Fibre-to-the-home, high-speed and national broadband plans: Tales from Down Under¹

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Abstract

In recent years governments in many countries have acknowledged the higher complexity involved in finding the more efficient path towards a so-called broadband ecosystem. As the first decade of the twenty-first century was ending, the governments of Australia and New Zealand committed to the construction of high-speed, fibre-optics next-generation access networks. This paper is about the approach followed by Australia and New Zealand to developing broadband infrastructure, the means deployed to build the network, and policy and market issues. The paper critically analyses the short history of each experience, including the political process, the reasons exhibited to justify the governments’ involvement in infrastructure deployment, and the institutional arrangements introduced to manage the participation of private partners. The paper proposes a framework for analysis and uses its elements to critically analyse policy and regulatory decisions affecting the deployment rate and goals set by Australian and New Zealand government for their respective fibre-based next-generation platforms. The framework is used to draw comparisons between the two country cases and in so doing allowing the appreciation of commonalities and differences in the development and expectations for the future of telecommunications markets in the region.

Keywords
Next-generation access networks, Fibre-to-the-home network, Broadband national plan, Public investment in broadband expansion, Australia’s National Broadband Network, New Zealand’s Ultra-Fast Broadband Network.
1. Introduction

Governments throughout the world are joining the increasing trend towards deliberate intervention in the deployment of Next-Generation Access Networks (NGAN), mostly built as fibre-to-the-premises (FTTP), with varying degrees of participation by the private sector. The governments of Australia and New Zealand are driving, each in its own way, the deployment of national fibre-optics broadband infrastructures.

This paper uses findings from recent literature to build an analytical framework in which the most salient issues regarding the construction of a fibre-to-the-home network in each, Australia and New Zealand, are discussed and analysed as the construction proceeds and the political struggles unfold. As government participation in the build-up of such wholly new telecommunications infrastructure is seen as an intervention in the market the paper discusses the arguments for government involvement and situates the particular decisions reached in those two countries within a market failure approach by providing a suitable justification; for both the Australian and New Zealand initiatives the paper then proceeds to describe the exact forms that intervention adopts by describing the institutional arrangement and governance of the broadband projects and their technical and economic aspects. It subsequently contributes elements to the three main analytical issues discussed herein: supply-side policies, demand-side policies and the role of regulation.

Since neither network is totally operational yet the paper also reports on the progress achieved in each country in terms of number of broadband connections – fibre, wireless and satellite - installed and activated. The two cases presented analyse regulatory decisions such as the split of New Zealand’s incumbent operator Telecom NZ and the Australian deal with Telstra; in both countries these companies grown out of the former government-owned monopolies are now major players in the deployment of their respective broadband networks. The agencies in charge of the projects in each country, Australia’s National Broadband Network Company (NBN Co) and New Zealand’s Crown Fibre Holdings (CFH) went through processes that determined the allocation of resources (see the specifics of each plan in sections ahead).

The paper is structured as follows. In section 2 the literature on recent trends in government initiatives for broadband expansion is reviewed; it builds an analytical framework to enable a critical view of demand-side and supply-side policies put in practice in the two countries as well as respective regulatory measures. Section 3 presents the highlights of both national broadband initiatives in each Australia and New Zealand, including their finance and construction mechanisms, allocated budgets, coverage goals and governance; by using the analytical framework presented in section 2 this section delves into the main five framework components. Section 4 performs a comparative analysis to reveal the pros and cons of each country’s approach to public investment for broadband expansion, analysing the promoters and constraints on the supply-side and the
2. Trends in government initiatives for broadband expansion

Several recent articles discuss the reasons for public investment and intervention in the broadband markets (Cave & Martin 2010; Crandall & Singer, 2010; Falch & Henten, 2010; FCC, 2010; Greenstein & McDevitt, 2011). In a paper that has attracted a great deal of attention, Cambini and Jiang (2009) classify previous studies on regulation and investment in broadband into two categories: (i) studies focusing on the impact of incentive regulation on investment, and (ii) studies exploring the relation between access regulation on investment. With retail competition increasing telecommunications operators have responded by investing on broadband infrastructure and the second approach above becomes prevalent. Regulators have become increasingly concerned with the level of broadband coverage and found in access regulation the means to accelerate (or sometimes slow down) further deployment. However when the market signaled that further investment in high-speed access slows down to, perhaps, a point of stagnation, some governments abandoned efforts to incentivize investment through access regulation and shifted towards intervention in the market with large-scale actions. This paper focuses on the pathway taken by Australia and New Zealand to broadband expansion whereby a radical policy to overturn the market is currently being implemented.

Cave and Martin (2010) provide an analysis of the reasons why to intervene a broadband market, while also discussing the “where” and “how” components to the analysis. Two reasons presented in (Cave & Martin 2010) are evident in both in Australia and New Zealand: equity and industrial policy. As will be explained in later chapters both countries grew frustrated with the pace of broadband deployment, a situation that has seen many people unable to get an acceptable quality broadband connection or in some cases no connection at all. Also their expectations for a national high-speed broadband infrastructure to positively impact their economies are reflected in their respective visions: Australian Government’s NBN vision states that “it will drive productivity” (Wong & Conroy, 2010, p. 1), whereas New Zealand’s broadband vision is that UFB’s tools and application will “enhance business productivity” with “the potential to bring real social and economic benefits” (CFH, 2010, p. 3). Their firm expectations have led both governments to use an industrial policy instrument with which to reach a “critical mass of high-speed broadband users” (Cave & Martin 2010:506). In answering the “how” question Cave and Martin discuss the role of public funds and whether they should be used to pay for costs or to impact on the revenue of a NGAN.

Direct investment of public funds in the build-up of a broadband network signals a lack of trust in the market’s ability to deliver on the build-up of critical infrastructure (Falch & Henten, 2010); furthermore, in such
situations using public funds on broadband access expansion is regarded as a strategic component of an economic growth policy. However, on the opposite shore some voices question the use of subsidies to roll-out fibre-to-the-home networks. For instance (Kenny & Kenny, 2011) examine the spread belief that “superfast broadband brings substantial economic and societal benefits”, questioning the use of subsidies on fiber deployment and the value of the applications that are supposed to use the network. They propose those funds be invested in more access to basic broadband or programs to entice those with no online access to sign up for broadband services.

In the two country cases studied here public funds have been committed to high-speed broadband expansion. Once the path towards deployment of public funds for broadband expansion has been undertaken, the next step is to examine the extent of the government’s intervention. For instance, Belloc et al., (2012), questioning the government’s intervening role, conclude that governments’ efforts throughout the world “appear to be well-grounded” with public policies exerting a positive impact on broadband growth either on a supply-side or a demand-side basis. OECD advocates for supply and offer policies that stimulate the construction of broadband infrastructure capable of creating a virtuous circle by which deployment encourages use and use encourages further deployment (OECD, 2008a); it also advocates for the role of the private sector in network upgrade and development and calls for government intervention when remote areas and low-income users are targeted.

