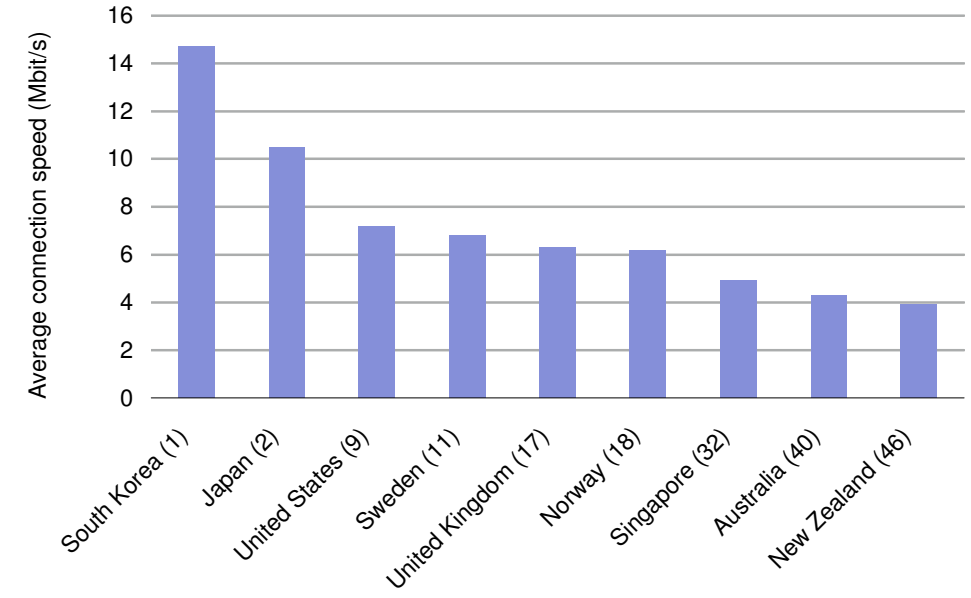

Exhibit 4.1: *Average Internet speed of countries (and their global rankings) [Source: Akamai State of the Internet report Q3 2012]*

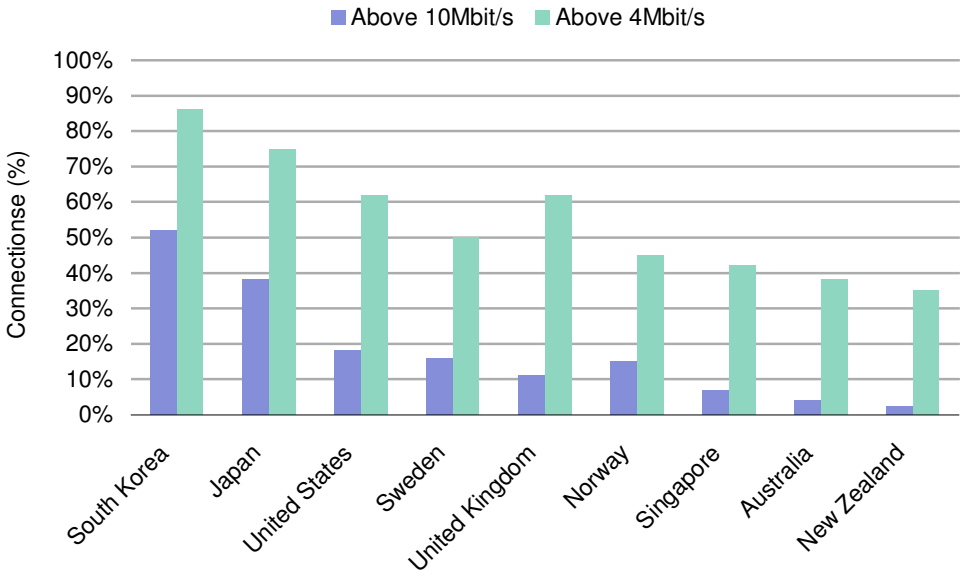

Exhibit 4.2: *Percentage of connections with speed above 10Mbit/s and 4Mbit/s [Source: Akamai State of the Internet report Q3 2012]*

The New Zealand government established the UFB Initiative and the Rural Broadband Initiative (RBI) to improve access to broadband services in New Zealand. The initiatives aim to bring faster broadband to 97.8% of New Zealanders.[98]

4.1 The UFB Initiative

The UFB initiative is a government programme to connect New Zealand homes and businesses to fibre optic technology. By 2020, 75% of New Zealanders are expected to be connected to UFB. By 2015, schools, hospitals and 90% of businesses are expected to be connected. UFB will enable downlink speeds of at least 100Mbit/s and uplink speeds of at least 50Mbit/s.[99]

Crown Fibre Holdings Limited (CFH) has been established to manage the $1.5 billion UFB investment of the New Zealand government.[100] CFH has partnered with Chorus and three Local Fibre Companies (LFCs), namely Northpower, Ultrafast Fibre and Enable Networks, to deploy the UFB infrastructure.[101] An overview of the UFB deployment plan is shown in Exhibit 4.3.

98 Ministry of Business, Innovation & Employment website, *Fast broadband,* available at http://www.med.govt.nz/sectors-industries/technology-communication/fast-broadband.

99 Ministry of Business, Innovation & Employment website, *Ultra-Fast Broadband Initiative*, available at http://www.med.govt.nz/sectors-industries/technology-communication/fast-broadband/ultra-fast-broadband-initiative.

100 Crown Fibre Holdings Limited website, *About Us,* available at http://www.crownfibre.govt.nz/about/.

101 Crown Fibre Holdings Limited website, *Where and when is UFB being delivered?*, available at http://www.crownfibre.govt.nz/ufb-initiative/rollout-timetable/.

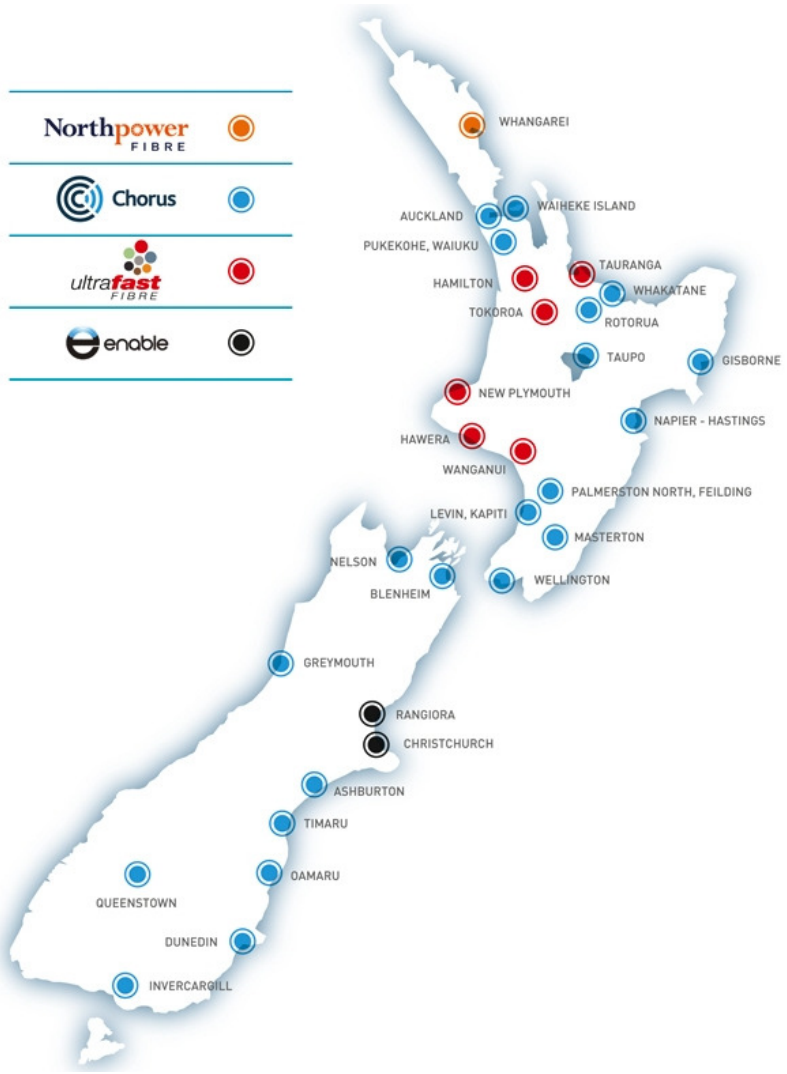

Exhibit 4.3:
UFB deployment plan and partners [Source: Crown Fibre Holdings Limited]

