

Beltrán, Fernando

**Conference Paper**

## Open access networks and national broadband plans: Tales from down

19th Biennial Conference of the International Telecommunications Society (ITS): "Moving Forward with Future Technologies: Opening a Platform for All", Bangkok, Thailand, 18th-21th November 2012

**Provided in Cooperation with:**

International Telecommunications Society (ITS)

*Suggested Citation:* Beltrán, Fernando (2012) : Open access networks and national broadband plans: Tales from down, 19th Biennial Conference of the International Telecommunications Society (ITS): "Moving Forward with Future Technologies: Opening a Platform for All", Bangkok, Thailand, 18th-21th November 2012, International Telecommunications Society (ITS), Calgary

This Version is available at:

<https://hdl.handle.net/10419/72525>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# **The 19th ITS Biennial Conference 2012**

## **“Moving Forward with Future Technologies: Opening a Platform for All”**

18 - 21 November 2012, Thailand

**Open access networks and national broadband plans:**

**Tales from Down Under**

**Fernando Beltrán**

**University of Auckland Business School**

**E-mail: [f.beltran@auckland.ac.nz](mailto:f.beltran@auckland.ac.nz)**

# Open access networks and national broadband plans: Tales from Down Under<sup>1</sup>

**Fernando Beltrán**

[f.beltran@auckland.ac.nz](mailto:f.beltran@auckland.ac.nz)

University of Auckland Business School

Auckland, New Zealand

September 2012

## **Abstract**

Recently, governments in many countries have acknowledged the higher complexity involved in finding the more efficient path towards a so-called broadband ecosystem. The governments of Australia and New Zealand are leading the deployment of national fibre-based broadband infrastructures through Public-Private-Partnerships (PPP). The paper is on the approach followed by New Zealand and Australia to developing Next-Generation broadband infrastructure, their broadband policies and strategies for network deployment. It also contributes an economic analysis that allows understanding the economics of those country-wide broadband platforms. The paper critically analyses the short history of each experience, including the political process, the reasons exhibited that justify the governments' involvement in infrastructure deployment, and the institutional arrangements introduced to manage the PPP. The paper's main goal is to contribute analytical tools to the understanding of the economic effects of a purpose-made infrastructure on the markets that, according to every government's declared expectation, will be propelled by the combined effect of policy decisions, regulations and technology deployment. The paper analyses the effect of network design principles such as open access and regulated wholesale tariffs on the efficiency of service markets to be deployed on the fibre-based next-generation platform.

---

<sup>1</sup>This work has been partially supported by University of Auckland Business School FRDF grant 3627071.

## 1. Introduction

The governments of Australia and New Zealand are driving, each in its own way, the deployment of national fibre-optics broadband infrastructures through Public-Private-Partnerships(PPP). The two cases presented analyse regulatory decisions such as the split of New Zealand's incumbent operator Telecom NZ and the Australian government deal with Telstra.

The government of Australia is investing close to A \$40.9 billion<sup>2</sup>, of which \$27.5 billion are Government equity and the remaining \$13.4 are debt funding, into the deployment of a nationwide broadband network, the National Broadband Network (NBN), pledging that *"by 2020, Australia will be among the world's leading digital economies"*<sup>3</sup>. The NBN will provide high-speed broadband access to 100 per cent of Australian households and businesses, with 93 per cent of Australian homes, schools and businesses connected via a high-speed fibre optics network, and the remaining population connected through a combination of next-generation fixed-wireless and satellite technologies. Likewise, the New Zealand national broadband initiative, whereby the government currently builds a nation-wide fibre-optics network, is known as the Ultra-Fast Broadband (UFB) network. Crown Holdings Fibre (CFH), the government agency in charge of UFB deployment, has invested NZD \$1.5 billion with a similar amount expected from private partners. Upon conclusion it is expected that 75% of New Zealanders will enjoy fibre access to the high-speed digital communications network. The remaining population will benefit from the Rural Broadband Initiative (RBI), a government program to deploy broadband access either wireless or satellite-based connections to rural areas.

The paper is structured as follows. First, main technical aspects and policy decisions regarding market wholesale structure and wholesale prices are described for Australia's NBN. Next, similar considerations are done for the case of UFB in New Zealand. In each of both cases a short historical account is provided in order to highlight the importance of the political process. Then the concept of broadband ecosystem is introduced followed by a discussion of three main features of any broadband ecosystem: understanding the incentives governments need to provide for infrastructure

---

<sup>2</sup> NBN Co, "Corporate Plan 2011- 2013", 2010, accessed Sep. 29, 2012, <http://www.nbnco.com.au/assets/documents/nbn-co-3-year-gbe-corporate-plan-final-17-dec-10.pdf>

<sup>3</sup> Australian Government, "National Digital Economy Strategy", 2011, accessed Sep. 29, 2012, [http://www.nbn.gov.au/files/2011/05/National\\_Digital\\_Economy\\_Strategy.pdf](http://www.nbn.gov.au/files/2011/05/National_Digital_Economy_Strategy.pdf)

growth and uptake of broadband-based services; the need for broadband policies on service creation and application development; and, finally, the importance of the open access design principle followed by both UFB and NBN and its implications for network neutrality. The last section concludes.

