

Structural Separation and the Role of Public-Private Partnerships in New Zealand's UFB Initiative

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Abstract: The political perception of New Zealand's broadband market performance as 'poor' has underpinned many significant changes to the telecommunications policy and regulatory environments since 2001. Most recently, this has been manifested in substantial government subsidies by way of public-private partnerships (PPPs) for an ultra-fast broadband (UFB) network that promises to deliver fibre connections with upload/download speeds of 100Mbps/50Mbps to 75% of New Zealanders by 2019. In this context, the paper examines the different PPPs with respect to allocation of task and risks between private and public parties. We conclude that problems with the UFB initiative might emerge as demand risks are not sufficiently specified which might slow broadband adoption in New Zealand.

Key words: Public Private Partnerships, Ultrafast Broadband (UFB), New Zealand.

The development of public private partnerships (PPPs) in New Zealand has to be considered in the context of the historical development of the sector and recent changes related to the government sponsored Ultrafast Broadband (UFB) Initiative. Even if New Zealand was in the early 1990s one of the first OECD countries to fully privatise its incumbent telecommunications company, broadband development has - by the New Zealand government, been considered - as lagging behind till the beginning of 2000s. As a result, the government sponsored UFB program was initiated. Throughout the 2000s, successive governments relied upon regulation and contractual undertakings to generate private-sector investment in broadband infrastructure. For example, the 2006 Telecommunications Amendment Act (no. 2) introduced local loop unbundling, enabling investment by competing operators on

Telecom's network; and in 2007 Telecom started to roll out a nationwide Fibre-to-the-Node (FTTN)¹ network to all communities with 500 or more lines which was finalized by 2011.

Similar to developments in Europe, the government of New Zealand recognized in 2008/9 that Next Generation Access (NGA) networks will become important in the development of the broadband market. The developments in New Zealand have contributed to the understanding with respect to possible migration paths, criteria for migration from traditional broadband to NGA networks and the effects of structural separation on NGA rollout.² In focusing on the different forms of public private partnerships in New Zealand, the analysis evaluated the risk allocation within the partners involved in the UFB initiative by characterizing different forms of risks. In this context, partnerships are considered as alternative means of generating value for private and public stakeholders by lowering risk and reducing uncertainty for private investment.

In the following, the theoretical foundations of public private partnerships are discussed (1st section). Afterwards, the emergence of public private partnerships in the broadband sector is put in the context of the discussion on next generation networks in New Zealand (2nd section). Then, the evolution and the structure of the broadband sector in New Zealand are discussed (3rd section). Finally, the UFB initiative and the different forms of PPIs are discussed (4th section). The paper concludes with a discussion of the main findings.

¹ With a Fibre-to-the-Node (FTTN) network, the fibre connection is terminated in a street cabinet or neighborhood nodes; this can be far away from the premises of customers. From the street cabinet final connections to the customer are mostly based on copper. FTTN is considered as an interim step toward implementing a full Fibre-to-the-Home (FTTH) network which provides a full end-to-end fibre connection to customers and is typically used to deliver advanced triple-play (TV, Internet and Voice) telecommunications services.

² Structural separation refers to the splitting up of retail from network operations which impedes the ability to access scale economies and interferes with incentives to align network deployment with marketing activity (HOWELL, 2010).

■ The incentive for private partners in public private partnerships in broadband development: theoretical perspectives

The national regulatory and legislative framework for public intervention in broadband markets