Chorus launched the UFB Initiative in the Wellington region in August 2011 with the aim of deploying the network to the zones shown in Exhibit 4.4.[102] As at 31 December 2012, UFB was deployed in several areas of Wellington including Lower Hutt City's Kelson and Melling suburbs, Wellington's Churton Park, Porirua's Papakowhai, Aotea, Whitby and

102 Chorus New Zealand Limited website, *Our network upgrade map,* available at http://www.chorus.co.nz/maps.

Plimmerton suburbs in addition to Central Masterton including premises north of Chapel Street.[103]

Exhibit 4.4: *UFB zones in Wellington [Source: Chorus New Zealand Limited]*

Over 50 Retail Service Providers (RSPs) have signed agreements with Chorus and/or the LFCs to sell UFB plans to residential and business customers.[104] However, only 18 RSPs were offering UFB services as at 31 December 2012.[105] The RSPs offering fibre broadband plans in Wellington include Orcon, CallPlus, Worldnet and Snap. The Chorus December

103 Ministry of Business, Innovation & Employment (2012), *Broadband Deployment update 1 July to 30 September 2012*, and Ministry of Business, Innovation & Employment (2012), *Broadband Deployment update 1 October – 31 December 2012*.

104 Crown Fibre Holdings Limited website, *UFB Products / Prices / Retail Services Providers,* available at http://www.crownfibre.govt.nz/ufb-initiative/frequently-asked-questions/.

105 Ministry of Business, Innovation & Employment (2012), *Broadband Deployment update 1 October – 31 December 2012*.

2012 half yearly report[106] notes that Telecom and Vodafone[107] are currently not offering UFB services despite representing approximately 80% of the fixed line broadband market in New Zealand.

4.2 Fibre uptake in New Zealand: drivers and barriers

The UFB deployment update at 31 December 2012 is shown in Exhibit 4.5.[108] Nationally, 134 912 end users were able to connect to UFB and 131 366 premises were passed.[109] However, only 3 806 users were subscribed to UFB.

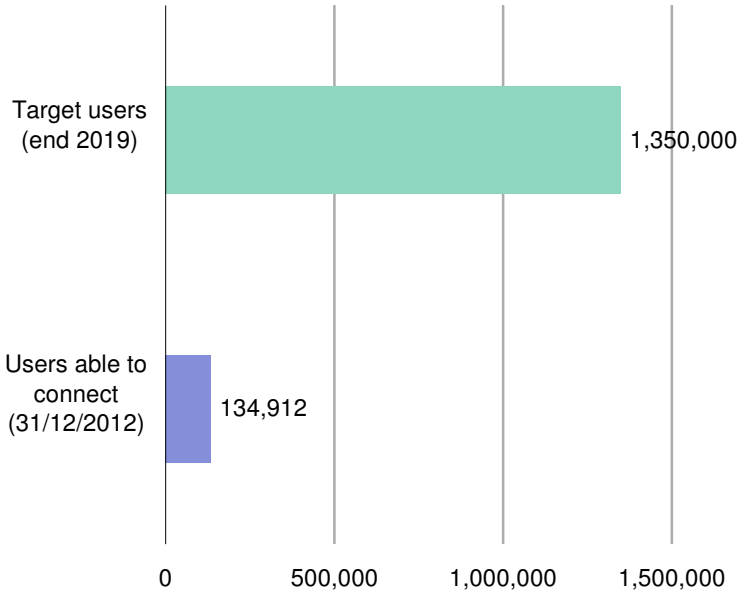

Exhibit 4.5: *National UFB deployment update at 31 December 2012 [Source: Ministry of Business, Innovation & Employment]*

106 Chorus (2012) *Half year report for the six months ended 31 December 2012.*

107 Vodafone is also the owner of TelstraClear since 30 October 2012.

108 *Ibid.*

109 *Ibid.*

The modest uptake to date may simply reflect the fact that the UFB project is still at an early stage. However it may also indicate that UFB services are already encountering barriers to uptake. So what barriers have been identified to date in New Zealand?

4.2.1 Evidence from local studies

The Commerce Commission published the Final Report of its UFB demand-side study in June 2012.[110] The study was initiated by the Commission to identify / inform factors that may affect the uptake of UFB in New Zealand (delivered both over fixed and wireless networks). One of the key findings of the study was that costs related to connecting to the network and using UFB services are a critical factor in the uptake of UFB for both consumers and small / medium enterprises (SMEs).

A 2010 survey of TUANZ[111] members identified price as a key barrier to UFB uptake together with accessibility, bandwidth, complexity of offerings, and realising and understanding benefits.[112]

Recent survey research[113], commissioned by Chorus, on potential business uptake of UFB in New Zealand indicated that 95% of businesses are 'aware' of UFB and after installation 64% are 'likely' to take up UFB services (with medium to large businesses being the earlier adopters). At the same time 39% of businesses admitted that they did not know whether UFB represented a 'big opportunity to introduce new and more efficient ways of working to businesses'. This suggests that while businesses have heard of UFB there is a general lack of understanding of the transformational benefits and opportunities offered by the technology. In fact this was confirmed by survey responses to the request to rank the importance to their businesses of UFB concepts. On-line back-up was rated as 'appealing' by 62% of surveyed businesses while 21% rated this as 'most appealing'. In contrast 53%

110 Commerce Commission (2012) *High speed broadband services demand side study,* Final Report, Project no. 13.07/12813, 29 June 2012.

111 Telecommunications Users Association of New Zealand.

112 Crown Fibre Holdings & TUANZ (2010) *Ultra Fast Broadband in Business – Seizing the Opportunity.*

113 Colmar Brunton (2013), *Why would Kiwi businesses take up fibre?*, March 2013.

rated productivity and integrated communications as 'appealing' and only 10% rated this as 'most appealing'. In other words it appears from this research that firms see UFB mainly in terms of improving current ICT performance, as opposed to a business-changing enabler.

4.2.2 Insights from market participants

A key driver for fibre uptake is improving business understanding of its potential and facilitating a straightforward installation process. Recently, IDC released a study on the expected UFB uptake in New Zealand.[114] The study predicted UFB uptake to rise to 50% by 2020 and concluded that:

> … the amount and type of education about the potential of fibre, development of content and applications, and consistent, easy-to-manage installation will be the main factors determining how fast uptake proceeds.

To this end, some RSPs are promoting the benefits of fibre broadband for businesses. For example Telecom highlights the manifold increase in broadband speeds, allowing businesses to have access to applications, services, suppliers and markets around the world.[115] Other benefits include extension of the global reach of the businesses providing opportunities for expansion, and improvement in productivity and efficiency as well as reduction in operational costs.[116] Fibre also facilitates teleworking which permits staff to work from flexible locations and save travel time and costs.

Chorus has recommended that the early adopters of fibre should be nurtured as they have the potential to increase UFB uptake more than any other campaign.[117] In addition, Chorus

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114 IDC (2012) *UFB uptake to reach 50% by 2020,* 22 November 2012, available at http://pcworld.co.nz/pcworld/pcw.nsf/news/idc-ufb-uptake-to-reach-50-by-2020.

115 Telecom New Zealand website, *Fibre Broadband for business,* available at http://www.telecom.co.nz/internet/ultrafibre/fibreforbusiness/.