## **2. The National Broadband Network of Australia**

In Australia the low rankings in the OECD tables on broadband uptake and pricing throughout the 2000s alerted the government to take political action aimed to deter Telstra, the incumbent telecommunications operator, to use its continuing control of the last-mile infrastructure to dominate the emerging market of fixed broadband. In November 2008, all Australian governments endorsed a six-volume National PPP Policy and Guidelines to replace separate arrangements across the nation<sup>4</sup>; shortly thereafter the newly elected Labour government proposed a National Broadband Network (NBN) as one of their 'nation-building' initiatives<sup>5</sup>. After two years of debates and revisions to the budget process in 2011 the cost to construct the NBN was raised to A\$36 billion plus A\$11 billion to be paid to Telstra for their existing network structure to be incorporated into the NBN<sup>6</sup>.

Earlier, in 2009 the government established NBN Co to manage the building and running of the NBN. NBN Co was immediately commissioned with the building of the network with a business plan that would make it the sole provider of wholesale services to retail service providers. Such providers, operating on a competitive environment, would be the operators of end-user services.

To enable high-speed connections between the population centers across the continent, the government had launched a \$250 million Regional Backbone Blackspots Program (RBBP) to build some supplementary broadband 'highways' to complete the network already in place, mostly owned by Telstra.

Early January 2012 marked the achievement of several crucial milestones for the broadband project. NBN Co announced it had signed agreements with network construction contractors in every

---

<sup>4</sup>Given, J. "Take your partners: public private interplay in Australian and New Zealand plans for next generation broadband", 2010, *Telecommunications Policy*, 34, 540-549.

<sup>5</sup> Kevin Rudd, "The global financial crisis", *The Monthly*. 42 (February), accessed Apr. 28, 2012, <http://www.themonthly.com.au/node/1421>.

<sup>6</sup>Lucy Battersby, "Tower ban regions face slower broadband", *The Sydney Morning Herald*, Jan. 18, 2012, accessed Mar. 19, 2012, <http://www.smh.com.au/it-pro/government-it/tower-ban-regions-face-slower-broadband-20120118-1q59y.html>.

state and territory; the opening of the nerve centre of the network – the National Operations and Test Facility in Melbourne; the signing of the first commercial contracts, the Wholesale Broadband Agreement; the lodging with the ACCC of the Special Access Undertaking framework for how the NBN will be regulated over the long term; and an ground-breaking deal with Telstra.

The deal with Telstra will have a large percentage of Australians migrating to fibre-optic connections for broadband and telephone services. As Telstra gradually shuts down its copper infrastructure over the next decade and moves its almost 10 million customers to the NBN, it will be compensated by NBN Co with A\$11 billion<sup>7</sup>. The deal secures Telstra a cash flow for the next 30 years<sup>8</sup> by which Telstra has effectively sold its copper network to NBN Co. Telstra will receive payments *“every time copper phone lines are disconnected and replaced by fibre-optics in premises”*<sup>9</sup>.

NBN Co plans to offer on the FTTP network to its Retail Service Provider wholesale speeds of up to 100 Mbps generally for towns with populations bigger than 1000 , comprising 93% of Australian premises by 2021<sup>10</sup>. The NBN will be rolled out in a series Fibre Serving Areas (FSA) of up to 40,000 premises that are made up of up to 12 geographic modules, each covering about 3,000 premises. It is envisaged that for each FSA module it will take about 12 months from the start of site works to activation of the first service<sup>11</sup>. The remaining 7% of premises are composed of 4% being those on the outer fringes of regional towns to be serviced with fixed wireless networks at 12 Mbps download and 1 Mbps upload speed, and 3% remote premises to be serviced with satellite services at 6 Mbps download and 1 Mbps upload speed<sup>12</sup>.

Figure 1 shows a schematic view of the NFAS product components. The wholesale speeds apply to the capacity delivered between the user’s port (or User-Network Interface, UNI) and the network port (or Network-Network Interface, NNI). NBN defines the Fibre Access Service (NFAS) as its primary functional unit. It is a “wholesale, layer 2 based Ethernet access product” that uses FTTP

---

<sup>7</sup>Yates.

<sup>8</sup>Lucy Battersby, “Telstra in 30-year NBN deal”, *The Age*, Mar. 7, 2012, accessed Apr. 17, 2012, <http://www.theage.com.au/business/telstra-in-30year-nbn-deal-20120307-1ukij.html>

<sup>9</sup>Idem.

<sup>10</sup>Given.

<sup>11</sup>NBN Co, “About the rollout”, 2011, accessed Apr. 29, 2012, <http://nbnco.com.au/rollout/about-the-rollout.html?icid=pub%3Arollout%3A1yr%3Abod%3Aabt-roll-maps>

<sup>12</sup> Lucy Battersby, “Tower ban regions face slower broadband”.

technology<sup>13</sup> that supports several classes of services, among those are the bit-stream services, traffic classes, telephony capability, multicast, service operation, administration and maintenance, and physical interconnection agreements<sup>14</sup>. The UNI is available on the NFAS in two forms: the UNI-Data and the UNI-Voice. NFAS traffic performance guarantees apply to the Access Virtual Circuit (AVC) component. The portion of the virtual circuit within the point of interconnection site –which belongs to the NBN - is known as the Connectivity Virtual Circuit (CVC).