Intervention in the deployment of telecommunications infrastructure is justified in the neo-classical approach by the existence of market failures. Regardless of the specific path followed by a country’s telecommunications markets, governments are reappearing as main players in the field by either promoting or developing broadband expansion plans. Gómez-Barroso and Feijóo (2010) suggest that an acceptable justification for government intervention is a market condition revealing that markets are not fully competitive. Nevertheless the market failure condition is not the only one justifying intervention in the information society age; when a government has embarked on plans to push forward the knowledge economy or has committed to closing the digital divide Gómez-Barroso and Feijóo (2010) include such conditions as justifications for intervention.

In answering the “how” question the split between private and public is a dead end especially when private supply-side has proven ineffective or too slow in providing society with the means to fair broadband access. One vehicle for uplifting the efficacy of the supply-side for the expansion of broadband connectivity is the public-private partnership (PPP) scheme (OECD, 2008b). A PPP is an agreement between the government and one or more private partners by which a private partner’s incentives are aligned with the government’s objectives in a
manner such that sufficient risk is transferred from the public side to the private partner (OECD, 2008b). Any PPP in telecommunications infrastructure deployments is expected to balance out four factors: connectivity; competition; innovation/growth; and social benefit (OECD, 2009).

Getting government and private agents aligned in the pursuit of a goal, which is what a PPP seeks to achieve, reinterprets the pragmatic logic approach (Mintzberg, 1996) that envisions government and the market as the extreme points of a continuum where bipolar antagonism is replaced by cooperation. The location of the interaction on the continuum is given by the level of risk being transferred. However as important as it may be in terms of settling the conditions of the partnership, risk is only one dimension that characterizes the public-private relation. Because of this Gómez-Barroso and Feijóo (2010) refer to “interplay” instead of “partnership”, broadening the scope for interaction especially in the context of NGAN deployment.

**Why intervene?**

- **Market failure approach**
  - Conditions for competition
  - Reach everyone
  - Role in economic development
  - Equity
  - Industrial Policy

**What form should intervention take?**

- **Private-Public Interplay**
  - From subsidiarity to a broad catalogue of tools

**Network architecture and analytical framework**

- **Open access platform**
  - Supply
    - Public finance support for access infrastructure
    - Access market
  - Demand
    - National Digital Strategies
    - Content market
  - Role of regulation
    - NBN Co Special Access Undertakings
    - New Zealand price of copper

**Fig 1.** Government intervention, forms of intervention and elements of broadband policy
A well-nourished stream of recent literature exemplifies the richness of the interplay between government and the private sector. Several country-cases include (Nuciarelli et al, 2010) who describe how the public-private interplay can facilitate local broadband initiatives in Italy and The Netherlands; (Gómez-Torres & Beltrán, 2011) on a comparative analysis of New Zealand, Korea and the Netherlands; (Ragoobar et al., 2011) on several cases of public intervention in the UK, Sweden and the Netherlands and local experiences such as (Maglaris & Troulos, 2011) on EU municipal broadband plans. In spite of these and other cases that exemplify the public-private interplay in the expansion of NGNs (core and access) both Gómez-Barroso and Feijóo (2010) and Falch and Henten (2010) coincide on their opinions that it is early to evaluate the effects of intervention policy. It is also early to assess which mode of interplay turns out to be the most effective.

Kim et al. (2010) conceive broadband deployment as an ecosystem that consists mainly of four elements: infrastructure; services; applications; and users, which are jointly interpreted as a digital ecosystem. As an ecosystem, high-speed broadband must include both the supply and demand sides of the market; the very idea of integrating several domains into a single, yet complex concept also “leads to a rethinking of approaches to spur broadband access and use” (Kim et al., 2010). On a broadband ecosystem governments have to exert actions to favour its development. Belloc et al. (2012) discuss indirect measures, such as regulatory intervention, and direct measures, which are more akin to industrial policy initiatives. Among direct measures the paper identifies supply-side policies and demand-side policies.

How public intervention may distort competition is the one aspect not to be disregarded when pondering about the regulatory implications of adopting one particular path towards broadband expansion. The effects can be either direct or indirect (Falch & Henten, 2010). Direct effects are observed through the short-term impact of broadband expansion whereas indirect effects refer to their impact on private investment and the strength of facility-based competition.

![Figure 2. Regulatory trajectories in the transition towards NGNs. Adapted from Kirsch and Hirschhausen (2008)](image-url)
Kirsch and Hirschhausen (2008) identify three main regulatory paths as shown in Figure 2: (i) infrastructure-based competition, (ii) vertical separation with open access, and (iii) integrated incumbent and regulated access. Countries with no market intervention exemplify path (i) whereas (iii) is considered by Kirsch and Hirschhausen as the most flexible and effective.

In this paper it is argued that, in addition to stating a vision of broadband network infrastructure for a country, government initiatives need to strongly support themselves on the design of investment incentives and the promotion of broadband use. The analytical framework proposed in this paper to study the Australia and New Zealand broadband initiatives, summarized in Figure 1, uses both the market failure approach by Gómez-Barroso and Feijóo (2010) and the motives-for-intervention framework by Cave and Martin (2010) in order to address the issue regarding the form of intervention: procurement contracts in Australia and a PPP in New Zealand. It proceeds to introduce three main issues, namely, supply-side policies, demand-side policies and the regulatory constraints that allow seeing where and how incentives and promotion for broadband deployment growth are placed. As the vehicle to achieve the sought objectives both countries have chosen to undertake the construction of a high-speed, FTTH, open-access platform with structural separation of wholesale access services, provided on a monopolistic basis and purchased by retail services providers which will compete to offer end-user services to households and businesses.

3. National broadband initiatives in Australia and New Zealand

In 2007 and 2008 the governments of Australia and New Zealand, respectively, committed to the construction of high-speed, fibre-optics next-generation access networks. The National Broadband Network (NBN) in Australia and the Ultra-Fast Broadband (UFB) Network in New Zealand respond to political decisions and are strategic anchors to the current governments’ plans. In spite of the political environment, especially in Australia, full turnaround of the commitments to these networks and the way contents markets are envisioned to operate seems unlikely (Gregory 2013); nevertheless political uncertainty becomes increasingly influential in the way the roll-out is carried out in Australia as the September 2013 election approaches.