116 *Ibid.*

117 Chorus New Zealand Limited (2012), *Paving the Path to Delivering Ultra Fast Broadband, December 2012.*

has also suggested promoting UFB benefits, selling bundled services and advertising through online sources to boost uptake.

International experience also indicates the importance of showcasing business performance improvements after adopting fibre broadband (see Section 3.5). Although the main focus of Crown Fibre Holdings is the management of UFB contracts, it has provided some examples of how New Zealand businesses are reaping the benefits of fibre. A summary of these examples is provided in Exhibit 4.6 with the details in Annex C.

Sector	*Business name*	*Main benefits of fibre*
Information Media and Telecommunications	Serato	Reliable global reach, better broadband support and data backup, faster upload of videos
Information Media and Telecommunications	Magnetism	Develop new products, save time and costs, better data storage and backup
Professional, Scientific and Technical Services	Marathon Photos	30% growth per year, faster upload of large data, better data backup
Health Care and Social Assistance	Kensington Hospital Ltd	Faster upload and download of large files, remote access, lower costs, better connection reliability
Transport, Postal and Warehousing	Cold Storage Nelson	Real time tracking of products, improved efficiency and customer service

Exhibit 4.6: *Examples of New Zealand businesses which have successfully adopted fibre [Source: Crown Fibre Holdings]*

Discussions with RSPs indeed confirmed that the installation process, particularly if the building / premises are rented by a number of different businesses (sometimes referred to as multi dwelling units encompassing business and / or residential tenants), can pose a barrier to uptake as approval is required from landlords or body corporates. Local government could potentially assist with remedying this situation by improving awareness / understanding of UFB benefits and installation processes amongst building owners – for example through communications via rates notices.

In general it appears that RSPs do not believe that fibre pricing is a major obstacle for uptake, but rather that firms may not fully understand the costs involved and the possibilities for economies. For example, a fibre connection may in fact offer a more economical alternative for telecoms connectivity for a small firm with multiple copper lines. One hindrance to immediate UFB uptake is, of course, that some businesses are

bound by fixed term ADSL contracts with RSPs and may have to pay a penalty to adopt fibre plans prior to contract expiry. It is also important to note that, unlike the residential offerings, fibre services for firms are not plug and play, and as such firms may require IT advice and support. Note that survey evidence also supported the RSPs' view that price was only one issue considered by firms in relation to Internet connections. Other key factors included consistent reliability, speed, flexible packages / contracts, trusted RSPs and service and support[118].

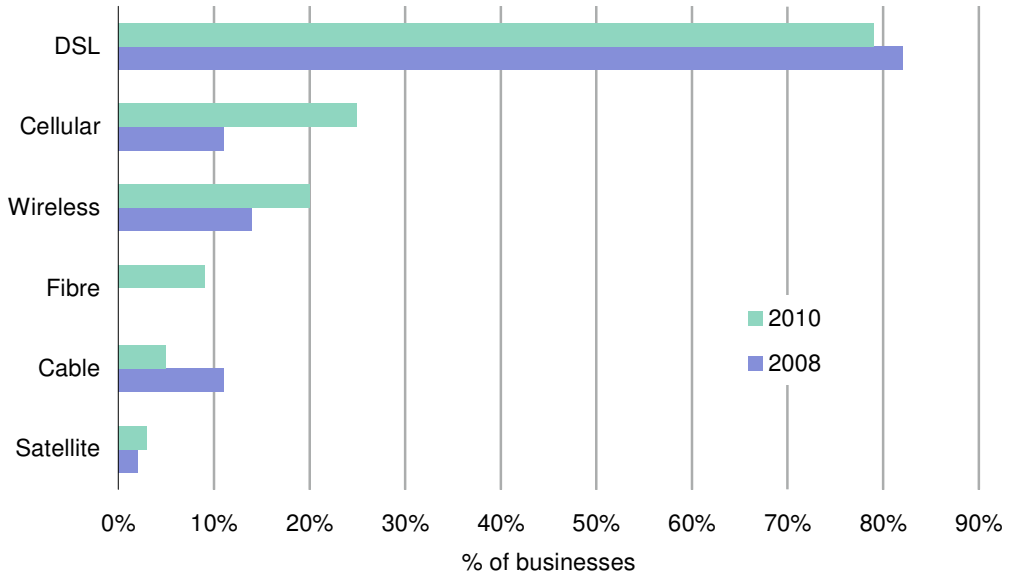
From LFCs there was consensus that the entry of Telecom and Vodafone into the UFB market would spur uptake, and that in some regions their absence contributed to the current relatively modest uptake. As at the date of writing of this report the timing of full market entry by Telecom and Vodafone remains unclear, although some market participants believe that this will not occur until later in 2014 (at the earliest).

4.2.3 The impact of competition from other technologies

While New Zealanders were some of the earliest adopters of Internet services, the market appears to be reaching saturation. There is little room for further growth in the business market – as at 2010, 93% of businesses had a broadband connection but only 9% had a fibre connection[119] (Exhibit 4.7). Therefore it follows that migrating existing broadband customers to UFB may represent a significant challenge, and price will be a factor in the business decision.

118 Colmar Brunton (2013), *Why would Kiwi businesses take up fibre?*, March 2013.

119 Statistics New Zealand (2011) *Business Operations Survey: 2010*, 8 April 2011.



Note: Businesses may use more than one broadband connection type, so the percentages will add to more than 100%. Cellular includes WAP, GPRS and 3G services.

Exhibit 4.7: *Broadband connection type, 2008 and 2010 [Source: Statistics New Zealand]*

A comparison of the (ADSL and fibre) broadband plans offered for business services by some RSPs is shown in Exhibit 4.8.

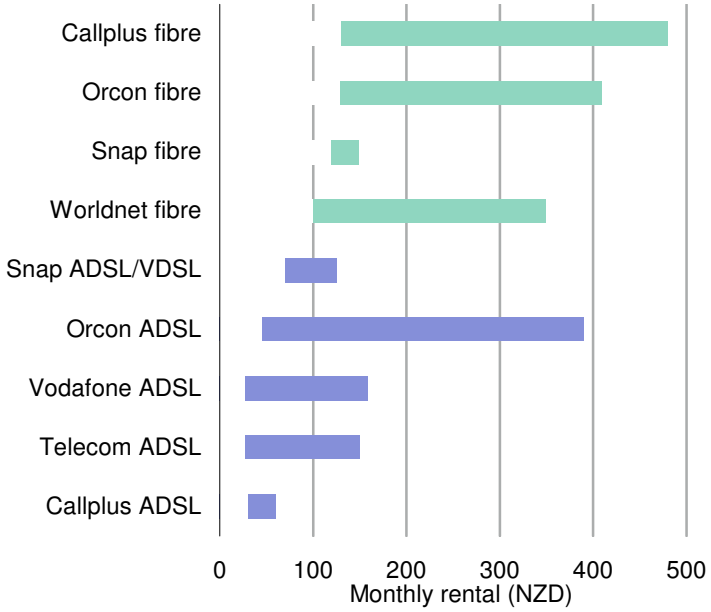


Exhibit 4.8: *Price ranges for business broadband monthly plans in New Zealand, January 2013 [Source: operator websites]*

This analysis reveals that fibre plans are priced at a premium over ADSL offerings. Chorus has publicly stated that relatively low DSL prices will jeopardise UFB uptake and as such has been active in opposing reductions in wholesale pricing for unbundled copper local loop (UCLL) and unbundled bitstream access (UBA)[120]. In particular Chorus claims that RSPs need the right incentives to migrate users to UFB services and the relativity of copper prices to fibre will be the key driver in this respect. In other words, Chorus perceives relatively low copper pricing as a barrier to UFB uptake and by implication relatively high copper pricing would drive UFB uptake.

