Effectiveness and Efficiency in the Build-Up of High-Speed Broadband Platforms in Australia and New Zealand

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Abstract: The government of Australia is investing close to AUD $37.4 billion into the deployment of a nationwide broadband network, the National Broadband Network (NBN). Likewise, the New Zealand national broadband initiative, whereby the government is currently building a nation-wide fibre-optics network known as the Ultra-Fast Broadband (UFB) network, is investing NZD $1.5 billion with a similar amount expected from private partners. This paper analyses key elements in the plans developed by Australia and New Zealand while inquiring about the pros and cons of the approach followed by each country, specifically referring to the effectiveness and efficiency with which their fibre-based access networks are being built. The paper summarises results from recent literature on the reasons for public intervention in broadband expansion and builds an analytical framework that inquires on the extent to which each broadband initiative has been an effective vehicle of fibre-based, broadband expansion and their efficiency in the transition towards fibre-based broadband.

Key words: fibre-to-the-home broadband platform, Australia broadband national initiative, New Zealand broadband national initiative, Public-private partnership, effectiveness, efficiency.

The need for broadband expansion is high on the agenda of many countries with a range of plans that will allow them to achieve broadband expansion. Depending on the nature of the plan some regard national initiatives as a form of government intervention in the telecommunications sector. Within just a few months of one another the governments of Australia and New Zealand embarked on a political gamble to deploy a wholly new broadband infrastructure that in each country promises to fundamentally alter the way telecommunications markets have been conducted. These two country-cases illustrate a model of broadband deployment whereby public funds are invested in the deployment of fibre-to-the-home (FTHH) next-generation access networks (NGAN); construction is managed by a new government company created to sell wholesale access

services and the network is open to competition by service providers, with a consequent, fundamental market change.

The government of Australia is investing close to AUD $37.4 billion 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". 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 is currently building 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 programme to deploy broadband access either wireless or satellite-based connections to rural areas.

This paper analyses key elements in the plans developed by Australia and New Zealand while inquiring about the pros and cons of the approach followed by each country, specifically referring to the effectiveness and efficiency with which their fibre-based access networks are being built. The paper draws some comparisons that allow for a comparative analysis of the mechanisms in place for fast broadband expansion supported by current facts and data reported by respective government agencies.

The paper is structured as follows: the 2nd section summarises results from recent literature on the reasons for public intervention in broadband expansion and builds an analytical framework that helps situate the main analysis of this paper. The framework works through the issues surrounding a Public-Private Partnerships, a mechanism government have recently opted for in the provision of a service, starting with the main criteria to assess when such infrastructure build-out mechanism is better than traditional procurement and then leading to examine the effects of risk transfer on the effectiveness and efficiency of the project. The 3rd and 4th sections describe, respectively, the next-generation nation-wide, fibre-based networks in Australia and New Zealand; mechanisms used to build them, and policy issues and regulatory decisions surrounding the first stages of development

are summarised. As the NBN and the UFB network are being built up following two models that differ in their fund mix and governance, the 5th section analyses the extent to which each broadband initiative has been an effective vehicle of fibre-based, broadband expansion. Next, in the 6th section, the analysis turns to the efficiency in the transition towards fibre-based broadband, questioning those aspects of governance that have become impediments to the efficient roll-out of the fibre; this section is also concerned with allocative efficiency and analyses the wholesale service pricing structures in the two countries and their effects on the price of future end-user services. Last section concludes.

■ Public investment in broadband deployment

Intervention in the deployment of telecommunications infrastructure, more specifically fibre-based broadband access expansion, is justified in the neo-classical approach by the existence of market failures. GOMEZ-BARROSO & FEIJOO (2010) suggest that acceptable justifications for government intervention in the information society age include governments' drive for embarking on accelerating the development of a knowledge economy, market conditions that reveal lack of or weak competition, and national commitments to close the digital divide.