This section opens with the highlights of both NBN and UFB in terms of each country’s vision for their publicly funded broadband infrastructures, finance and construction mechanism, allocated budget, coverage goals and governance. By using the analytical framework presented in section 2 this section delves into the main five framework components, the reasons for governments’ interventions, the type of intervention chosen in each country, the supply-side aspects, the demand-side aspects, and the role of regulation in both countries and where appropriate reveals comparative views of the two plans.
3.1. Australia’s National Broadband Network

The National Broadband Network in Australia is the largest publicly funded infrastructure project in the history of the country. It aims to build a nationwide fibre-to-the-home next-generation access network reaching 93% of Australian households and businesses. To manage the building and running of the NBN the government established NBN Co in early 2009. The project receives funds in the amount of A$37.4 billion (NBN Co, 2012a) of public investment. In 2010 a review of the original proposal was released through the Statement of Expectations for the NBN (Wong & Conroy, 2010). In the Statement the government not only reviewed its NBN vision and objectives but also updated the mandate on NBN Co; in particular the Statement:

- deems access to high-speed broadband essential to Australians
- establishes NBN Co as government-owned commercial entity
- expects NBN to be a driver for productivity and improve education and health services
- expects 90% of Australians premises get connected to 100 Mbps with the remaining 10% connected to at least 12 Mbps
- expects NBN Co to seek and secure spectrum on commercial terms
- agrees that NBN is to be planned as a monopolistic fixed-line network able to cross-subsidise entry level prices for all premises
- provides long-term financial certainty to NBN Co with equity funding for A $27.5 billion for the rollout period

The fixed broadband network is expected to service 93% of Australians; the remaining 7% of premises are composed of 4% being those on the outer fringes of regional towns to be serviced with fixed wireless and satellite networks at 12 Mbps download and 1 Mbps upload speed (Wong & Conroy, 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, 2011c).

3.2. New Zealand’s Ultra-Fast Broadband Network

In 2009 the government of New Zealand announced it would invest $1.35 billion into the Ultra-Fast Broadband network initiative, a high-speed fibre-to-the-home next-generation access network that will deliver broadband services at a speed of 100 Mbps downstream and 50 Mbps upstream to business and households. 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). 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. A similar share is expected from private investors who have signed agreements with CFH, who oversees the UFB private-public partnership with the 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.

75 per cent of New Zealanders will benefit from UFB for which $300 million are being invested. 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. Further investment from the two RBI partners, Chorus and Vodafone is expected as the two firms in 2011 were awarded the tender to provide broadband to rural New Zealand homes and businesses in partnership with the government. In rural areas RBI will deliver broadband to 252,000 rural households at peak speeds of at least 5Mbps in at least 85% of rural homes and businesses. Public hospitals and schools in rural New Zealand will get each a fibre connection complemented with extended cellular telephone coverage (MBIE, 2011). The agreement with Chorus states that the partner must “identify opportunities to collaborate with third parties and find ways to reduce the network set up cost” (MBIE, 2012a). RBI’s targets include the buildup of 154 new cellphone towers and the upgrade of 387 cellphone towers by Vodafone and more than 3,000 kilometres of new fibre extension by Chorus.

CFH’s vision is for a world-class telecommunications infrastructure that will “enable a more productive New Zealand economy, deliver better outcomes in service key areas such as health and education” (CFH 2013) and allow improved Internet services.

3.3. Reasons for intervention

In Australia, one of the country’s top ten companies, Telstra, used to dominate the fixed voice market - including retail and wholesale connections - with about 85% of market share. Born out of the privatization of the historic state-owned domestic communications monopoly in the mid-1970s, Telstra became the leading private operator of fixed telephony and since 1991 one of three cellular mobile operator. In 1995 the Australian Competition and Consumer Commission was established after the merge of two commissions that oversaw trade practices and prices across the economy. With the introduction of competition in the mid-1990s the dominance of Telstra in the Australian market has shrunk, its last century dominance steadily eroded with retail market share decreasing from 70% to 66% in 2012 (ACCC 2012). Its copper service portfolio mix has also been impacted by the strength of competition with access seeker services using local loop going from 5% of its
services to 12%. And while its fixed-line market shrank, its dominant position in the mobile market increased with a market share growing from 37% in mid-2010 up to 42% in mid-2012 (ACCC, 2012).

It was clear from the low rankings in the OECD tables on broadband uptake and pricing throughout the 2000s that Telstra used their continuing control of last-mile infrastructure to dominate the emerging market of fixed broadband. Frustrated with the shortage of investment into next-generation fixed-line fibre access networks, mainly by Telstra, and faced with the private sector’s diminishing capacity to invest in the wake of the global financial crisis in 2008 the newly elected Labor government proposed a National Broadband Network (NBN) as one of their ‘nation-building’ initiatives (Rudd, 2009). In November 2008, all Australian governments endorsed a six-volume National PPP Policy and Guidelines to replace separate arrangements across the nation (Given, 2010).

In New Zealand the telecommunications market has been dominated by a single player, Telecom New Zealand. Telecom is the largest fixed-telephony operator and the second largest mobile operator in New Zealand. A precursor to the government broadband initiative was the recognition in 2005 by the Ministry of Economy Development that Telecom had not delivered on its 2003 promise to achieve a broadband uptake of more than 250,000 residential consumers and the deployment of fibre-to-the-node by 2005’s end in response to the Commerce Commission’s decision to defer unbundled local loop (Milner 2009). What followed was a new law for the industry known as the 2006 Telecommunications Act and Ministerial Determination in 2007 mandating the operational separation of Telecom, based on that for British Telecom in the UK. Telecom would then consist of three groups: access network services, telecom wholesale and telecom retail.

Since 2005, the New Zealand government grew increasingly distressed about the country’s lagging behind most of the developed world in terms of broadband capability and penetration. 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, in 2008 the National Party made it part of its political campaign to announce an initiative to provide high-speed broadband to New Zealanders. Reforming the telecommunications sector to make it a propeller for economic growth a crafted mixture of regulatory reform and infrastructure investment was needed. The Commerce Commission warned that regulatory reform alone, one of the two conditions the government could actually dictate, would not be enough to create the right conditions to ensure higher and sustained growth rates. As a result the National Party government proposed the deployment of a countrywide fibre-optics infrastructure into New Zealand cities (Milner, 2009) in what would be known as the UFB initiative.

Foreseeing that private investors would not take on building or expanding broadband infrastructure in the country, 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. Crown Fibre Holdings Ltd was created by the government through its Minister for Communications and Information Technology to manage the investment on the UFB infrastructure. Since its creation CFH oversees UFB network’s construction and operation, but both the Minister and Treasury have an on-going oversight and monitoring role of CFH.

3.4. Types of intervention

Australia and New Zealand pursue a similar purpose yet the mechanisms chosen to do so are different. Australia’s government decided to fully fund the NBN with taxpayers’ money whereas New Zealand adopted a form of PPP with proportional shares of investment from both sides. This section looks at the types of vehicles chosen for network deployment and the issues arising from the network architecture which will have repercussions on the future of telecommunications markets in each country.