If we consider relative pricing of alternative broadband technologies in other countries we find examples of relatively high uptake in markets with multiple competitively priced broadband technologies. For example, Norway is a world fibre leader, achieving take-up rates of 62% of premises passed. Telenor's ADSL and VDSL products are comparably priced to fibre (Exhibit 4.9). Prices for another competing technology, mobile broadband, are comparatively lower than both DSL and fibre.

120 See, for example, Chorus (2013), *Submission on UBA Draft Determination*, 1 February 2013.

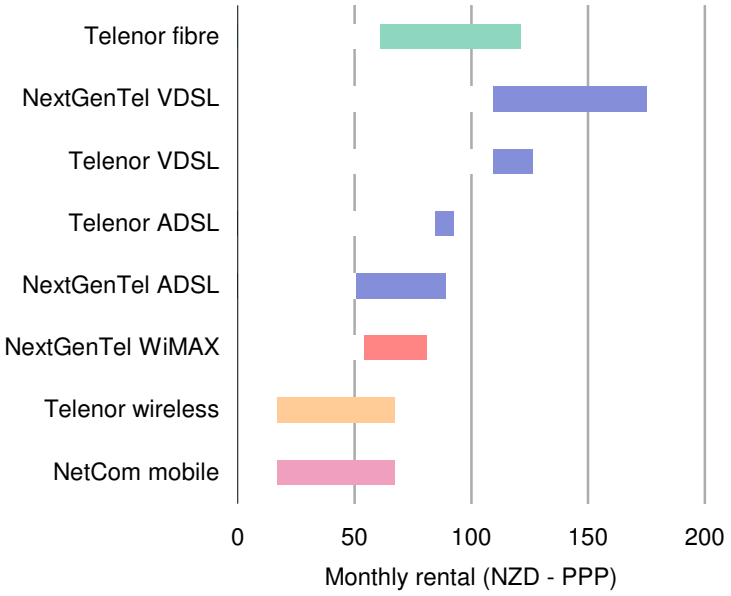


Exhibit 4.9:
Price ranges for business monthly broadband plans in Norway, February 2013 [Source: operator websites]

At the same time there are other markets where fibre has enjoyed less success competing against existing DSL technologies. The UK is one of the least successful European countries with fibre penetration. We find that DSL pricing is extremely attractive compared to both fibre and cable offerings (Exhibit 4.10). BT's lower priced DSL and fibre offerings have data caps while the higher priced services include unlimited data.

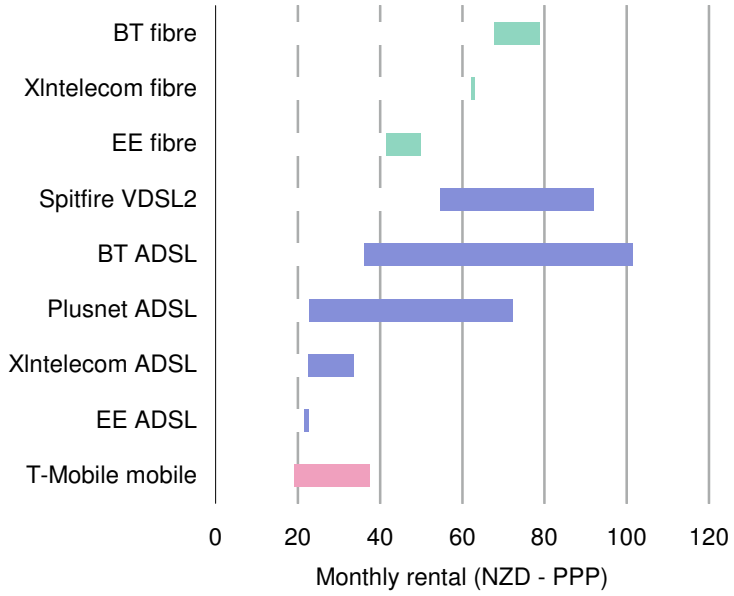


Exhibit 4.10:
Price ranges for business monthly broadband plans in the United Kingdom, February 2013 [Source: operator websites]

If a significant differential emerges in New Zealand between copper and fibre retail pricing then service features will become a major selling-point. In countries with vigorous competition from alternative technologies, triple play bundles are an important product offering for fibre service providers, as is the case in Norway. In other words, the challenge for RSPs will be to develop product offerings that will engage the local addressable business market. Products will need to be differentiated both from the existing lower speed broadband services as well as from other UFB services.

4.3 Stimulating UFB demand: current initiatives

The actions recommended by CFH to tackle the barriers to UFB uptake focus on education, leadership and publicity. Exhibit 4.11 shows an overview of the recommended initiatives to promote uptake of fibre broadband.[121] These initiatives are being implemented by the

[121] Crown Fibre Holdings Limited website, *What is happening in my community,* available at http://www.crownfibre.govt.nz/ufb-initiative/whats-happening-in-my-community/.

Digital Leadership Forums (DLFs)[122] and working groups[123] which have been formed by various local communities. with support from local councils and/or economic development agencies.

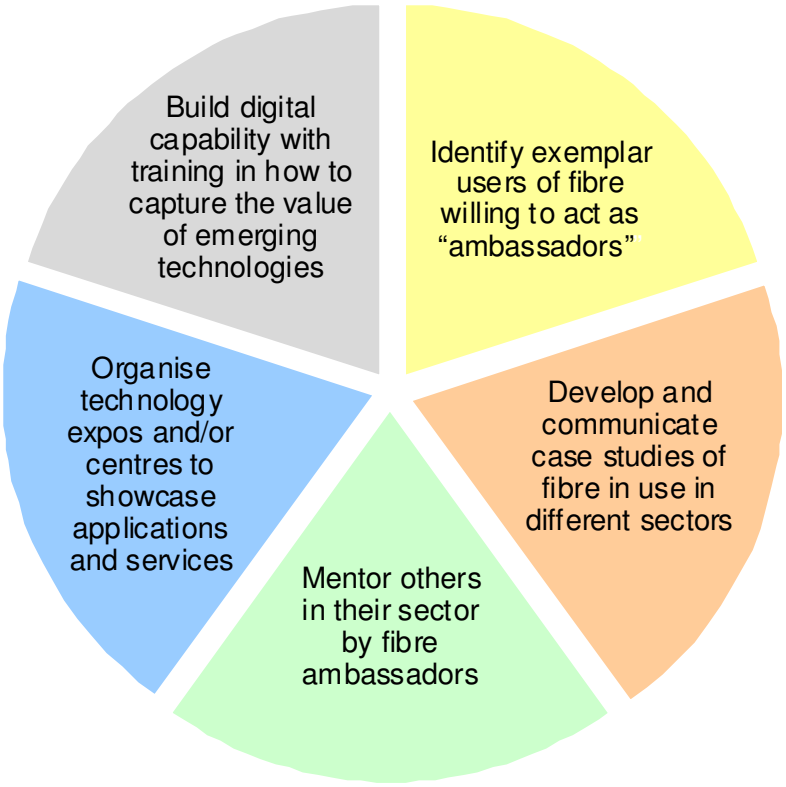


Exhibit 4.11: *Initiatives to leverage the benefits of UFB [Source: Crown Fibre Holdings Limited]*

DLFs and working groups convened in various regions of New Zealand, including Auckland[124], Wanganui[125], Wellington[126] and Dunedin[127], aim to develop and implement

122 *Ibid.*

123 Examples of working groups include Wellington Region Broadband Operational Group (BOG) and Western Bay of Plenty (WBOP) broadband working group.

124 Auckland Council website, *Digital Leadership Forum,* available at http://www.aucklandcouncil.govt.nz/EN/AboutCouncil/representativesbodies/advisorypanels/Pages/digitalleadershipforum.aspx.