Faced with the challenge of bringing their citizens into the knowledge economy by providing a world-class telecommunications infrastructure some governments, among them Australia's and New Zealand's, have realised that the split between private and public reached a dead end, especially because the private suppliers of broadband access proved ineffective or too slow in providing their societies with the means to better broadband access. As the first decade of the 21st century was ending governments started to reappear as main players in the field by either promoting or developing broadband expansion plans.

Once the decision to invest in the expansion of broadband access is made, the question this paper addresses is about the best vehicle to deploy public funds in a fast, fibre-based national broadband access infrastructure. The fibre-based broadband backbone initiative is examined using the OECD approach to analysing the efficiency and effectiveness of a Public-Private Partnership (PPP), a mechanism mainly used in the last two decades in several countries to improve the government's delivery of services.

The OECD (OECD, 2008b) defines a PPP as "an agreement between the government and one or more private partners" that has the private partners delivering the service "in such a manner that the service delivery objectives of the government are aligned with the profit objectives of the private partners" with the condition that sufficient risk be transferred to the private partners. An OECD report (OECD, 2008a) highlights the role of the private sector in network upgrade and development with caveats for government intervention especially when remote areas and low-income users are targeted. Another OECD report (OECD, 2009) explains the reasons for PPP stating that "policy makers may want to consider investing in partnership with private companies. These public private sector partnerships have been successful in a number of cases and allow government investment to be coupled with technological and market experience". In the context of broadband access expansion a PPP scheme is expected to balance out four factors: connectivity; competition; innovation/growth; and social benefit (OECD, 2009).

The variety of arrangements that shape PPPs is broad. PPPs are as diverse and creative as they can be designed: from the creation of a new agency which fully manages network build-out, to the private partner's undertaking of network deployment with risk-sharing, to the complete assumption of risk with management control by the private partner. Recent literature exhibits a handful of country-cases that include local broadband initiatives: in Italy and The Netherlands facilitated by an interplay between public and private parties (NUCIARELLI *et al*., 2010); cases of public intervention from UK, Sweden and the Netherlands (RAGOOBAR *et al*., 2011); local experiences such as (TROULOS & MAGLARIS, 2011) on EU municipal broadband plans; and (GOMEZ-TORRES & BELTRÁN, 2011) on a comparative analysis of three countries (New Zealand, Korea and the Netherlands) that help pave the way for their analysis of the Colombian broadband plan. In spite of these and other cases that exemplify the public-private interplay in the expansion of NGNs and NGANs several papers concede that it is early to evaluate the effects of intervention policy and to assess which mode of interplay turns out to be the most effective (BARROSO-GOMEZ & FEIJOO, 2010; FALCH & HENTE, 2010).

Thus, the question a government must ask itself is which of the two main options, traditional public procurement or public-private partnership (PPP), is most appropriate. Evidently technical criteria are needed when assessing the options. Several determinants as stated by OECD (2008) can be listed that aid the complex decision-making process that leads to choosing the best project construction vehicle; they include, affordability and value for

money, budgetary limits, the role and nature of risk transfer, the level of competition and the nature of the service.

The European Commission (EC, 2003) prescribes two criteria, affordability and value-for-money (VFM), for a government to decide whether procuring a project or partnering with a private party. Affordability involves determining "whether or not a project falls within the inter-temporal budget constraint of government" (OECD, 2009). The VFM criterion depends on risk transfer, performance measurements - such as faster implementation-, incentives, and generation of additional revenue (EC, 2003; Arthur Andersen, 2000). Faced with deciding between traditional procurement and PPP a government will then choose the most affordable option with the potential to deliver the highest VFM (OECD, 2008).

VFM is directly related with effectiveness and efficiency of the outcome. An effective project will score a higher VFM than a less effective project. Inquiring about efficiency helps clear the way to determining the VFM a PPP or a procurement project is expected to deliver. The European Commission favours an approach by which, when a project has not yet been started, an ex-ante VFM analysis is undertaken that assesses the potential of a PPP to generate VFM; a second VFM analysis must later be done to analyse the VFM achieved (EC, 2003).