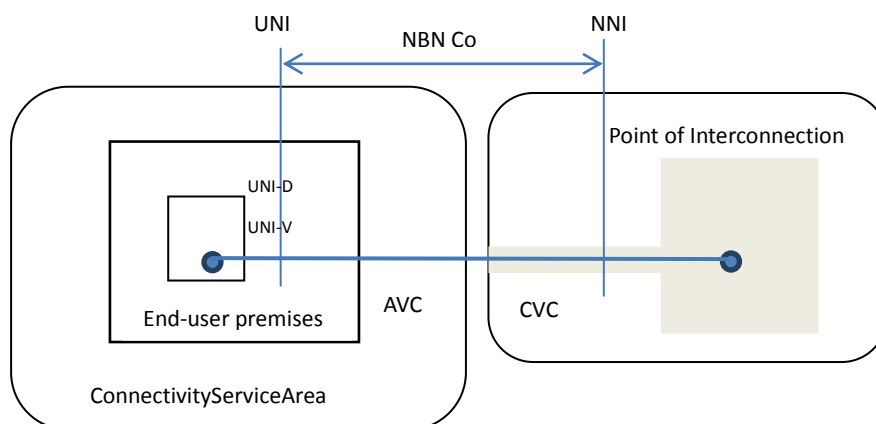


Figure 1. Product components of the NFAS<sup>15</sup>.

The NFAS will provide wholesale access service to service providers; those services, also known as Layer-2 services, will be purchased by NBN’s customers, that is, the service providers that will use them to deliver end-user, IP-based telecommunications services.

In order to guarantee a flexible range of options to service providers that support their different traffic profile needs, the NFAS offers four service classes (known as Layer-2 Class of Service, CoS)<sup>16</sup>. Table 1 displays the four service classes and illustrates their potential utilization by wholesale services that are used as inputs to provide end-user services. Any provider can use the NFAS to provide the following service types: unicast data services, IP-based telephony services, and multicast data services<sup>17</sup>. All service types can operate simultaneously over the same port on the end-user’s

<sup>13</sup> NBN Co, “Wholesale NBN Co Fibre Access Service. Product Overview Fibre Access Services”, 2010, accessed Sep. 29, 2012, [http://www.nbnco.com.au/assets/documents/product-overview-fibre\\_1\\_03\\_final.pdf](http://www.nbnco.com.au/assets/documents/product-overview-fibre_1_03_final.pdf)

<sup>14</sup> NBN Co, “NFAS Traffic Class Performance” Discussion Paper, accessed Apr. 26, 2012, <http://www.nbnco.com.au/assets/documents/traffic-performance-whitepaper-dec-2011.pdf>

<sup>15</sup> Adapted from NBN Co, “NFAS Traffic Class Performance”

<sup>16</sup> NBN Co, “NFAS Traffic Class Performance”

<sup>17</sup> NBN Co, “NBNCo Technical Discussion Paper (multicast)”, accessed Apr. 28, 2012, <http://www.nbnco.com.au/assets/documents/nfas-technical-discussion-paper-multicast.pdf>

equipment. Unicast services may be used for a range of data applications, among them Internet access, while multicast services allow multi-media content distribution.

NFAS Traffic Class	Characteristic	Bit stream features	End-user services
<b>Traffic Class 1</b>	Deterministic throughput with committed capacity	Low bit-rates Small packets	Voice
<b>Traffic Class 2, Traffic Class Multicast</b>	Deterministic throughput with committed capacity	High bit-rates Large packets	Streaming High Definition Video
<b>Traffic Class 3</b>	Committed capacity	Ability to burst at peak rate	Premium data Gaming Business VPN access
<b>Traffic Class 4</b>	Best-effort	Ability to burst at peak rate	Internet access

Table 1. NBN Co's Traffic Classes and examples of end-user services

### 3. New Zealand UltraFast Broadband network

With the country's 22<sup>nd</sup> position in Internet speed amongst 45 countries and its 35th place out of 66 countries in terms of broadband Quality of Service (QoS), in 2009 the New Zealand government announced an initiative to provide high-speed broadband to New Zealanders through the deployment of a countrywide optical fibre infrastructure into New Zealand cities<sup>18</sup> in what is today known as the Ultra-Fast Broadband (UFB) network. Evidence of the effects of broadband uptake on GDP per capita from a World Bank report<sup>19</sup>, which shows that a 10% increase in broadband achieves up to 1.21% increase in GDP in developed countries and up to 1.38% increase in developing countries, was used as a main source and justification. The announcement was followed by the creation of Crown Fibre Holdings (CFH), the state-owned company that will manage and monitor the Crown's investment in the UFB and will operate the UFB private-public partnership with selected partners. The initiative is a main component of a larger body of policy aimed to reform the

<sup>18</sup>Murray Milner, "Playing the Telecommunications Game in New Zealand". *Telecommunications Journal of Australia*, 59, 17, 2012.