3.4.1. Reshaping the telecommunications markets in Australia

In late March 2009 the Australian Government announced plans to invest over 8-10 years at least A$21.5 billion of taxpayers’ money into the NBN using a PPP model with “significant private sector investment” (Conroy 2009). To manage the building and running of the NBN the government established NBN Co in early 2009 and indicated this government-owned enterprise should concentrate on Layer 2 services, the building of the network, and then selling wholesale services to retail service providers (RSPs). However, an implementation study conducted in 2010 by McKinsey and KPMG concluded that the estimated rate of return was insufficient to attract private investors (Given, 2010). Consequently the Australian government announced a shift away from the PPP model (Wong & Conroy, 2010) with NBN being fully funded with Government equity at least until the company’s cash flows would allow it to support private sector debt. In 2011, doubts about the viability of the business plan where raised again as the cost to construct the NBN was then estimated at A$37.4 billion (NBN Co, 2012a).

In 2010 NBN Co issued its 2011 – 2013 Corporate Plan, a document that set out key objectives and priorities for that 3-year period. In 2012 the 2011-2013 Plan was superseded by the 2012-2015 Corporate Plan (NBN CO, 2012a). In particular the Plan commands NBN Co to complete deployment of Dark Fibre connectivity, 121 Points of Interconnection and about 650 Fibre Access Nodes by 2015. To enable high-speed connections between the population centers across the continent, the government 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.

Over 2011 the government and Telstra held negotiations that came to an end in March 2012 that concluded Telstra’s structural separation process on an agreement known as Telstra Definitive Agreement allowing NBN Co
to efficiently re-use Telstra’s existing infrastructure as the migration of fixed telecommunications services from copper to fibre is finished (Battersby, 2012). While Telstra expects to maximize revenue from the outgoing copper network, a large percentage of Australians will have to migrate to fibre-optic connections for broadband and telephone services. The deal also allows NBN Co access to Telstra facilities such as ducts, pits, conduits, and dark fibre (NBN Co, 2012a).

The transfer of existing Telstra broadband infrastructure to NBN Co is envisaged to result in the weakening of Telstra’s strong market position as infrastructure owner, wholesaler and retailer. 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 under an A$11 billion deal (NBN Co, 2011d). The deal secures Telstra a cash flow for the next 30 years and is expected to offset the decrease in revenue raised from fixed telephone lines. In short Telstra has effectively sold its copper network to NBN Co while not having to sell off its pay TV branch, nor divest from its mobile telecommunications investments. Revenue will be raised from leasing the already existing Telstra infrastructure to NBN Co and receiving payments when a copper phone lines is disconnected and replaced by a fibre connection. The deal also represents much sought-after certainty for NBN Co’s as Telstra agrees to prefer the NBN for wholesale fixed line services (NBN Co, 2011d).

In June 2011, while NBN Co announced binding agreements had been entered into with Telstra, it also executed an agreement with SingTel Optus to “progressively migrate Optus HFC subscribers to the NBN as it is rolled out” (NBN Co 2012a, p. 17). A year later, in July, the ACCC authorized the Optus HFC Agreement, which became unconditional. As customers migrate from Optus to NBN Co, the former will receive compensation payments estimated in A $800 million in steady payments when NBN Co services become available in areas now served by Optus HFC network which is expect to occur not earlier than 2014 (Lohman, 2012).

3.4.2. Reshaping the telecommunications markets in New Zealand

In 2011 four companies were chosen as private investors in the new PPPs known as Local Fibre Companies (LFCs). The purpose of the UFB project is to accelerate the roll-out of an access network deploying optical fibre infrastructure (next-generation infrastructure) to 75 percent of New Zealanders by the end of 2019. New Zealanders will be served by a regional LFC according to their location as follows (see Table 1): the Whangarei region served by Northpower Limited; Hamilton, Tauranga, New Plymouth, Wanganui, Hawera and Tokoroa regions (central North Island), users will deal with Ultrafast Fibre Limited, whereas in Christchurch, Rolleston or Rangiora (east-central South Island), Enable Networks Limited is rolling the fibre. All other towns and cities, comprising about 70% of the country’s premises, will be served by Chorus.

Table 1. LFCs, population to serve and their number of signed-up RSPs for each LFC
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 (CFH, 2011). The agreement with Telecom included a condition by which Telecom would have to demerge if it wanted to participate in the UFB network. Telecom shareholders voted in favour of the proposal and in November 2011 Telecom split into Chorus, owner of the last mile copper and the UFB network, and Telecom retail which kept the PSTN, a 3G wireless network and the national backhaul network, among others (MacMahon & Milner, 2013). The operational separation from 2007 was abolished.

The New Zealand government will not expect to see any new (subsidized) copper wires to rural locations, instead any new telephone connections would be provided via broadband connections, some of which will not be optical fibre but fixed wireless and satellite connections. With the split of Telecom in late 2011 the historic Kiwi Share obligations have been inherited by Chorus, together with the existing copper wire infrastructure. The ownership restrictions put into place for Telecom on privatisation in 1990 are after the split only applicable to Chorus. This means Chorus, after the split the 8th largest company on the NZX, cannot be more than 49.9% foreign owned whereas Telecom NZ, after the split the 3rd largest company on the NZX, could in future come under foreign majority ownership (Fletcher, 2011). The obligation to provide a rural phone service is currently split between Chorus as the network provider and Telecom NZ as the retail service provider. The provision of telephone services brings into play the free local area calling New Zealanders have traditionally enjoyed which was enshrined in the 1990 Kiwi Share agreement. New Zealand had traditionally one of highest rates and time durations of local calls in the OECD, exacerbated during the period of dial-up internet connections to local ISPs (Howell, 2008), and it remains to be seen whether consumers are willing to give up their free local phone calls for a bundled broadband plus IP-based telephony service.

<table>
<thead>
<tr>
<th>Local Fibre Company</th>
<th>Population in service area</th>
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<tr>
<td>Enable Networks</td>
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<tr>
<td>NorthPower Fibre</td>
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<tr>
<td>UltraFast Fibre</td>
<td>454,000</td>
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<tr>
<td>Chorus</td>
<td>2,300,000</td>
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3.5. Supply-side issues

Deployment of a vast fibre-base infrastructure for high-speed broadband access embodies the supply side
of policy efforts to consolidate a digital ecosystem. A plan is put forward that will roll-out fibre to specific regions at higher-than-normal construction rates. This section reveals the extent to which effective construction is taking place for both NBN and UFB, comparing the targets to the actual deployment figures.