Laying out a fibre-based, high-speed NGAN requires understanding the economic characteristics of the good that is being delivered. One aspect, used in this paper's country-based comparative analysis further below, is the degree of 'publicness' (FOURIE & BURGER, 2000:711) of a FTTH broadband connection. A FTTH broadband connection is rival and excludable; besides, as demand cannot be easily determined, there exists a situation where the builder faces a degree of risk. FOURIE & BURGER (2000) conclude that such conditions suggest a PPP can take place.

PPP is also a vehicle for risk transfer. In fact, it is the degree of risk transfer from the government onto the private party that determines the real nature of the contractual relationship between them. A private partner undertaking the delivery of the good in question will be incentivised to incur the necessary effort to be efficient and effective. FOURIE & BURGER (2000) distinguish three types of efficiency: allocative efficiency, technical efficiency and X-efficiency. A middle-of-the-road assessment of a public infrastructure project can be based on assessing the effectiveness of the deployment and the efficiencies achieved, if information is available. According to FOURIE & BURGER, "efficiency in its widest sense also implies that consumer

preferences are served optimally, and effectiveness implies that social goals are maximally served". (2000:698). Trade-offs between effectiveness and efficiency get in the way of trying to maximise both conditions simultaneously. When a private partner participates in the delivery of a good through a PPP it is usually assumed that managerial expectations for profits will be a powerful incentive to achieve efficient outcomes. Thus, a potent combination involving risk (or fear of it) and expectations for rewards (profits) will create a suitable managerial environment that incentivises managers towards efficiency.

In building their respective broadband national infrastructures by extensively deploying FTTH across their geographies, Australia and New Zealand are pursuing a similar purpose yet the mechanisms chosen to do so are different. Australia's Labour government opted for a wholly publicly funded network whereas New Zealand adapted the PPP approach to its budget reality and partisan orientation. The previous discussion opens the floor for key questions this paper addresses: what is the extent of the effectiveness and efficiency with which Australia's NBN and New Zealand's UFB are being built and what are the practical implications of the vehicle chosen in each country on the two measurements?

■ The national broadband network of Australia

Australia's low rankings in the OECD charts 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 2008 the newly elected Labour government proposed a National Broadband Network (NBN), a nation-wide high-speed fibre-to-the-premises (FTTP) network, as one of their 'nation-building' initiatives (RUDD, 2008). 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. After years of debates and revisions to the budget process, in 2011 the cost of building the NBN was revised to AUD $37 billion plus AUD $11 billion to be paid to Telstra for their existing network structure to be incorporated into the NBN.

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

2012 marked the achievement of several crucial milestones for the broadband project, among them, the signing of the first commercial contracts, known as Wholesale Broadband Agreements and a 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 AUD $11 billion (YATES, 2012). The deal secures Telstra a cash flow for the next 30 years (BATTERSBY, 2012b) 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" (BATTERSBY, 2012b).

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 (Given, 2010). 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 (NBN Co, 2011). The remaining 7% to be serviced with fixed wireless and satellite networks at 12 Mbps download and 1 Mbps upload. NBN Co's access service encompasses 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 (NBN Co, 2001b). NBN Co 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. NBN Co delivered its self-regulating undertaking in 2012 as part of the government's intention to provide a regulatory framework to the wholesale portion of the network. The undertaking, named Special Access Undertaking (SAU), sets out the pricing and regulatory framework for the operation of the NBN for the next 30 years (TAYLOR, 2013). The SAU includes a five-year freeze on wholesale product prices and cap (rate of annual inflation less 1.5%) on annual price increases.

The Australian Competition and Consumer Commission questioned the SAU on two grounds (ACCC, 2013): NBN Co's commitments to provide oversight mechanisms to agreements NBN Co enter with customers and the declared ability for NBN Co to withdraw and create products. In July 2013 ACCC agreed on the terms and final text of the SAU.