<sup>19</sup>World Bank (2009). Information and Communications for Development 2009: Extending Reach and Increasing Impact, accessed April 28, 2012, <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONS/EXTINFORMATIONANDTECHNOLOGIES/EXTIC4D/0,,contentMDK:22229759~menuPK:5870649~pagePK:64168445~piPK:64168309~theSitePK:5870636,00.html>



telecommunications sector to make it a propeller for economic growth. In November 2011, after negotiations that involved the government, CFH and the incumbent Telecom NZ, the latter was finally split into a wholesale branch, now known as Chorus, and a retailer that retained the Telecom brand.

The purpose of the UFB project is to accelerate the roll-out of an access network deploying optical fibre infrastructure to 75 percent of New Zealanders by the end of 2019. The priority of this project is broadband users such as businesses, schools and health services, in addition to greenfield developments in particular residential areas<sup>20</sup>. UFB aims to guarantee residential broadband services at a speed of 100 Mbps downstream (from the internet to the user) and 50 Mbps upstream (from the user to the internet). CFH oversees a government investment of NZD \$1.5 billion in the UFB with a similar share expected from private investors.

The private-public partnerships are known as Local Fibre Companies (LFCs). Close to 70% of the country's urban premises will be served by Chorus. The remaining urban residential and business areas will be connected to with Northpower Fibre Limited (in the north), Ultrafast Fibre Limited (in western and central areas of the North Island) and Enable Networks Limited (in Christchurch and east-central South Island). In May 2011, CFH finished agreements with all four LFCs which state that CFH funds the cost of fibre 'passing', that is, the connection running down the street, while the partner must fund each 'drop', that is, the connection from the street to the premise<sup>21</sup>.

Figure 2 is a schematic representation of the main architectural features regarding the connectivity from the UFB to the end-user's premises; the diagram shows the general architecture of an LFC service area and potential interface points for access seekers.

---

<sup>20</sup>CFH, "Ultra Fast Broadband in Business - Seizing the Opportunity", accessed May 22, 2010, <http://www.crownfibre.govt.nz/media/9669/ultra%20fast%20broadband%20in%20business%20-%20seizing%20the%20opportunity.pdf>

<sup>21</sup>CFH, "Fact Sheet: Agreement with Enable Networks", accessed Mar 19, 2012, <http://www.crownfibre.govt.nz/media/13092/fact%20sheet%20-%20agreement%20with%20enable%20networks.pdf>.

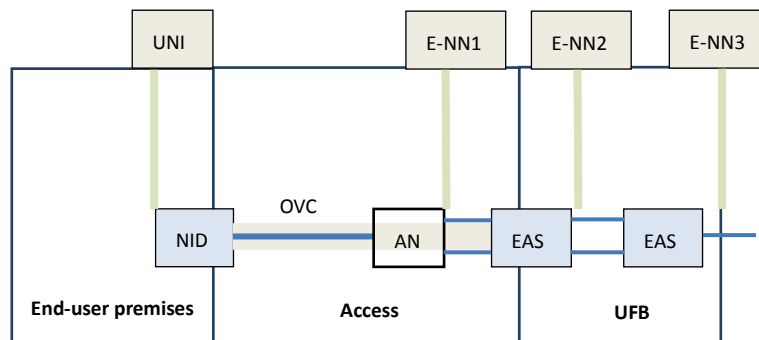


Figure 2: Access Provider Network Architecture (TCF, 2011)

The Network Interface Device (NID) is provided by the LFC and is located in the end-user’s premises. The NID implements the User Network Interface (UNI) which is the physical and logical demarcation point for the service and terminates the physical access fibre. At the opposite extreme the fibre terminates on the Access Node (AN) of the LFC network. Traffic from a number of ANs is delivered to the network’s point of service or External-Network Network Interface (E-NNI). A service will be operated using an Operator Virtual Circuit (OVC), which is an association between a UNI and E-NNI. Bandwidth management should assure that between the UNI and each Retail Service Provider’s E-NNI the bandwidth commitments on each OVC are honoured at all times.

Since the UFB will operate as an open access network, a provider service, known as Retail Service Provider (RSP) wishing to provide end-user telecommunications services only has to register with a LFC. An RSP will purchase wholesale services from the LFC using the technical and economic conditions spelled for OVCs (see next section).

Consumers in any region will have access to the UFB network at no charge from their LFC; in fact CFH has stated in its agreements with the LFC that “except in exceptional circumstances there will be no one-off wholesale connection charge for residential consumers to connect to UFB at a wholesale level”<sup>22</sup>. LFCs will sell Layer-2 (wholesale) services to RSPs, charging them at regulated wholesale prices, to be used in the delivery of end-user (retail) services. Once a RSP purchases Layer-2 access, it can release its own products to end-users which would be most likely based on a triple play (Internet access, VoIP, IPTV) offer. LFCs are not allowed to trade with end-users directly

<sup>22</sup>CFH, “Fact Sheet: Agreement with Enable Networks”, accessed Mar 19, 2012, <http://www.crownfibre.govt.nz/media/13092/fact%20sheet%20-%20agreement%20with%20enable%20networks.pdf>.

but only provide wholesale access for RSPs who in turn will serve end-users<sup>23</sup>.