Current figures on the roll-out of NBN as well as projected numbers of premises passed and activated as stated in NBN Co’s 2012-2015 Corporate Plan (NBN CO, 2012a) are shown in Figure 3. The figure also displays the achieved and projected daily run rates, that is, the number of connections built per day (on a 250-day year) on average in a given year. Numbers of passed and activated fibre connections are used to report on the activated-to-passed ratio, an indicator that exhibits the adoption of fibre-based services by households where fibre has been installed.

![Fig 3](image)

**Fig 3.** Past and projected deployment and uptake of NBN’s fibre connections.

Source (NBN Co 2013b; 2012a).

The 2012-2015 Plan updated the expected number of premises passed and premises activated with FTTH previously set in the 2011-2013 Plan. Figure 3 shows the total premises passed and total connections activated as of Q1 2013 and the projected figures of NBN fibre deployment and activation. NBN forecasts an average of 1.7 million connections built per year once the project is finished (NBN Co, 2013); it also reports that at end March 363,360 premises were in the overall coverage footprint, with 96,060 passed with fibre and a total of 48,600 premises activated (fibre, fixed-wireless and satellite).

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<th>Table 2.</th>
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<td>premises activated (millions)</td>
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<td>6850</td>
<td>Numbers show the daily run rate in a given year</td>
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15
Facilities access

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<th>(AUD)</th>
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<td>Zero charge</td>
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Network-Network Interface

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<th>(AUD)</th>
<th>(AUD)</th>
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<td>$200</td>
<td>$1,000</td>
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<tr>
<td>10 Gigabit per second 10GBaseLR</td>
<td>$400</td>
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Access Virtual Circuit (downstream/upstream)

<table>
<thead>
<tr>
<th>Speed</th>
<th>(AUD)</th>
<th>(AUD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/1 Mbps</td>
<td>$24(^a)</td>
<td>N/A</td>
</tr>
<tr>
<td>25/5 Mbps</td>
<td>$27</td>
<td>N/A</td>
</tr>
<tr>
<td>25/10 Mbps</td>
<td>$30</td>
<td>N/A</td>
</tr>
<tr>
<td>50/20 Mbps</td>
<td>$34</td>
<td>N/A</td>
</tr>
<tr>
<td>100/40 Mbps</td>
<td>$38</td>
<td>N/A</td>
</tr>
</tbody>
</table>

\(^a\) 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.

NBN CO will sell wholesale services to service providers as inputs to their end-user services 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). Prices for NFAS product components are shown in Table 2.

The information in Table 3 summarises the progress in the deployment of UFB and RBI in New Zealand connections until the first trimester of 2013. The rate of deployment in both UFB and RBI initiatives can be compared with the targets set by the New Zealand government in the timeframe shown.

Table 3. State of deployment of New Zealand’s UFB and RBI

<table>
<thead>
<tr>
<th>Date</th>
<th>Number of premises passed</th>
<th>Target</th>
<th>Number of connected end-users</th>
<th>Number of active RSPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec 2011</td>
<td>16,000</td>
<td>70,000</td>
<td>1,233</td>
<td>13</td>
</tr>
<tr>
<td>Jun 2012</td>
<td>76,311</td>
<td>70,000</td>
<td>2,445</td>
<td>18</td>
</tr>
<tr>
<td>Sep 2012</td>
<td>101,786</td>
<td></td>
<td>3,806</td>
<td>18</td>
</tr>
<tr>
<td>Dec 2012</td>
<td>131,912</td>
<td></td>
<td>5,133</td>
<td>21</td>
</tr>
<tr>
<td>Mar 2013</td>
<td>171,886</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rural Broadband Initiative

<table>
<thead>
<tr>
<th>Date</th>
<th>Vodafone (number of premises)</th>
<th>Chorus (number of premises)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun 2012</td>
<td>52,923</td>
<td>19,028</td>
</tr>
<tr>
<td>Sep 2012</td>
<td>55,481</td>
<td>23,400</td>
</tr>
<tr>
<td>Dec 2012</td>
<td>89,235</td>
<td>36,100</td>
</tr>
<tr>
<td>Mar 2013</td>
<td>100,120</td>
<td>42,400</td>
</tr>
<tr>
<td>Target (2016)</td>
<td>147,000</td>
<td>105,000</td>
</tr>
</tbody>
</table>

(Source: MBIE quarterly reports on UFB Jul 2011- March 2031.)
In New Zealand most currently operating Internet service providers have already signed up to the LFCs to become new retail providers on the new platform. A few newcomers will enter the market as well. New and already established providers will vie to position themselves on the platform. The number of content providers advertising their broadband-based offers is slowly increasing as the construction of the networks unfolds.

Table 4. Products and prices for home/retail customers agreed on by CFH and LFCs.

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

(*) CCPM: Customer charges per month. (®) Gigabit Passive Optical Network. 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).

Local Fibre Companies In New Zealand reached agreements with CFH on wholesale service prices; a LFC will not be allowed to charge more than a specified “monthly price” when its client RSP signs up a new customer and are “capped” for an agreed term. For the home/retail customer and business entry segments Table 4 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.

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.

3.6. Demand-side issues

Boosting the demand side in 2011 the Australian government stepped up its efforts to strengthen its take
on leading the way to make Australia a world-leader in the digital economy by launching its National Digital Economy Strategy (Australian Government, 2011). The Strategy considers NBN a “key step towards its vision” while setting eight goals that focus on online participation and online engagement by households and businesses, smarter management of the environment, improved health and age care, expansion in online education, increased teleworking, more online government service delivery and greater engagement in the digital economy by the regions (Australian Government, 2011).

A study recently released by the University of Melbourne and Swinburne University of Technology on the adoption of NBN in Brunswick, Australia, (Nansen et al., 2012) examines high-speed broadband uptake by households and how it impacts household consumption patterns and costs of communication technologies. The study considers high-speed broadband as part of a whole domestic technological environment avoiding any focus on specific applications.

Main findings can be summarised as follows (Nansen et al., 2012):

- Early adopters of the NBN are home owners with higher incomes than those with ADSL.
- Early adopters are active in deciding to get connected to the NBN and are guided by speed rather than price.
- Non adoption of NBN is due to not knowing about it, high perceived cost, lack of information about the installation process, and satisfaction with current Internet connection.
- NBN users are more knowledgeable about speed and monthly data limits, but all across the sample of users, regardless of their connection type, Internet speed is better understood by experiencing it rather than quantitatively.
- Households connected to NBN are twice more likely to use it as a place of work than other households.