125 Wanganui District Council website, *Ultrafast broadband for Wanganui,* available at http://www.wanganui.govt.nz/UltraFastBroadband.asp.

local initiatives tailored for the business sectors in their regions. Although it is still early days with UFB deployment and uptake in New Zealand, the DLFs and working groups appear to be adopting the role of 'independent trusted advisors'. They are actively working to promote UFB awareness and education in different regions with a view to overcoming barriers to uptake. Examples of initiatives from these forums/groups include:

- Auckland Council is working to promote broadband adoption through the 46 Business and Improvement District (BID) programmes running in Auckland. The council believes that UFB information should be provided to businesses in two stages – installation and adoption. Adequate information about the installation process leaves a positive perception about UFB and sufficient knowledge about the benefits will increase uptake. The council and the BIDs are encouraging peer promotion so that the businesses hear about the benefits from other businesses that have adopted UFB. The council is also working with CFH to develop example case studies tailored to the local businesses in the Auckland region. Chorus is also assisting the BIDs by directly meeting individual businesses and addressing issues of installation costs and fibre ownership. For example, the North Harbour Business Association (NHBA) promoted UFB awareness in a business breakfast event by inviting a speaker from Chorus. NHBA is also organising an expo with Chorus and Auckland Council to encourage uptake and remove any misconceptions about UFB.

- Bay of Plenty Council is playing a proactive role in encouraging UFB awareness and education. The council has recruited 'champions' to boost the uptake of UFB by increasing cooperation between the government, education and business sectors. In addition, the council established a Tauranga co-working space which provides free UFB to resident companies. The council also promoted UFB at the Western Bay of Plenty (WBOP) Careers Expo and Technology for Smarter Business Expo. The WBOP broadband working group (established by the local business community) promotes benefits of UFB to increase productivity.

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126 Wellington Regional Strategy website, *Broadband*, available at http://www.wrs.govt.nz/broadband.

127 Digital Office website, *Our Projects,* available at http://www.digitaloffice.co.nz/home.

- The Whakatane District Council website provides information about the UFB rollout process and support available for adoption. The Chamber of Commerce in Whakatane has been instrumental in advancing the fibre deployment plans (of Chorus) in the region and forming the Digital Leadership Forum. The forum is organizing a technology event later this year to increase UFB awareness and promote uptake.

- Wanganui District Council formed the Wanganui Digital Leaders Forum to facilitate the deployment and use of UFB. The council is promoting awareness by providing a range of information on its website including a detailed UFB deployment map for the region. The Business Group of the Wanganui DLF has published several articles illustrating the applications and benefits of UFB. In addition, the video of the UFB event organised by the Business Group is available on YouTube. Wanganui has been named one of Intelligent Community Forum's Smart21 Intelligent Communities of 2013[128] for its efforts in developing strategies for adoption of new broadband technologies.[129]

- In Wellington, the Broadband Operational Group (BOG) has been facilitating local businesses by ensuring efficient deployment of UFB as well as promoting uptake.[130] Wellington Regional Strategy (WRS) identifies broadband as a key enabler of economic growth and is supporting the uptake of faster broadband services for businesses as a key focus area.[131] In addition, the WRS Office and the councils in the region are liaising with CFH to set the priority areas for UFB deployment.[132] They are also working with Chorus to efficiently manage UFB rollout and regularly update council and community boards.

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128 Wanganui's selection is based on its work to understand the challenges of broadband and develop initiatives to encourage new technologies for the benefit of the community.

129 Intelligent Community Forum website, *The Smart21 Communities,* available at https://www.intelligentcommunity.org/index.php?src=gendocs&ref=Smart21&category=Events&link=Smart21.

130 Wellington Regional Strategy (2012), *Wellington Regional Strategy 2012 – Growing a sustainable economy*, available at http://www.wrs.govt.nz/assets/WRS/Publications/Wellington-Regional-Strategy-2012.pdf.

131 Wellington Regional Strategy website, *Activities – world-class infrastructure*, available at http://www.wrs.govt.nz/world-class-infrastructure.

132 Wellington Regional Strategy Office (2012), *Annual Report 2011/2012*, available at http://www.wrs.govt.nz/assets/WRS/Publications/WRS-Annual-Report-2011-2012.pdf.

- In some regions, such as Rotorua and Marlborough, local business support agencies and the corresponding Chambers of Commerce promote UFB uptake by directly dealing with local businesses. Venture Southland believes businesses focus on reliability (more than speed) and plans to hold workshops in Invercargill to increase awareness.

- The Digital Office in Dunedin is promoting UFB uptake by increasing awareness through its website which has extensive information about the concept of UFB, rollout process, benefits (through case studies) and available support for adoption. In addition, the office has appointed 'Digital Ambassadors' to provide guidance and education about UFB.

5 Conclusions: how can local government assist?

Common themes emerge from our review of international and local experience – namely that the inhibitors of UFB uptake by businesses may include:

- lack of education and knowledge about the transformational potential of the technology
- institutional resistance to change
- perceived inability to afford UFB services
- perceived and actual difficulties associated with installation
- limited requirements for high bandwidth due to a paucity of applications and content.

We have also seen that the cost and availability of other high quality broadband technologies may or may not have an impact on fibre demand, depending on local circumstances. Naturally where there are limited alternatives fibre demand may be strong. However, equally in a competitive market with competing technologies the total market for broadband may expand as service providers deliver affordable, innovative and differentiated products.

5.1 Drivers and barriers

The main drivers and barriers of UFB uptake are summarised in Exhibit 5.1.