■ New Zealand ultrafast broadband network

With the country's 22nd 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 (MILNER, 2012) in what is today known as the Ultra-Fast Broadband (UFB) network. The mainly urban network will be complemented with Rural Broadband Initiative (RBI) aimed to bring high-speed broadband to rural New Zealand. The purpose of the UFB project is to accelerate the roll-out of an access network deploying optical fibre infrastructure, using FTTP, to 75 per cent 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 (CFH, 2010).

Foreseeing that private investors would not take on building or expanding broadband infrastructure in and supported on results on the effects of broadband uptake on GDP growth from a World Bank report (World Bank, 2009), 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, in late 2009 the Ministry of Economic Development (MED) prepared and issued an 'Invitation to Participate' (ITP) under which potential investors would submit their proposals on how they would co-invest with the government to achieve the UFB objective in one or more candidate areas.

The announcement was followed by the creation of Crown Fibre Holdings (CFH), the state-owned company charged with managing and monitoring Crown's investments in the UFB. CFH oversees the UFB private-public partnership with selected partners. The initiative is a main component of a larger body of policy aimed to reform the 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.

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) and the Crown shares ownership of LFCs.

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 an LFC. An RSP will purchase wholesale services from the LFC using the technical and economic conditions stated by CFH.

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"(CFH, 2011). 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 but only provide wholesale access for RSPs who in turn will serve end-users. The original invitation from the Ministry in 2009 allows an LFC to offer end-user services in competition with RSPs only if the LFC uses a separate subsidiary. The latter contributes to further justify the introduction of non-discriminatory and equivalence principles.

■ Effectiveness of broadband national initiatives

In both Australia and New Zealand, while racing for taking control of government, winning political parties in 2007 and 2008, respectively, denounced the incumbents' lack of investment in fibre connections and in doing so announced their own initiatives on fibre-based, nationwide

networks. The low levels of fibre penetration at the time indicated that private initiative alone would not, in a time acceptable to governments, reach their expected penetration levels of fibre-based, high-speed broadband access. It was evident that neither government would be keen on waiting for incumbents to upgrade their networks and improve the speed of deployment. Regulatory incentives were not in place and, possibly, would have never been enough to attract the high levels of investment required. An innovative network would only be deployed if governments entered the game. The current state of deployment in each country (as of mid-2013) provides valuable information for analysing the speed of network deployment and, in so doing, looking into the effectiveness of broadband deployment in each country.

Is Australia's wholly government-owned NBN Co compromising effectiveness?

Australia adopted a traditional procurement model with several contractors building fibre connections all throughout the country. Table 1 shows the current (as of first quarter of 2013) and projected state of NBN fibre deployment and activation; the table shows the total premises passed and total connections activated. NBN Co reported that deployment objectives were achieved for 2012 (NBN Co 2013) with a forecast of 1.7 million connections per year on average for the last years of the project.

The daily run rate, that is, the number of fibre connections built in a day, was 83 for 2012 and is expected to be about 1,200 and 3,800 for the next two years, 2013 and 2014, respectively. NBN Co Corporate Plan 2012-2015 (NBN Co 2012a) states that NBN Co will deliver by 2015 about 6,000 premises per day. The success of NBN, though, is not totally up to deployment but also consumer uptake. By December 2012 NBN Co reports that 34,500 homes and businesses were using the network (fibre, fixed-wireless and satellite). Currently the uptake is somewhat between 10% and 16%, that is, the percentage of households through which fibre has passed and the connection has been activated. For the years up to mid-2016 the activated-to-passed ratio is expected to increase as shown in table 1 (NBN Co 2012a).

Table 1 - Past and projected figures on NBN roll-out in Australia

Year (mid)	*Premises passed*	*Target*	*Premises activated*	*Activated-to-Passed ratio (%)*	*Daily run rate (000)*
2011	3,000		-	-	
2012	18,000		1,800	10	84
2013	163,000	270,000	26,000	16	1200
2014	856,000	1,130,000	856,000	37	3860
2015	2,700,000		1,380,000	52	6420
2016	4,500,000		3,000,000	65	6850

The pathway towards completion of fibre connections has been full of problems ranging from disappointing underperformance by several contractors, a series of resignations by NBN Co top officers and the game of politics by the opposition parties. Several downgrades of the announced targets have occurred during the first two years of construction (, 2013; RAMLI & HUTCHINSON, 2013). The debate about whether FTTP or FTTN is the best choice has been reignited by the increasing favourability the opposition seems to be gaining and its leaders have lost no opportunity to publicly denounce the delays and announce their own plans for the NBN. Among their promises are an overhaul of the FTTP architecture in favour of a fibre-to-the-node (FTTN) design and the reduction in the total invested funds from AUD $37 billion to AUD $29 billion.