In Australia, according to NBN, uptake is voluntary and not the result of final disconnection notices, whereby customers are told their copper connection will be switched off. As of Q1 2013 NBN Co had announced that uptake was 28% in twelve FSAs with average data consumption well above the national average (NBN Co, 2013a). Although the sample of twelve areas may not be statistically significant such rate indicated a faster uptake than ADSL (which took six years to achieve 28%) or HFC (15 years to reach 34%) (NBN Co, 2013a).

The complementary programmes that would enhance the demand-side of the broadband ecosystem in New Zealand appear to have been scrapped off the government’s plans. In 2008 the Labour government issued the Digital Strategy 2.0 (MED 2008), a plan that advocated for ‘super-fast connection, enhanced user confidence and cool content”. The 2008 election brought the National Party to power and the Strategy went into oblivion. Current demand-side activities extend only to local government and Maori communities. Opportunities that will promote the use of UFB in the health sector are currently being identified by the National Health IT Board and
the Ministry of Health.

In New Zealand recent work by Beltrán and Mirza (2013) aimed to empirically explore the drivers and barriers to consumer adoption of UFB using three different data sets, finds that consumer awareness and pricing are the main factors that need to be addressed for a successful UFB rollout. Using a mixed-data source approach Beltrán and Mirza (2013) postulate a framework composed of barriers, drivers, and deciding factors. The barriers are reasons for consumers to refrain from UFB access adoption whereas the drivers are motivators. The deciding factors can become either a barrier or a driver depending on the consumer preference or market condition for a particular factor.

3.7. Regulation

Australia and New Zealand have opted for a broadband deployment model following an open-access broadband platform model, (see Figure 2 as adapted from (Kirsch & Hirschhausen, 2008)), whereby wholly new markets are expected to flourish, and regulatory concerns focus on compensating the incumbent (such as with the Telstra and Optus agreements in Australia) and regulating wholesale prices as a means to reduce investment uncertainty. One other aspect that does not become apparent in either country is the provision of enough incentives to attract upper layer players, except for the certainty provided by the wholesale service tariffs, shown in Tables 1 and 2 in section 3.4, which commit to either fixed prices or fixed annual changes over announced time periods.

Australia’s NBN Co is the sole operator of the network; in New Zealand, CFH and four private companies, partnered in four LFCs have been granted exclusive rights to operate the fibre-based platform in mutually exclusive geographical areas. RSPs will purchase wholesale services from the platforms on a competitive playfield underlain by the open access principle, the design principle behind NBN and UFB. The regulatory aspects of the fibre-based platform and the wholesale service tariff schemes in both Australia and New Zealand respond to the open access architecture. Regulators on both sides of the Tasman Sea have raised their concerns in regards to particular issues as the broadband platforms start to take shape. In Australia regulatory affairs regarding the NBN are consigned in the Special Access Undertakings issued by NBN Co and submitted to ACCC. In New Zealand recent decisions by the Commerce Commission on the wholesale price of unbundled local loop access are expected to impact the business plans of the new UFB service providers.

In 2011 NBN Co delivered its self-regulating undertaking, also known as Special Access Undertakings (SAU), as a part of the government’s intention to provide a regulatory framework to the wholesale portion of the network. NBN Co filed the document setting out the pricing (as in Table 2 in Section 3.1.1) and regulatory framework for the operation of the NBN for the next 30 years (Taylor, 2013). The submission was signaled by
ACCC as not likely to be accepted and NBN Co had to redraft it to address the concerns from multiple parties (Hutchinson, 2012). ACCC’s main criticisms referred to the “nature and oversight” of ACC over the next 30 years and the level of certainty given to access seekers. In September 2012 and later in December NBN Co filed new modifications to the SAU describing it as a framework that “strikes a balance between the long-term interest of end-users, access seekers and NBN Co” for the next 30 years (NBN Co, 2012b).

The current NBN Co’s proposed modular SAU provides a 30-year regulatory framework for product and service description and long-term cost recovery, while dealing with uniform national wholesale pricing, pricing stability and predictability and economic efficiency on a 10-year period after which revisions will be done every three to five years. SAU includes a five-year freeze on wholesale product prices and cap (rate of annual inflation less 1.5%) on annual price increases. In its reply (ACCC, 2013) the Australian Competition and Consumer Commission asked NBN Co to further work on commitments to provide oversight mechanisms to agreements NBN Co enter with customers, while also questioning the declared ability for NBN Co to withdraw and create products. In particular ACCC believes that “the product withdrawal divisions diminish the prospect that the price caps in place would incentivise NBN Co to invest and operate efficiently”.

Providing incentives and a less uncertain regulatory environment to investors was a position staunchly defended by the New Zealand government in 2010 when proposing a “10-year regulatory holiday” (Watson, 2011); the proposal would have excluded the LFCs from the Telecommunications Act until 2020 (Labour, 2010; Watson, 2011). Since the government was actively seeking for private money to be invested in the UFB it seemed quite intent on protecting the private investors’ incentives (Beltrán, 2012). Eventually as the pressure mounted the government withdrew its proposal and quickly sought to include contractual mechanisms to protect its partners from unexpected price changes (Techday, 2011). Wholesale services on the UFB network are to be provided in a non-discriminatory standard in the initial period ending on December 2019 and in an “equivalence and non-discriminatory” standard afterward (CFH, 2010).

In 2012 the Commerce Commission’s decision to reduce the price of the unbundled copper local loop (UCLL) service sent a signal to the Internet access market about the price of copper for the following years. The decision affects 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 UCLL, 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).
4. Elements of a framework for broadband policy

The state of development of the broadband national plans in Australia and New Zealand, as of mid-2013, can be better appreciated on Table 5, which displays information regarding the main figures for the current state of deployment, the total funds invested, the institutional arrangements, key summary information on network operation, and the regulatory framework. Information in Table 5 is a solid starting point to discuss the elements that constitute this paper’s approach to a framework for broadband policy.