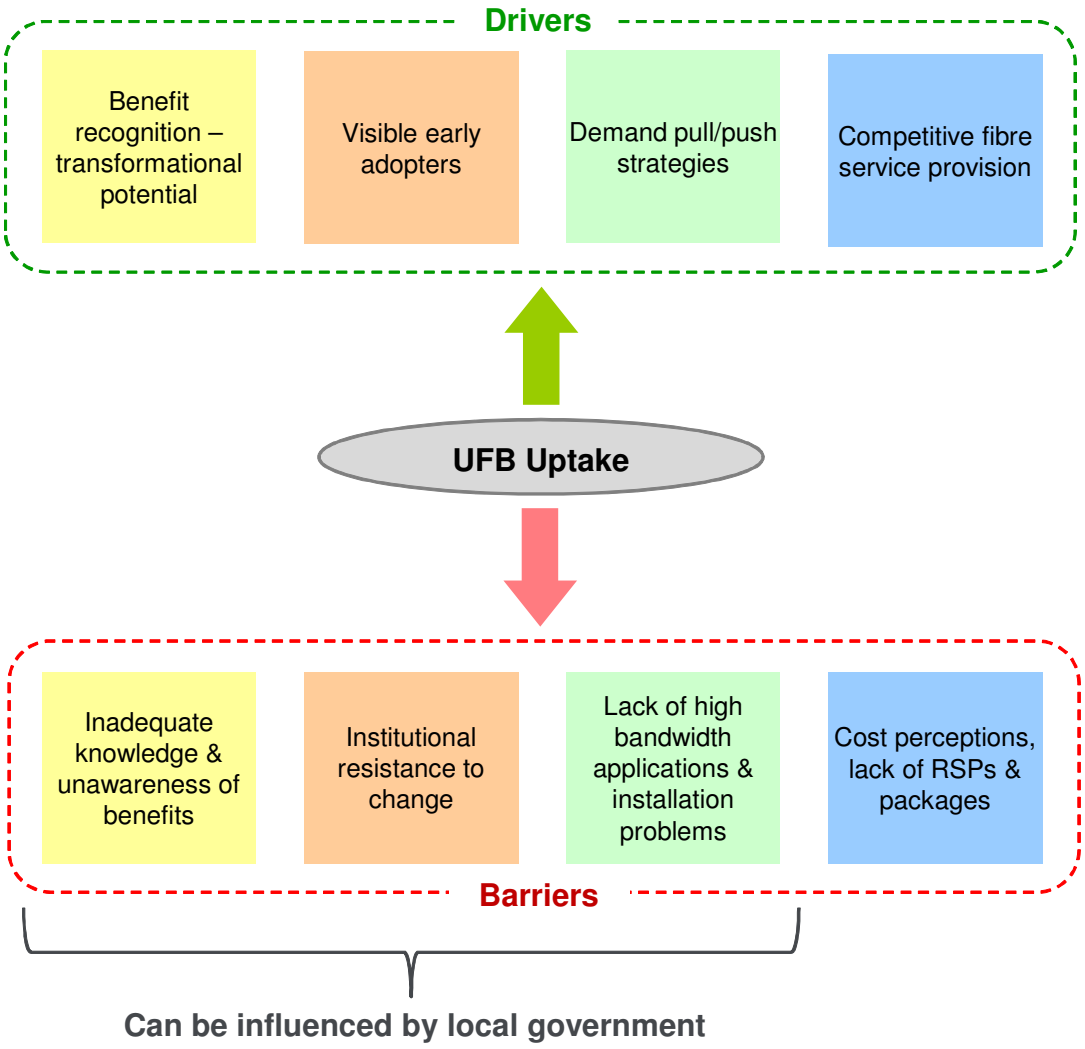

Exhibit 5.1: *Drivers and barriers to UFB uptake [Source: Network Strategies]*

In New Zealand the UFB initiative is based on an open access model with competing RSPs providing fibre offerings to the market. As such over time we would expect the business market in Wellington to enjoy a choice of fibre service providers with a growing number of product offers tailored to local business. Nevertheless international evidence indicates that uptake may be accelerated by local government via a mixture of strategies, policies and interventions, including demand pull and push strategies (Exhibit 5.2).

Policy development	Clear policy goals are required, not only in relation to fibre deployment but also for ICT infrastructure. Policies should address services / applications / demand promotion and be aligned with industry specific policy objectives.
Education and promotion for business / industry	The lack of understanding amongst businesses of the opportunities for transformational change via UFB may be addressed by assistance with education and training, as well as promotional activities to increase awareness. This includes working with industry to drive demand from within industries. In this regard example targeted case studies may be particularly useful.
Leading by example	Government and public bodies typically have significant ICT requirements, and so have opportunities to lead by example. It may be possible both to coordinate demand from public entities and to encourage businesses to engage using fibre-based services through e-government / e-procurement and e-business initiatives.
Working with RSPs / IT professionals	A focus is necessary on reducing installation difficulties and ensuring packages are designed specifically to meet the needs of various businesses – in particular SMEs. It is important to note that for businesses fibre-based services are not simply 'plug and play'. As such consideration must be given to maintenance support, user friendly platforms and software, and support for installation and use. In addition the development and use of applications that require UFB access may be promoted.
General education and promotion initiatives	The use of ICT in education and general promotional activities will increase awareness in general of high speed broadband and its potential. This may lead to spillover effects, increasing business demand for UFB.

Exhibit 5.2: *Potential strategies by local government to promote uptake of fibre services [Source: Network Strategies]*

More detailed local government initiatives recommended to increase business UFB uptake based on local and international studies are summarised in Exhibit 5.3.

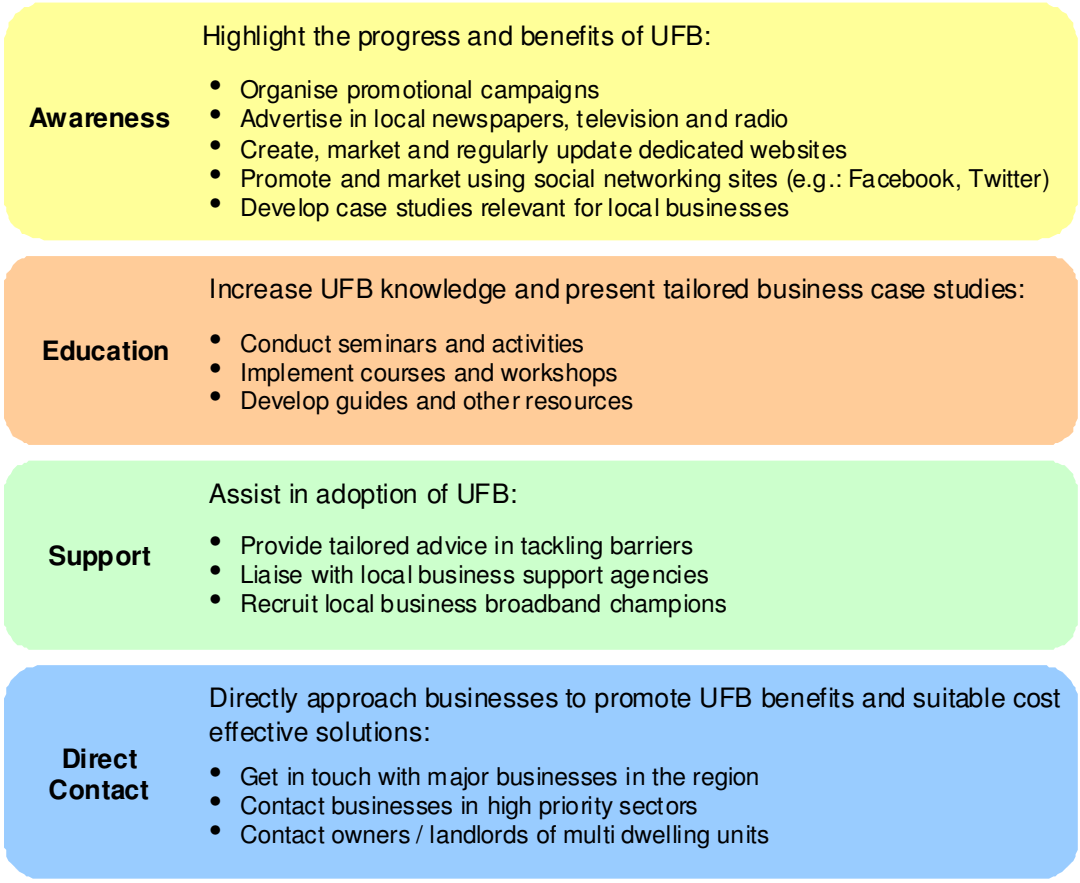

Exhibit 5.3: *Suggested local government initiatives to increase business UFB uptake [Source: Network Strategies]*

5.2 Increasing UFB awareness in Wellington

While it appears that New Zealand firms in general have heard of UFB, there are significant gaps in understanding of the potential business advantages it has to offer (beyond simply improving current Internet performance). Regional and local councils have a unique stakeholder role in relation to UFB. Unlike RSPs and LFCs, councils have no direct vested interest and as such firms regard councils as independent trusted advisors. Consequently councils are well positioned to develop awareness and educational initiatives. To this end, local case studies appear to be a very useful tool to demonstrate the benefits of fibre-based services, including increased productivity, more efficient use of existing and emerging applications, and possibilities for innovative and transformative

change. Naturally such studies should also evaluate the costs of service uptake to establish whether the costs might outweigh the potential benefits. However, our research to date indicates that in New Zealand attractive commercial offerings are becoming available, and as such for many businesses perceptions of the high cost of fibre may in fact be misplaced.

The second stage of this project will include the development of case studies, examining both costs and benefits, for Wellington firms that have already adopted UFB services in addition to firms contemplating UFB uptake.

Annex A: Examples of UFB benefits to New Zealand businesses

Crown Fibre Holdings has profiled a small number of companies to illustrate how New Zealand businesses are reaping the benefits of fibre.

Serato is an audio and video software producing company which won the People's Choice prize in the New Zealand Innovators Awards (2011). The company has customers located all over the world and hence, a fast and reliable fibre connection is:

> …the main conduit for software sales and updates, for support, and communication with customers. The main servers are in the US (with the requirement to back up the data to New Zealand), and Serato's tens (if not hundreds) of thousands of customers could be anywhere, so having to communicate with them means needing to move a lot of data around. Staff also have to frequently upload large files like high definition artist performance and product videos.[133]

Magnetism is a software company which uses UFB for video conferencing to save time and costs.[134] In addition, UFB has enabled development of new products, upload and download of large files and better data storage.