#### 4. Comparing the wholesale offers of NBN and UFB

Both NBN and UFB follow a similar pathway to selling wholesale services. Wholesale services are the key to the provision of new end-user services on the broadband platforms. Given the economic structure imposed on the Australian and New Zealand broadband platforms, service providers should find in the price levels of wholesale service price scheme the right incentives for deploying their business plans. Both countries have already advertised price charts which prescribe the price levels and allowed increases for the first 8 to 10 years – depending on the country- of operation. Next we review the two country wholesale price structures.

##### 4.1. NBN wholesale prices

Wholesale customers will be charged the same price across all NBN three technologies: fibre, wireless, and satellite<sup>24</sup>. Prices for NFAS product components are shown in Table 2. As can be seen access to facilities is at no charge. AVC products vary across a range of upstream/downstream combinations.

Product component	Monthly charge (AUD)	Non-recurring charge (AUD)
<b>Facilities access</b>		
Optical distribution frame termination point	Zero charge	Zero charge
<b>Network-Network Interface</b>		
1 Gbps 1000Base LX	\$200	\$1,000
10 Gigabit per second 10GBaseLR	\$400	\$5,000
<b>Access Virtual Circuit*</b> (downstream/upstream)		
12/1 Mbps	\$24 <sup>#</sup>	N/A
25/5 Mbps	\$27	N/A
25/10 Mbps	\$30	N/A
50/20 Mbps	\$34	N/A
100/40 Mbps	\$38	N/A

Table 2. NFAS product component prices

(\*) Includes UNI-Data<sup>#</sup> A freeze has been imposed on the price of 12/1 AVC until mid-2017; the other prices are also frozen but only until the end of 2013<sup>25</sup>.

<sup>23</sup> In its 2009 Invitation to Participate, MED says that a LFC can indeed offer end-user services in competition with RSPs. LFC would have to use a separate subsidiary. The latter contributes to further justify the introduction of non-discriminatory and equivalence principles.

<sup>24</sup> Lucy Battersby, “Tower ban regions face slower broadband”

<sup>25</sup> Lucy Battersby, “NBN reveals 5-year fixed price plan”, *The Sydney Morning Herald*, Dec. 6, 2011, accessed

NBN Co envisages that once, with completion of the RBBP, the fiber ‘highway’ infrastructure is improved and owned by a larger variety of providers (no longer predominately Telstra) the consumers will benefit from increased competition and packages with larger download quotas and faster speeds will become available. This however would not prevent retailers increasing end-user prices.

#### 4.2. New Zealand

As a result of negotiations between CFH and the LFCs, the latter have posted price lists for wholesale service prices; the prices are on a “per customer per month” basis. By regulation a LFC will not be allowed to charge more than the specified monthly price when its client RSP signs up a new customer.

An example of LFC prices for the home/retail customer sector in New Zealand is displayed in Table 3 with a similar structure, although higher-speed connection for businesses. The table shows the price caps that CHF and its partners have agreed on for entry level broadband connection, high-definition video, and entry-level business service prices. LFCs will charge wholesale prices that will rise steadily during the first 8 years as is the case of Residential Entry and Residential Triple-Play while others will be kept constant or will slightly decrease as in Triple-Play 100/50<sup>26</sup>.

<i>Product</i>	<i>Downstream/Upstream data rates</i>	<i>2011 CCPM* (NZD)</i>	<i>2019 CCPM* (NZD)</i>
<b>Basic Voice Channel</b>	Greenfields or LFC-discretionary	25.00	25.00
<b>GPON<sup>#</sup> Residential Entry</b>	30Mbps/10 Mbps	37.50	42.50
<b>GPON Residential Triple-Play</b>	30Mbps/10 Mbps	41.25	46.25
<b>GPON Business Entry</b>	30Mbps/10 Mbps	49.95	49.95
<b>GPON Triple-Play</b>	100Mbps/50 Mbps	55.00	49.90
<b>GPON 100/100</b>	100Mbps/100 Mbps	175.00	175.00
<b>HD Video Channel</b>	10 Mbps for multicast video	5.00	5.00

Table 3. Products and prices for home/retail customers in the CFH-Chorus agreement.

(\*) CCPM: Customer charges per month.

(<sup>#</sup>) Gigabit Passive Optical Network, a network architecture that brings fiber to the premises using a point-to-multipoint scheme that enables a single optical fiber to serve multiple premises.

---

Mar. 19, 2012, <http://www.smh.com.au/business/nbn-reveals-5year-fixed-price-plan-20111206-1og1j.html>

<sup>26</sup> The notation adopted by CFH for wholesale services such as Triple Play 100/50 means that the service guarantees 100 Mbps for downstream traffic (from the provider to the end-user) and 50 Mbps for upstream traffic (from the end-user to the provider).