By seeking not to partner with any private operator, the Australian government has relied solely on the capacity of NBN Co to manage the largest infrastructure project in the history of the country. Its ability to do so has been questioned early on by the political opposition, which quite possibly would not have been a major ingredient, had it not been for the many problems NBN Co has been confronted with. Such situation leads to question whether the continuously missed targets affecting the effectiveness of the broadband project would have been less pronounced or non-existent at all, had the governance included a private partner bearing the responsibility (hence assuming an obvious risk level) to comply with agreed goals.

Table 1 also reveals the enormous short-term expectations about the speed of fibre deployment in the country at a moment when NBN Co has struggled to keep up with their own targets. The latter is aggravated because of the commonly accepted view in the country that NBN Co needs to go through major organisational changes if it is to steer the NBN on the right direction.

Effective deployment of UFB in New Zealand

In May 2011, CFH finished agreements with 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 premises. Two companies partnered with CFH to serve two (non-overlapping) regions under the "preferred commercial model" (CFH, 2013), by which the partners make payments to CFH as fibre connections at individual premises are connected to the network. With a third partner in which CFH only has partial ownership, equity is not bought back as fibre is rolled out and households connected, but can be realised by an optional buy-out by the private party. The fourth and last company building the UFB is Chorus, which will serve close to 70% of the country's urban premises. The Crown's equity in Chorus allows the latter to return funds to CFH from 2025. It is expected that Chorus will return the funds at least ten years later.

Table 2 - New Zealand's UFB network deployment

Goal: 1,340,000 (end of 2019)				
Date	*Number of premises passed*	*Target*	*Number of connected end-users*	*Number of active RSPs*
Dec 2011	16,000			
Jun 2012	76,311	70,000	1,233	13
Sep 2012	101,786		2,445	18
Dec 2012	131,912		3,806	18
Mar 2013	171, 886		5,133	21
Jun 2013	229,633		9,984	50

The information in table 2 and table 3 summarises the progress in the deployment of UFB and RBI connections until mid-2013; public figures for targets, only available for 2012, show the deployment to be above target. By mid-2013 the Ministry of Communications and Information Technology reported that targets for UFB and RBI had been exceeded with about 300,000 users in the country able to connect to the UFB network (MBIE, 2013); the Ministry also reported 149,000 homes and businesses in rural areas able to have access to faster broadband under the RBI. RBI uptake reached 38 per cent whereas UFB, completed at about 20 per cent, has an uptake of about 3 per cent (MBIE, 2013). The low uptake figure compares favourably with those of Singapore and the UK (MBIE, 2013) when measured at about the same time after construction started.

Table 3 - State of deployment of New Zealand's RBI

Date	*Vodafone* (*) *(number of premises)*	*Chorus (number of premises)*
Jun 2012	52,923	19,028
Sep 2012	55,481	23,400
Dec 2012	89,235	36,100
Mar 2013	100,120	42,400
Jun 2013	111,050	50,120
Target (2016)	147,000	105,000

(*) Fixed wireless broadband peak rates at least 5 Mbps

Source: MBIE Year Two and Quarter Four reports on UFB – June 2013

Clearly the coordinated work between government and partners through CFH seems to be paying off in terms of targets for both UFB and RBI. In addition the fraction of consumers who have switched on to the UFB now enjoy a rather large range of service providers. UFB success cannot be only measured by the success of its supply-side but by the adoption and use consumer uptake will achieve; nevertheless, two years after construction began encouraging completion figures reveal the governance structure and mechanisms in place are effectively delivering.