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133 Crown Fibre Holdings Limited website, *Turning the tables,* available at http://www.crownfibre.govt.nz/2012/10/turning-the-tables.

134 Crown Fibre Holdings Limited website, *Magnetism,* available at http://www.crownfibre.govt.nz/2012/08/magnetism-in-business.

Another example of a business successfully using UFB is Marathon Photos, supplier of photos and videos to marathon participants globally. The use of fibre (to quickly upload large data online and back up the data to the cloud):

> … has boosted productivity and saved cost, driving 30% growth, year on year in the last three years… Owner, Francis Kay says time is critical and with fibre he can quickly post large files of the races on his website so customers can view themselves online and buy a copy while the endorphins are still flowing.[135]

The need to transfer large files (x-rays, medical photos and scans) led to the adoption of UFB at the private hospital and medical centre, Kensington Hospital Ltd.[136] Fibre not only provided a faster and more reliable broadband connection but also resulted in cost savings.

> Finance Manager Karen Duncan says since the move to Ultra-Fast Broadband, surgeons have been able to look at a patient's x-rays from the operating theatre, test results come through quickly, and a GP can, within a normal consultancy timeframe, call up a specialist website to show a patient pictures of their condition.[137]

The final example is of a privately-owned cold storage logistics provider, Cold Storage Nelson. UFB has enabled the company to provide real time tracking of cartons for its clients using a sophisticated inventory management system.[138] This has resulted in increased efficiency and improved customer service.

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135 Crown Fibre Holdings Limited website, *Fibre in Use – Marathon Photos,* available at http://www.crownfibre.govt.nz/2011/10/fibre-in-use-business-1.

136 Crown Fibre Holdings Limited website, *Whangarei customer finds UFB costs less, not more,* available at http://www.crownfibre.govt.nz/2012/06/whangarei-customer-finds-ufb-costs-less-not-more.

137 *Ibid.*

138 Crown Fibre Holdings Limited website, *Cold Storage in Nelson,* available at http://www.crownfibre.govt.nz/2011/08/cold-storage-in-nelson/Crown.

Annex B: International case studies

B.1 Sweden

The "ICT for Everyone – A Digital Agenda for Sweden"[139] plan followed the 2009 Swedish Broadband Strategy[140]. The Agenda proposed a new ICT goal – that Sweden should become the best in the world in exploiting the opportunities offered by digitisation. The Agenda was developed with contribution from government agencies, enterprises, civil society and citizens and was intended as a tool for coordinating government efforts / actions focusing on the following strategic areas: [141]

- ensuring ICT is easy and safe to use for everyone
- development of a large and varied supply of services by both private and public sectors to increase and encourage innovation and new business models
- deployment of basic infrastructure to enable the use of digital services (including adhering to national and international standards, and providing good access to telephony and broadband in all parts of the country)

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139 Swedish Ministry of Enterprise, Energy and Communications (2011) *ICT for Everyone – A Digital Agenda for Sweden*, November 2011.

140 Swedish Ministry of Enterprise, Energy and Communications (2009) *Broadband Strategy for Sweden*.

141 Swedish Ministry of Enterprise, Energy and Communications (2011) *ICT for Everyone – A Digital Agenda for Sweden*, November 2011.

- maximising the role of ICT in societal development – for example by ensuring that laws / policies (such as those of privacy and copyright) are updated, as well as ensuring the use of ICT for a more sustainable society, for global development / research / innovation, and by encouraging modernised forms of democracy and participation.

The role of local government and central government highlighted in the Agenda included:[142]

- formulate policy goals and eliminate obstacles to development
- pursue opportunities that digitisation presents at the global and national levels
- create an enabling environment for the development of new services and establishment of infrastructure
- research and innovation must be supported to improve / modernise / support the digital environment
- encourage innovative thinking and development of new methods and working practices.
- ensure government administration is efficient and more accessible
- develop purchasing skills in the public sector on the basis of identified needs and services that would generate benefits
- provide models and drive efforts to ensure everyone can use ICT (disability, socioeconomic circumstances or geographical barriers must be overcome)
- while digital services and infrastructure may be provided by the market, the public sector must ensure that rules are applied in a uniform manner
- schools and tertiary institutions need to provide an opportunity for students to develop their digital skills
- ensure transparency and access to information
- encourage collaboration between different stakeholders.

A Swedish Digitisation Council has been established to describe / analyse development toward ICT policy objectives and identify any opportunities that exist in the area. The Council aimed to collaborate with authorities, individuals and organisations to develop a

142 *Ibid.*

draft action including identifying necessary key indicators that would be monitored to measure progress in fulfilling the national ICT objectives.

B.2 City of Seattle, Washington, United States

In December 2012 it was announced that the City of Seattle had reached an agreement with Gigabit Squared (organisation specialising in the planning, implementation and roll-out of ICT infrastructure) to develop and operate a fibre network.[143] A demonstration fibre project will begin in 12 neighbourhoods and wireless services will be used to provide coverage to other areas in the city quickly (compared to the time required to rollout a fibre network). FTTH / FTTB[144] connections will initially be provided to over 50 000 households and businesses.

According to the Gigabit Seattle website the aim of the network is to provide speeds that can support future applications and innovations with a view to enhance economic opportunities and quality of life.[145] Furthermore the Gigabit Seattle network is expected to enable video links for students for access to education from across the world. Medical professionals are expected to be able to better collaborate in real time with professionals located globally to deliver the best possible medical care. Public services are also expected to improve with safer streets and efficient government services. For example, deploying Internet services in police vehicles as well as fire and safety vehicles is expected to provide the professionals with resources that will improve performance.[146]

143 City of Seattle Mayor's office (2012) *Gigabit Seattle.*

144 Fibre to the business.

145 Gigabit Seattle, *About Gigabit Seattle.*

146 *Ibid.*

B.3 Chelan County Public Utility District, Washington, United States

The Chelan County Public Utility District (Chelan PUD) in Washington State entered the fibre market in 2000 competing with private network owners. Residents and community leaders recognised the benefits and opportunities that would be offered through affordable broadband access and deployment began with Washington State Government approval.[147]

As at August 2012 fibre services were available to approximately 70% of the county residents and the Chelan PUD had invested approximately USD120 million in the network.[148] Speeds of up to 1Gbit/s are offered to businesses accommodating various telecommunications or data connection requirements including tiered and burstable Ethernet levels.[149] Many of the County's agricultural and tourism businesses use fibre to help manage:[150]

- irrigation
- temperature and humidity control
- yield and rates
- coordination with transportation
- communications with vendors, distribution channels and sales teams
- financial reporting and accounting
- storage monitoring
- energy-saving programmes.

The CEO of Cevado Technologies commented that fibre technology had allowed the business to grow from three to four employees to having 20 people on staff over a period of three to four years. Cevado Technologies provides interactive website and programming services for clients from across the United States. Fibre has allowed the company to compete in the market more effectively. The CEO considers that fibre has provided himself

147 *Fiber optics In Chelan County – Lighting our Future video*, 2006.

148 Chelan County PUD (2012) *Chelan County PUD hires new leader for its fiber-optic system*, 28 August 2012.

149 Chelan County PUD website, *Strengthening local economy,* available at www.chelanpud.org.

150 *Ibid.*

and his staff the option of building a business and staying in the area instead of having to move to another location for work and business opportunities.[151]

Innovations in smart business technology utilising fibre in Chelan County have included:[152]

- local and rural business monitoring
- monitoring and savings on energy use
- reducing the need for travel for local and rural workers thereby having a positive impact on the environment and the community
- increased access to continuing education and training for employees
- improved internal processes with immediate access to information on industry best practices and the market
- efficiencies leading to cost-savings with the ability to collect, monitor and control large amounts of data to optimise systems.