## 5. The broadband ecosystem

The idea that broadband access creates conditions for providers, users and investors to increase the volume of transaction and the potential for spilling effects into several sectors of society was first formalized through the introduction of the broadband ecosystem concept by Kelly et al. (2009). The concept of broadband ecosystem enables us to have a broader view of broadband infrastructure as a platform that enables the enhancement of relationships among its users and suppliers. According to Kelly et al. a broadband ecosystem is “a multilayered system of interconnected high-capacity communications networks, bandwidth-intensive services, applications, and users”. Figure 3 shows the elements of the broadband ecosystem construct.

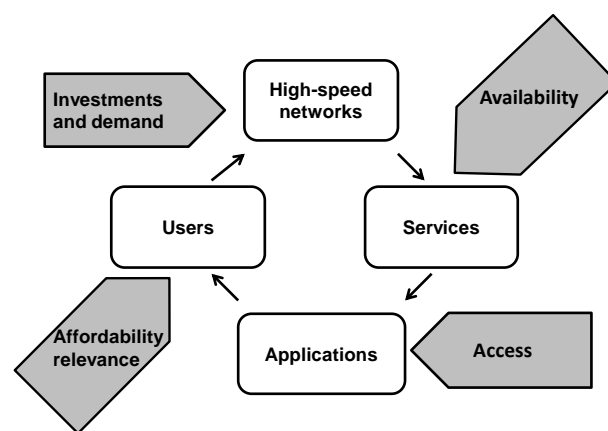


Fig. 3.The broadband ecosystem. Source: Kim et. al. (2010)

The broadband ecosystem model suggests that investment in high-speed networks creates the conditions for service and application availability; next, assuming that users can afford them they will create the demand that will be able to sustain investment. This idea of a virtuous circle in the broadband ecosystem raises the question of where and how a government can propel the flow of actions on the ecosystem by intervention, if necessary. Australia and New Zealand have decided to spur the expected benefits by proposing private partners to co-invest in the deployment of, mainly, fibre access complemented with wireless and satellite broadband access, solving the supply question at least concerning the conditions for better and more reliable access infrastructure. The two countries are among the highest per-capita investors in the OECD in terms of use of public funds for broadband deployment as can be seen in Figure 4.

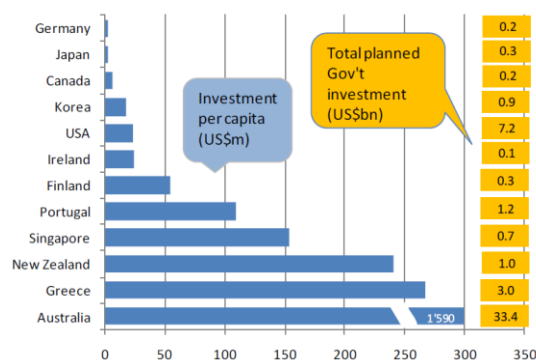


Figure 4. Government investment on broadband (Taken from Kelly et al. 2009)

### 5.1. Incentives for infrastructure growth and uptake

Several governments have stated their visions for the deployment of broadband infrastructure. But besides stating a clear vision government initiatives need to strongly support themselves on the design of investment incentives and the promotion of broadband use<sup>27</sup>. New Zealand has put forward two initiatives to develop broadband infrastructure in the country: the UltraFast Broadband network (UFB) and the Rural Broadband Initiative (RBI)<sup>28</sup>. The LFCs that build the UFB were created after the government provided the incentives that would attract private investors that see in government's role a vehicle for risk and uncertainty attenuation. This is a key aspect that aims to diminish some of the obstacles NZ entrepreneurs objected to when seeking to become partners. PPPs have played a key factor for the deployment of broadband networks by exploiting a relationship of mutual benefit to each party. An incentive scheme has been designed into the fibre network plan by which the public partner will fund the cost incurred by the private partner to connect end users; then, during the ten-year concession period the government expects that this mechanism will see the private partner progressively buy out a significant portion of the public partner's shares in the joint venture. During the concession period, the private partner will receive all of the dividends paid by the joint venture from its operating profits.

Policy aimed for broadband uptake and use needs also be developed. In an open access broadband network policy-makers enable an environment for participation and demand *in terms of the access to the network*<sup>29</sup> when access to the network is priced below cost or at no charge at all.

<sup>27</sup> Gómez-Torres, L. M., & Beltrán, F. "Analysis of an integrated plan for expanding broadband access in Colombia" *Telecommunications Policy*, 2011,35(9-10), 871-882.

<sup>28</sup> MED Ministry of Economic Development. Invitation to Participate. October 2009.

<sup>29</sup> Kim, Y., Kelly, T., and Raja, S. "Building broadband: Strategies and policies for the developing world, *Global Information and Communication Technologies (GICT) Department*" 2010, World Bank.