**Table 5** Comparison of the Australian and New Zealand broadband plans across five themes.

<table>
<thead>
<tr>
<th>Where are they doing?</th>
<th>Australia</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deployment</strong></td>
<td>By 2020 12.2 million fibre premises passed, 1 million fixed wireless and satellite premises covered; 8.5 million fibre premises connected (NBN Co 2012a).</td>
<td>By 2019 1,350,000 fibre premises passed; by 2015 252,000 rural households covered (MBIE 2012)</td>
</tr>
<tr>
<td><strong>Achieved so far</strong></td>
<td>Mid-2013: 484,000 premises passed, of which 207,500 passed with fibre; 70,000 connected (NBN Co 2012a).</td>
<td>Mid 2013: 229,633 fibre premises passed, 5,133 activated; 161,000 rural premises passed. (MBIE 2013)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How much does it cost?</th>
<th>Australia</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Funding</strong></td>
<td>Government funded</td>
<td>Government invests half of the total and private partners afford the rest</td>
</tr>
<tr>
<td><strong>Capital expenditure</strong></td>
<td>A $37.4 billion [E 49.1 billion*]</td>
<td>NZ $1.5 billion [E 0.95 billion*]</td>
</tr>
<tr>
<td><strong>$ per person</strong></td>
<td>A $1,669 [E 1,270]</td>
<td>NZ $341 [E 215]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How is it structured?</th>
<th>Australia</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leading agency</strong></td>
<td>National Broadband Network Company, NBN Co.</td>
<td>Crown Fibre Holdings, CFH.</td>
</tr>
<tr>
<td><strong>Private participation</strong></td>
<td>NBN Co is wholly owned by the Australian government; private participation is through procurement contracts for fibre build-up.</td>
<td>Four partnerships with private parties (Chorus, Enable Networks, North Power Fibre, UltraFast Fibre)</td>
</tr>
<tr>
<td><strong>Supportive programs</strong></td>
<td>Regional Backbone Blackspots Program, RBBP.</td>
<td>Rural Broadband Initiative, RBI.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How will it operate?</th>
<th>Australia</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Layer 1</strong></td>
<td>NBN Co builds a high-speed FTTH open-access platform</td>
<td>CFH partnering with private operators builds four regional FTTH networks</td>
</tr>
<tr>
<td><strong>Layer 2</strong></td>
<td>It sells wholesale access services to retail service providers</td>
<td>It sells wholesale access services to retail service providers</td>
</tr>
<tr>
<td><strong>Layer 3</strong></td>
<td>RSPs sell end-user services over the platform</td>
<td>RSPs compete selling end-user services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What are the regulations?</th>
<th>Australia</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regulatory commitments</strong></td>
<td>Self-regulatory guidelines and commitments consigned in the Special Access Undertakings under review by ACCC</td>
<td>Commerce Commission monitors the buildup process</td>
</tr>
<tr>
<td><strong>Copper infrastructure</strong></td>
<td>Total decommission of Telstra’s last mile copper infrastructure as dictated by the NBN Co-Telstra agreement</td>
<td>Commerce Commission rules in favour of access seekers by reducing the price of ULCC.</td>
</tr>
</tbody>
</table>
With reasons for government intervention in both Australia and New Zealand, respectively, having been discussed previously within the context of a market-failure approach, the precise forms such interventions adopted were then described. The latter included the projects’ respective governances and the main technical aspects of the new broadband platform architectures including the structure of entry-level wholesale products. Such elements help in organizing the rest of the analysis which, this paper argues, can be summarised in a simple, yet convenient framework that includes the supply-side policies, the demand-side policies and the regulatory measures. On the supply side amendments and changes to the original plans play a role in shaping up the output and the kind of offer government fibre agencies are putting out there for the public at large. They also may constrain the speed of deployment, which is a major factor in the sought-after efficiency of the new platform. On the demand side consumers’ attitude towards connection uptake and consumers’ perception on the future benefits, with an overall appreciation of positive and negative effects on society and economy, are studied by way of using recent results published after separate academic surveys were conducted in both countries. The demand side also is further stimulated by two government programs, namely, Australia’s National Digital Economy Strategy (Australian Government, 2011) and New Zealand’s Digital Strategy 2.0 (MED, 2008). The third and last element, the regulatory environment, is the one element where the two countries most visibly differ, with Australia’s NBN Co having settled on a set of regulatory guidelines, the Special Access Undertakings, approved by ACCC in mid-2013. In New Zealand, on the other hand, effective regulatory measurements affecting the future UFB markets only concern the price of copper lines.

4.1. Supply-side: promoters and constraints

Using the model introduced in Figure 1 this section explores those supply-side aspects of NBN and UFB that promote their development or act as constraints to slow it down.

NBN Co Corporate Plan states that by 2015 NBN Co will deliver about 6,000 premises per day (see Figure 3). Current fibre uptake sits around 16% and NBN Co expects it to increase to about 50% in 2015. In its 2012-2015 Corporate Plan NBN Co also announced a change from Demand Drops to a Build-drop strategy (NBN Co 2012a, p.13) a decision that signals an important change from what was originally state in the 2012-2013 Corporate Plan. The Build drop strategy consists of the installation of connection devices at the premises while the network (distribution and local segments) is being built instead of waiting until a Retail Service Provider’s order for service is received after its customer wants to activate end-user services (Demand Drops). Build drop is expected to be more cost effective, particularly in light of the Telstra deal which causes a greater certainty in uptake. This will cause an acceleration of the capital expenditure over the project’s lifetime.
Supply-side is affected by delays incurred in different parts of the country by contractors caused by renegotiations, scarcity of skilled labour, wrong managerial decisions as reported by the Australian press over the recent months. The most contentious issue though, is the already chronic NBN Co’s failure to meet its build-up targets. Supplying the number of connection in the numbers expected by the Plan is becoming a very hard target to meet as the daily run rate indicates; it will take NBN CO a remarkable effort to overturn the current rates. As it stands NBN Co’s managerial difficulties are standing in the way to an effective deployment and threaten to become a constraint to the NBN rather than a promoter.

NBN and UFB were designed as open-access platforms. RSPs need access to wholesale services the platform provides. Underlying the open-access condition is the respective governments’ visions to create conditions for new, innovative services provided by new entrepreneurs. RSPs play a double-role in the expansion of broadband in that they promote both the supply-side and demand-side. RSPs are main customers of the fibre-based platform and their commercial success assures the government’s goals to achieve its revenue goals, which can be taken as an indication that supply-side policies achieve their targets. On the other hand, RSPs have direct contact with end-users and their service offers and bundles stimulate demand for the platform capacity; their commercial strategies are therefore to increase demand for fibre-based services.

A service provider will typically purchase wholesale services at monthly capped wholesale prices. Regulatory pricing approach in both countries is allowing for a period of several years during which wholesale service prices for the residential end-user market will either be frozen with price reviews promised at 3 to 5 year intervals - as in Australia (NBN Co, 2011a) - or are already set for slight increases (with a constant annual growth rate) or slight decreases (with a constant annual decrease rate) over the next 8 years – as in New Zealand (CFH, 2011).

In Australia NBN Co deems RSPs “access seeker” stating that it must be a licensed carrier, carriage service provider or content service provider under the Telecommunications Act. Additional conditions include meeting NBN Co’s credit test and interoperability requirements (NBN Co, 2012c).

Currently no RSP advertises IPTV or IP-based television in New Zealand. Pending further regulatory inquiries into the current hurdles to accessing premium TV programming some service providers may become IPTV providers as well. Thus, the traditional Internet access plan – with data caps still applied in Australia and New Zealand – will transform into a richer bundle that includes some type of IPTV. Video services over the Internet have the potential to overturn the status-quo of video service provision, particularly the pay television business. With broadband networks being able to deliver higher speeds, Over the Top (OTT) providers – delivering TV to end-users over third party broadband networks (Commerce Commission, 2012) and offering
them on-demand contents -would have the ability to reach larger audiences.