Video conferencing centres have been established in educational and business centres in the Greater Wenatchee Area utilising the Chelan County PUD fibre network to allow video conferencing for businesses and educational institutions as well as for families.[153]

According to the Chelan County PUD connecting the schools to the fibre network has allowed the communities to provide the best opportunities for education by enabling tele-education.[154] The fibre network has also allowed high-quality and specialised medical services to be delivered to patients in rural areas.[155] Fibre services have become an important tool for emergency response providing the essential infrastructure and ensuring communication during natural disasters and emergencies.[156]

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151 *Fiber optics In Chelan County – Lighting our Future video.*

152 Chelan County PUD website, *Smart homes and businesses,* available at www.chelanpud.org.

153 Chelan County PUD website, *Video conferencing,* available at www.chelanpud.org.

154 Chelan County PUD website, *Education – the Fiber Advantage,* available at www.chelanpud.org.

155 Chelan County PUD website, *Health care,* available at www.chelanpud.org.

156 Chelan County PUD website, *Emergency response,* available at www.chelanpud.org

B.4 Bristol Virginia Utilities, United States

Bristol Virginia Utilities (BVU) owns a fibre network providing services to the City of Bristol, Washington County and Abingdon in Virginia State. BVU was the first municipal utility in the United States to offer triple play services which were launched in 2003.[157] As the network was initially being deployed in 1999 to provide telemetry for BVU-owned electric substations, local businesses and residents began expressing interest in connecting to the network and pushed for access. As a result BVU conducted surveys to determine the financial feasibility of extending the fibre network citywide. The survey results presented a significant interest from consumers for access to the network. Business plans were developed to launch the OptiNet unit of the network with two goals:[158]

- enhance economic development opportunities in Bristol and the surrounding areas through access to new services and future-proof technology
- improve the quality of life for residents and small businesses by offering affordable broadband access at stable prices.

By the end of 2004 BVU had a 39% penetration rate of homes passed and by the end of 2007 this had exceeded 60%. According to BVU's President and CEO BVU has achieved higher penetration rates than most other municipal fibre projects and cable operators and attracted commercial customers that were not being served by incumbent operators. This was claimed to be due to BVU's proactive efforts to ensure that the needs of the customer were understood and met.[159]

Surveys targeting existing businesses and organisations using fibre services were held by BVU as part of the FTTH Economic Impact Model project for the FTTH Council North America. The survey found that the highest benefits of fibre services were associated with operational activities (Exhibit B.1). As a result of the availability of fibre services the

157 BVU website, available at http://www.bvu-optinet.com.

158 *Ibid.*

159 *Ibid.*

number of days worked from home increased. Nearly 17% of survey respondents stated that they worked more from home directly because of FTTH.[160]

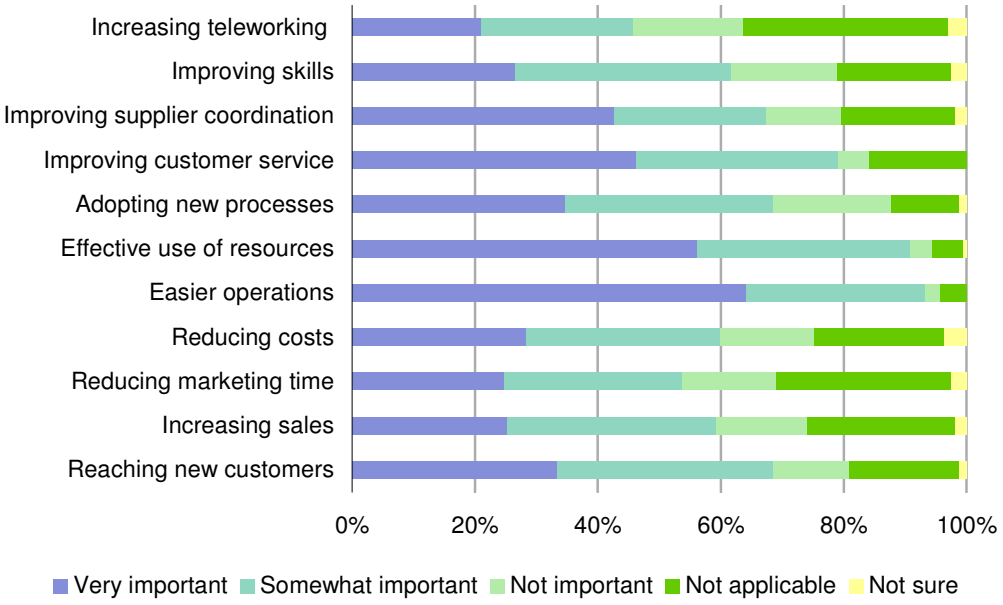

Exhibit B.1: *Benefits of fibre services [Source: BVU]*

B.5 Hull and East Yorkshire, United Kingdom

A increase of Internet traffic levels by almost 30% was experienced on KC's FTTH network in Hull and East Yorkshire during winter of 2012. The availability of fibre services has meant that remote working was feasible for workers unable to travel to work due to bad weather or snow. An increased number of businesses in the region are now using cloud services and Virtual Private Networks (VPNs) to minimise disruption.

160 BVU (2010) *Economic impact of fibre deployment in rural America – Survey results for BVU and Southwest Virginia,* 2 October 2010.

According to KC, company statistics indicated that small businesses in particular are utilising technology to empower staff to complete their work remotely.[161]

B.6 Connecting Cheshire, United Kingdom

Connecting Cheshire is an initiative between the Cheshire East Council, Cheshire West and Chester Council, Warrington Borough Council and Halton Borough Council (collectively referred to as CW&H) to bring high speed broadband to 110 000 homes and businesses in the region.[162]

A study of the potential impact of high speed broadband in CW&H found that between GBP180 million and GBP4 billion in business benefits could be realised between 2010 and 2025. Over 11 000 new jobs are expected to be created.

Connecting Cheshire is engaging with the business community in the region to increase awareness and provide impartial advice, information and promote access to superfast broadband.[163] An awareness programme for the local community is also being developed including workshops and road shows to discuss the impact of superfast broadband. "Digital Champions" have been recruited by Connecting Cheshire to create awareness at the local level including encouraging demand registrations from businesses / residents (reaching over 5 000[164] demand registrations in December 2012).[165]

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161 KC (2012) *30% surge in Internet traffic as employees log on at home to beat the snow.*

162 Connecting Cheshire website, available at www.connectingcheshire.org.uk.

163 Connecting Cheshire (2011) *Transforming your business and community.*

164 Connecting Cheshire (2012) *Connecting Cheshire reach 5,000 demand registrations,* News and Events, 19 December 2012.

165 Connecting Cheshire (2011) *Transforming your business and community.*

B.7 MälarEnergi Stadsnät, Sweden

The city of Västerås was the first in Sweden to build a municipal open-access fibre network in 1999. The motivation behind the deployment was to attract new businesses to the area.[166]

Promotional activities such as seminars and meetings to explain the advantages of fibre were conducted for different segments of the market (for example business users, real-estate owners etc). Despite high upfront costs, subscribers were interested in adding value to their properties and gaining access to services that were being offered at lower prices than other networks. In September 2010 more than 35 different service providers were offering over 185 services on the network including IPTV (Internet Protocol television), security services (alarms and monitoring), local booking systems (for businesses such as the local laundry, garage, etc) as well as community services such as healthcare and communication for the elderly.[167]

B.8 Pau-Pyrénéés, South West France

In April 2011 it was estimated that as a result of FTTH deployment over 800 new jobs had been created since 2005 in the municipality of Pau which encompasses a population of approximately 140 000 people.[168] The region has subsequently become highly attractive for new businesses. Distance learning has been developed by the University of Pau for students and a new campus has been established in Pau by the prestigious École Internationale des Sciences du Traitement de l'Information (a major French engineering school).

166 FTTH Council Europe (2010) *MälarEnergi Stadsnät – Pioneer open network in Sweden*, FTTH Success Story, September 2010.

167 *Ibid.*

168 FTTH Council Europe (2011) *Pau-Pyrénéés,* FTTH Success Stories, April 2011.

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