As both country-cases studied in this chapter attest it, access to the platform by end-users is at no cost in Australia (see Table 1) and at no one-off wholesale connection charge for residential consumers in New Zealand.<sup>30</sup>

## **5.2. Broadband policies on service creation and application development**

Three stages of service development are regularly identified, namely, promotion, oversight, and universalization<sup>31</sup>. In New Zealand's UFB incentives for the promotion of services are found in preferred prices or pricing scheme for provision of broadband networks to schools and other priority users. Government practices a hands-off approach by which intervention is only justified when market is not able to deliver. New Zealand's Digital Strategy 2.0 proposes a widening of digital access to government services and an improved, new stage of development and improvement of local digital content; additionally the plan also foresees actions to assure creators and investors an adequate intellectual property legal framework.

## **5.3. Open access, network neutrality and discrimination**

The Internet was designed as an open network with "no gatekeepers over new content or services"<sup>32</sup>, its layered end-to-end architecture placing network intelligence at the edges rather than at the core. Such technical features are the sources of the wide range of services and innovative offers only possible by avoiding central control and by incentivizing innovation at the edges. Same principle applies to the UFB and NBN. While incumbent telephone companies have not traditionally interested in providing an open access platform, the fibre-based broadband networks have been conceived as a level playfield in which service providers cannot be refused access.

One of the questions raised by open access to a third-party infrastructure is the extent of the operator's involvement in the provision of services in a way that service providers end up competing with the network's owner. Both Australia and New Zealand have mandated that for a period of several years (in Australia until 2020, in New Zealand until 2019) the network operators cannot

---

<sup>30</sup> CFH "Fact Sheet: Agreement with Enable Networks", 2011, Retrieved from <http://www.crownfibre.govt.nz/media/13092/fact%20sheet%20-%20agreement%20with%20enable%20networks.pdf>.

<sup>31</sup> Kim et al.

<sup>32</sup> Cerf, V. G. "U.S. Senate Committee on Commerce, Science, and Transportation hearing on network neutrality", 2006.

provide retail services directly. Therefore in those countries open access is complemented with an explicit mandate that forbid end-user service provision by network operators.

Concerned with open access, innovators, end-user application developers, and the public in general understand the virtues of open access to Internet. Since the platform allows the provision of Internet-based services the network neutrality debate will start to occupy a particular place in the efficient functioning of both UFB and NBN. The network neutrality principle proposes that no operator can discriminate against content or traffic that travels on its network or against particular websites and devices used to access the Internet. Forbiddance on network operators alleviates network neutrality concerns, at least for the period over which no network owner is allowed to be a retailer.

Under network neutrality, all traffic is treated equally, and discrimination and prioritisation are prohibited. Network neutrality opponents warn of the possible efficiency losses incurred by imposing a uniform regime on traffic management on all providers under any circumstance. In other words, the critics inquire about the role of traffic discrimination as a possible welfare enhancer; they claim that allowing providers to offer a menu of options by which users are price-discriminated may have the ability to increase network operation efficiency.

The latter raises the question: in a broadband environment, which forms of network discrimination are appropriate? <sup>33</sup>. Any form of traffic discrimination is subject to debate. As providers respond to different consumers' tastes by offering different sets of service attributes, consumers may benefit from having a wide variety of services that closely match their preferences.

Given the multiproduct nature of telecommunication service provision, retailers will find it to their advantage to perform a sort of network management deemed as "non-neutral". Two non-neutral network policies are usually mentioned:<sup>34</sup> application-based and source-based discrimination. Application-based discrimination is the prioritisation or discrimination of traffic based on the type of content or application. Under source-based discrimination, traffic is prioritised or discriminated based on its source, that is, the identity of a network user serves as the prioritisation, or discrimination, criterion. Network providers are able to assign priority levels to individual network users. They may find it appealing to execute price discrimination, and charge

---

<sup>33</sup>Commerce Commission New Zealand "High speed broadband services demand side study", 2011, Issues paper 1: technical issues. December.

<sup>34</sup>Federal Trade Commission, 2007, *Broadband connectivity competition policy*.



differently for prioritised and non-prioritised network services<sup>35</sup>. Many scholars argue that source-based discrimination may lead to a superior allocation of network capacity and network cost<sup>36</sup>. Others argue that it may result in a strong redistribution of market power in favour of network providers, which these would then use to exploit network users<sup>37</sup>. Regulators generally perceive it as anticompetitive.

## 6. Conclusion

By design the new broadband platforms are open access, high-speed networks with no obviously apparent competition in the wholesale access market. Agreements have been reached by which wholesale prices have been effectively locked-up for a number of years, providing a degree of regulatory certainty to the investors on the wholesale market as well as on the retail side. In both, Australia and New Zealand, such regulatory certainty is an outcome of public debate and pressure exerted by diverse actors via the competition watchdogs. In fact the concerned bodies, ACCC in Australia and the Commerce Commission in New Zealand, have advised and challenged NBN Co and CFH, respectively, on modifications or changes to proposed undertakings.

The dominant incumbents, Telecom in New Zealand and Telstra in Australia will focus their efforts on continuing their current market dominance in the copper-based broadband market as long as the full turnover to fibre access is still not completed. Meanwhile they start to cooperate for mutual benefit with the main players in the current traditional media and TV sector.