4.2. Demand-side: promoters and constraints

The second component of the analytical framework refers to the set of initiatives and incentives created by the fibre promoter, the government, to enhance the demand-side capacity to acquire and use broadband connections and services. Demand for fibre connections and activation of the fibre for service consumption are the two central pillars of the fibre-to-the-home initiatives’ success in Australia as well as in New Zealand. Uptake of fibre activations for both countries can be seen in Figure 3 and Table 3. Customers’ response in Australia is 5-fold larger than in New Zealand. As of mid-2013 New Zealand has achieved 20% completion and its uptake is about 3%. Uptakes in other countries have been similar at similar states of completion: Singapore 2% when construction reached 24%; UK 3% when reaching 24% (Adams, 2013).

Current fibre uptake rate in New Zealand reflects the mix of barriers, drivers, and deciding factors that restrain and promote the activation of FTTH-based services. Recent work by Beltrán and Mirza (2013) found that in New Zealand consumer awareness and pricing are the main factors that need to be addressed for a successful UFB rollout. Among deciding factors the study not surprisingly finds that a free or low-cost connection to the premises will enhance the adoption; nevertheless come 2015 those New Zealanders who don’t have it yet may have to pay for the fibre connection as the government has assured, through an agreement with three of its private partners, free-of-charge residential fibre connections only until the end of 2015 (Adams, 2013). A remaining partner, Ultra-Fast Fibre has undertaken to provide them free until 2019. The latter means that fibre connection cost will become a barrier. The results of a consumer study by Canstar Blue reported in (Wade, 2013) found that that consumers struggle to understand the differences between their current connection and the fiber technology used by the UFB. In the absence of connection charges low uptake rates relate to the lack of awareness. Beltrán & Mirza (2013) also find a high-degree of consumers contentment with existing ADSL-based Internet connections and consumers inclined to decide about their participation in the content market – that is, get their connection activated - if startup costs are low, products are easy to setup and the number of retail service providers and their offers are attractive. Most current offers only bundle Internet access and a VoIP line.

In addition to fibre uptake demand-side stimuli can take varied forms such as those promoted by Australia’s National Digital Economy Strategy (Australian Government, 2011) and New Zealand’s Digital Strategy 2.0 (MED, 2008). The Australian National Digital Economy Strategy is a comprehensive approach to a full utilisation of the newly introduced high-speed broadband capability and an invitation to all sectors of the economy. The expectations set by the Digital Strategy exert a particular kind of pressure on NBN Co to deliver on its build up schedule as they will materialise only when the NBN becomes operational and a critical mass of users engage
with the programmes and activities. Coordination between NBN Co and the government agencies charged with the Digital Strategy’s leading projects is essential. The NBN will provide several key factors which will promote the development of the Strategy’s goals such as the higher speed download and upload services which will allow household and small businesses to access new applications; ubiquitous availability; and a uniform national wholesale tariff structure.

4.3. The role of regulation

The transformation of the telecommunications markets in Australia and New Zealand is fueled by demand-side and supply-side policies as explained thus far; as the governments and respective government companies in charge of the plans move forward with deployment of fibre connections, disconnection of copper lines and further commitments to the incumbent (NBN Co and Telstra in Australia) or on-the-go reviews and further negotiations (CFH and Chorus in New Zealand), respective regulatory bodies do need to keep vigilant and act accordingly when needed. Regulatory action, be it threats or decisions or reviews, do play a highly important role in shaping up the future telecommunications markets operating on the high-speed broadband platforms. This section discussed the major platform operation decision affecting the market structure in both countries known as open-access and the ensuing market model. Then it presents the major regulatory recent decisions regarding the first evolution stages of the broadband markets in both countries.

ACCC proposes a number of suggested variations. Some of the main areas include providing certainty about how NBN Co will comply with its obligations under the telecommunications access regimes particularly with any ACCC regulatory rulings; on the other hand, allowing periodic price rebalancing through an ACCC review and amendments to clarify the ACCC can have a role in overseeing product withdrawals and new products as well as their prices (ACCC, 2013). ACCC also highlighted some merits of the SAU including the prices set out were likely to allow a smooth transition from existing telecommunications networks and NBN Co’s long-term commitment to not raise prices above the CPI - 1.5 per cent.

Cave 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, 2012:15). 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.

5. Conclusion
The national broadband initiatives of Australia and New Zealand, currently being developed, are the subject of analysis by this paper, which draws an upgraded picture of their current status and provides an analysis that inquires about the reasons for direct government intervention in broadband deployment, the vehicle and mechanisms towards successful deployment and operation of the broadband platform, the promoters and constrainers of demand-side and supply-side policies and the regulatory decisions taken thus far.

In recent years both countries found themselves struggling to boost up their respective numbers of high-speed broadband connections. Grown out of frustration with the incumbent, both governments across the Tasman launched –within one year’s difference – national programs for the expansion of broadband by adopting an innovative scheme that promised to overturn their telecommunications markets.

Australia’s NBN exemplifies the return to public sector’s control of essential facilities, having concluded that the construction of a modern high-speed, FTHH broadband access network and can’t be achieved by private initiative alone. New Zealand, instead, relied on private partners that build and operate the network in association with CFH. In both countries but at different degrees, fibre-to-the-home technology will be complemented with fixed-wireless and satellite broadband connections.

This paper built a simple, yet convenient framework for the analysis of the two broadband national plans while discussing its main proposed elements: supply-side policies, demand-side policies and regulatory measures.

Supply-side policies were analysed to inquire about the promoters and the constraints impacting the roll-out of fibre connections. On each review period Australia’s NBN Co struggles to meet its construction targets; its fibre uptake of about 16%, on the other hand, is rather high if compared with a handful of international experiences. New Zealand, by adopting a PPP-based deployment strategy has managed to exceed its targets, but the uptake of its FTTH network is only 3%. The contrasting results follow from the way each country structured the governance and financial strategy of its fibre initiative.

On the demand-side front current information allows to appreciate a better-than-expected rate of uptake in Australia and a somewhat disappointing rate in New Zealand. Lack of information, inability to appreciate the advantages of the new technology and a lack of awareness on the consumer side may be contributors to the low uptake rate in New Zealand. On the other hand the agreement reached with the incumbent that incentivizes the disestablishment of copper connections when fibre is available and favourable wholesale service rates enticing RSPs may be working in favour of positive results in Australia.
Finally the implications on competition brought in by the open-access principle were analysed alongside recent regulatory decisions in both countries.

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