■ Wholesale and retail price efficiency

Wholesale services will be provided to service providers as inputs to their end-user services. In Australia wholesale customers will be charged the same price across all NBN three technologies: fibre, wireless, and satellite. An NBN Co Fibre Access Service (NFAS) product consists of a set of product components used by service providers as building blocks to offer end-user services (NBN Co, 2011C). Access to facilities is at no charge whereas Access Virtual Circuit (AVC) products, which are to be used to provide end-user services, vary across a range of upstream/downstream combinations.

In New Zealand, CHF and its partners agreed on entry-level broadband connection, high-definition video, and entry level business service prices in negotiations that took place in 2011. Such wholesale prices are effectively the "capped portion" of a retail price for a given service.

Table 4 - Australia's NBN Co wholesale service price list
NFAS product component prices

Product component	*Monthly charge (AUD)*	*Non-recurring charge (AUD)*
Facilities access		
Optical distribution frame termination point	Zero charge	Zero charge
Network-network interface		
1 Gbps 1000Base LX	$200	$1,000
10 Gigabit per second 10GBaseLR	$400	$5,000
Access virtual circuit (*) (downstream/upstream)		
12/1 Mbps	$24 (**)	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

(*) Includes UNI-Data

(**) 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.

Table 5 - New Zealand's CFH wholesale service price list
Products and prices for home/retail customers agreed on by CFH and LFCs

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

(*) CCPM: Customer charges per month.

(**) Gigabit Passive Optical Network, a network architecture that brings fibre to the premises using a point-to-multipoint scheme that enables a single optical fibre to serve multiple premises.

Prices for NFAS product components in Australia are shown in table 4, whereas prices for basic voice channel and GPON entry-level services in New Zealand are listed in table 5. Those services will be used by RSPs to produce their retail service offers. In Dec 2011, NBN Co announced a

wholesale price freeze at $24/month for the 12/1 AVC product until mid-2017 after which it would be allowed to increase at half the rate of inflation (BATTERSBY, 2011). This however would not prevent retailers increasing end-user prices. Likewise, in New Zealand the prices of a Basic Voice Channel, the GPON Business Entry - providing 30 Mbps raw rate on the downlink and 10 Mbps on the uplink - and the GPON 100/100 will remain fixed until 2019; prices for other services, Residential Entry and Residential Triple-Play, will steadily increase.

Both NBN Co and CFH, the latter on a longer term - have committed to keep some key wholesale service prices at constant levels. In New Zealand, CFH has gone a step further in committing to pre-established, moderate price variations during the period 2011-2019. Risk is reduced when the corporation owning the production supplies commits to wholesale service price stability. With less risk, RSPs may find it more attractive to enter the broadband platform market and start operating, hopefully, innovative services. The number of RSP already operating on the UFB network demonstrates that competition has increased. It would then follow that retail prices will tend to align on levels that are allocatively efficient.

In 2012 the Commerce Commission's decision to reduce the price of the unbundled copper local loop (UCLL) service sends a signal to the Internet access market about the price of copper for the following years. The decision becomes an input to the plans of LFCs and commercial RSPs once they start operating services on the UFB. In spite of originally having proposed a reduction of up to 19% in the monthly rental price of UCCL, in late 2012 the Commission decided to rely on a mixed method approach to determining a 3.85% reduction in the geographically averaged UCLL monthly rental price setting it at NZD $23.52. In its decision the Commission benchmarked price trends for countries that applied forward-looking cost-based pricing methods between 2007 and 2012 (Commerce Commission, 2011). CAVE (2012:15) analyses the price reduction issue reminding first that the regulator's duty is "to promote efficiency and to maintain incentives on networks to innovate and invest". Cave notes that the existence of parallel networks, a copper-based and a fibre-based, does not promote productive efficiency and, therefore, the period of coexistence needs to be limited, instead of reducing copper access prices on the basis of replacing the existing network. On the other hand, price reduction does not promote dynamic efficiency either since it slows down or distorts the emergence of the fibre network.