The main questions raised by the new landscape provided by NBN and UFB refer to the structure of markets once RSPs start to aggressively target consumers and compete for providing bundles of services. Stakes are high in both countries as their respective fibre-based telecommunications platforms are expected to deliver conditions that will propel the markets for telecommunications services into greater contributors to economic growth.

---

<sup>35</sup>Peha, J. "The benefits and risks of mandating network neutrality, and the quest for a balanced policy", 2007, *International J. of Communication* 1, 644–668.

<sup>36</sup>Becker, G., Carlton, D., Sider, H. "*Net neutrality and consumer welfare*", 2010, *J. of Competition Law and Econ.* 6(3), 497–519.

<sup>37</sup>Peha.

## References

- Australian Government, "National Digital Economy Strategy", 2011, accessed Sep. 29, 2012, [http://www.nbn.gov.au/files/2011/05/National\\_Digital\\_Economy\\_Strategy.pdf](http://www.nbn.gov.au/files/2011/05/National_Digital_Economy_Strategy.pdf)
- Battersby, L. "Tower ban regions face slower broadband", *The Sydney Morning Herald*, Jan. 18, 2012, accessed Mar. 19, 2012  
<http://www.smh.com.au/it-pro/government-it/tower-ban-regions-face-slower-broadband-20120118-1q59y.html>.
- Battersby, L. "Telstra in 30-year NBN deal", *The Age*, Mar. 7, 2012, accessed Apr. 17, 2012, <http://www.theage.com.au/business/telstra-in-30year-nbn-deal-20120307-1ukij.html>
- Becker, G., Carlton, D., Sider, H. "Net neutrality and consumer welfare", 2010, *J. of Competition Law and Econ.* 6(3), 497–519.
- Cerf, V. G. "U.S. Senate Committee on Commerce, Science, and Transportation hearing on network neutrality", 2006.
- CFH. Fact Sheet: Agreement with Enable Networks, 2011, accessed Sept. 29, 2012, <http://www.crownfibre.govt.nz/media/13092/fact%20sheet%20-%20agreement%20with%20enable%20networks.pdf>.
- CFH, "Ultra Fast Broadband in Business - Seizing the Opportunity", 2010, accessed May 22, 2011, <http://www.crownfibre.govt.nz/media/9669/ultra%20fast%20broadband%20in%20business%20-%20seizing%20the%20opportunity.pdf>
- Given, J. "Take your partners: public private interplay in Australian and New Zealand plans for next generation broadband", 2010, *Telecommunications Policy*, 34, 540-549.
- Kim, Y., Kelly, T., and Raja, S. "Building broadband: Strategies and policies for the developing world, Global Information and Communication Technologies (GICT) Department", 2010, World Bank.
- Kelly, T., Mulas, V., Raja, S., Zhen-Wei, Q., & Williams M. "What role should governments play in broadband deployment?", 2009, "*infoDev/OECD Workshop on Policy Coherence in ICT for Development*, Paris, September 2009.
- Gomez-Torres, L. M., & Beltrán, F. (2011). "Analysis of an integrated plan for expanding broadband access in Colombia", 2009, *Telecommunications Policy*, 35(9-10), 871-882.
- MED Ministry of Economic Development. Invitation to Participate. October 2009.
- Milner, M. "Playing the Telecommunications Game in New Zealand", 2012, *Telecommunications Journal of Australia*, 59, 17.
- NBN Co, "Corporate Plan 2011- 2013", 2010, accessed Sep. 29, 2012, <http://www.nbnco.com.au/assets/documents/nbn-co-3-year-gbe-corporate-plan-final-17-dec-10.pdf>
- NBN Co, "NBNCo Technical Discussion Paper (multicast)", accessed Apr. 28, 2012, <http://www.nbnco.com.au/assets/documents/nfas-technical-discussion-paper-multicast.pdf>
- NBN Co, "NFAS Traffic Class Performance" Discussion Paper, accessed Apr. 26, 2012, <http://www.nbnco.com.au/assets/documents/traffic-performance-whitepaper-dec-2011.pdf>
- NBN Co, "Wholesale NBN Co Fibre Access Service. Product Overview Fibre Access Services", 2010,

accessed Sep. 29, 2012, [http://www.nbnco.com.au/assets/documents/product-overview-fibre\\_1\\_03\\_final.pdf](http://www.nbnco.com.au/assets/documents/product-overview-fibre_1_03_final.pdf)

Peha, J. "The benefits and risks of mandating network neutrality, and the quest for a balanced policy", 2007, *International J. of Communication* 1, 644–668.

Rudd, K., "The global financial crisis", *The Monthly*. 42 (February), accessed Apr. 28, 2012, <http://www.themonthly.com.au/node/1421>.

World Bank (2009). "Information and Communications for Development 2009: Extending Reach and Increasing Impact", accessed April 28, 2012, <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/EXTIC4D/0,,contentMDK:22229759~menuPK:5870649~pagePK:64168445~piPK:64168309~theSitePK:5870636,00.html>