■ Conclusion

As difficult as assessing a project still under construction may be, the broadband platform deployment in Australia and New Zealand already provide signals that encourage an analytical approach that questions the vehicle and mechanisms towards successful deployment and operation of a national FTHH, broadband platform.

Australia's NBN exemplifies the return to public sector's control of essential facilities, implying the construction of a modern telecommunication network, and more specifically high-speed, FTHH broadband access, can't be achieved by private initiative alone. Likewise New Zealand's UFB is an open access FTTP broadband platform, which has relied instead on private partners that build and operate the network in association with CFH.

Table 6 compares the two national broadband initiatives using three questions: how effective deployment has been so far; how is the governance structured; and what are the main regulatory decisions in each country. The table helps conclude that while Australia struggles with completion targets, New Zealand comfortably exceeds its targets. Australia already has a regulatory framework that will be applied for the next 30 years. New Zealand's Commerce Commission only exerts a monitoring role of the deployment process.

The 2012 deal between Telstra and NBN Co means the transfer of existing Telstra broadband infrastructure to NBN Co with a AUD $11 billion compensation from the government. A large percentage of Australians will have to migrate to fibre-optic connections for broadband and telephone services. With such a decision NBN Co virtually eliminated any demand-side risk at a price that adds to the price tag of the network.

At this point it seems appropriate to summarise the lessons from the on-going fibre deployment experiences as seen through the data presented in this paper. Repeated misses on achieving constructions targets and consequent revisions suggest the Australian mechanism is not effectively delivering on its commitments to Australian citizens; as the 2013 election approaches, NBN Co is increasingly pressured by the opposition parties and, at times, publicly challenged on technical and commercial grounds. Compare this with the relative success of the New Zealand deployment where partnerships, with varying degrees of risk transfer, have reached or exceeded construction targets, and no revisions have yet taken place.

Table 6 - Three questions about the Australian and New Zealand broadband plans

		Australia	*New Zealand*
How effective has the project been thus far?	Budget - Capital expenditure - $ per person	A $ 37.4 billion [E $49,1 billion (*)] A $1,669 [E $1,270]	NZ $ 1.5 billion [E $0.95 billion (*)] NZ $ 341 [E $215]
	Deployment - Achieved so far	Mid 2013: 163,000 premises passed with fibre; 26,000 activated (NBN Co 2013)	Mid 2013: 229,600 fibre premises passed; 9,990 fibre premises connected; 160,000 rural premises passed. (MBIE 2013)
How is it structured?	- Leading agency - Private participation	National Broadband Network Company, NBN Co NBN Co is wholly owned by the Australian government; NBN Co uses traditional procurement to contract construction	Crown Fibre Holdings, CFH CFH entered into four partnerships with private parties (Chorus, Enable Networks, North Power Fibre, UltraFast Fibre) Rural Broadband Initiative, RBI
What are the regulations?	- Regulatory commitments - Copper infrastructure	Self-regulatory guidelines and commitments consigned in the Special Access Undertakings accepted by ACCC Total decommission of Telstra's last mile copper infrastructure as dictated by the NBN Co-Telstra agreement	Commerce Commission monitors the build-up process Commerce Commission rules in favour of access seekers by reducing the price of ULCC

(*) Exchange rates at May 17, 2013

Both experiences show government's commitment to FTTH broadband platform construction. In Australia, perhaps it was political ambition that embarked the country in a controversial form of construction and such a bet is undoubtedly creating an unforeseen burden. In New Zealand questions regarding the adequacy of an FTTH network were not raised, except for a few opponents. Having partially shifted the risk of construction onto its partners, CFH has made sure they got incentivised to accomplish the targets efficiently and in a timely manner. That is not the situation in Australia where some contractors have either defaulted or started renegotiations.

Although this paper does not analyse the incipient retail markets, a logical next step to the analysis of efficiency and effectiveness in the two

country cases is to examine the state of competition in the provision of end-user services as well as the level of innovation brought in by the new providers.

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