In the growing literature on the role of public intervention in broadband markets, the main arguments have been related to public goods properties of broadband and the effects of competition on broadband (PICOT & WERNICK, 2007). If public sector entities intend to facilitate broadband deployment, they face the delicate task of putting forward legitimate reasons for intervention ranging from basic infrastructure and market failure arguments to opportunistic rationales (LEHR, SIRBU & GILLETT, 2006; SADOWSKI, NUCCIARELLI & DE ROOIJ, 2009). A central argument in the political discussions within the public utility framework has been whether (or not) broadband can be considered as a public good characterized by non-excludability (i.e. no one can be excluded from consumption) and non-rivalry (i.e. consumption by an individual does not reduce the availability of the good to others) (PICOT & WERNICK, 2007). As has been shown, however, both arguments are restricted in their applicability to broadband (FRISCHMANN, 2012).³ If politicians used the public utility argument for broadband, the discussion would focus on the public funding available for broadband diffusion and the different ways of stimulating demand. Competition-related arguments, in contrast, have been put forward to discuss more efficient ways of improving the terms and the design of market regulation, in particular with respect to facilitating inter- and intra-platform competition in broadband markets.

As a result of balancing public-goods related and competition-related arguments, national government in different OECD countries have developed a variety of regulatory models ranging from "distinctly

³ FRISCHMAN (2012) has extended the public goods view by addressing, the costs of exclusion and the effects of rivalrous consumption. His focus has been on the "sharable" nature of infrastructural resources, i.e. the extent to which these resources can be accessed and used by multiple users at the same time. Due to rivalrous consumption leading to congestion (and the depletion of resources), managerial choices should address the provision of particular resources to users. He concludes that commons management is an appropriate tool to provide infrastructural resources.

deregulatory" (observable, e.g. in the United States and the United Kingdom) to an "interventionist approach" (e.g. Japan and Korea) and a "third or middle way" with a focus on regulatory intervention using competition analysis which should limit the impact of industrial policy (different countries in the European Union) (HUIGEN & CAVE, 2008). In New Zealand, the role of government has recently changed from a more deregulatory approach towards a more interventionist approach in which the government becomes involved in the precise specification of the network technology, network implementation and the selection of firms responsible for network rollout. The country-specific developments in broadband markets in the United States, in different countries in the European Union and in New Zealand are addressed in table 1.

Table 1 – Regulatory models, NGA networks and separation

<i>Regulatory Model</i>	<i>"Distinctly deregulatory"</i>	<i>"Third or middle way"</i>	<i>"Interventionist approach"</i>
Example Countries	United States	Netherlands, Germany	New Zealand
Separation	Structural separation	Some European countries functional separation (*)	Structural separation
National broadband plans	National broadband plan	Different national broadband plans (**)	UFB initiative
NGA technologies	Variety of broadband technologies	Mainly fibre-based or advanced upgraded cable networks	PON and Point-to-Point architectures
Migration paths	Not further specified	White areas, black areas and grey areas (***)	Candidate Coverage Areas
Types of public intervention	Variety of forms of public intervention	Market investor principle, Services of General Economic Interest	Local fiber company (LFC) partnering model(s)

(*) There are a few countries in Europe where functional separation has been introduced (like the United Kingdom) or there are intentions for introduction functional separation (like Italy). For a more comprehensive review of the different country-specific forms of separation in Europe see (NUCCIARELLI & SADOWSKI, 2010; TROPINA, WHALLEY & CURWEN, 2010).

(**) The European Commission is targeting with its Digital Agenda to provide by 2020 all Europeans with internet speeds of above 30 Mbps and 50% or more of European households with internet connections above 100 Mbps. European countries differ with respect to their national broadband plans ranging from Finland with the most ambitious plans 100 Mbit/s by 2015 to countries which do not have any broadband plans yet (NUCCIARELLI, SADOWSKI & RÜHLE, 2013).

(***) The main document defining the different migration paths has been the Guidelines of the European Commission from 2009 (CEU, 2009).

Source: Based on (HUIGEN & CAVE, 2008), own additions

In contrast to their increasing importance in Europe (DELOITTE, 2006), public private partnerships have hardly operated at all in New Zealand until very recently (JOCK, 2010; NIU, 2011). Under conditions of structural separation, the incentive structure has to account for the separated private firm as well as for other firms in the market.⁴ This incentive structure is rooted in the form of allocation of risks and tasks between partners in the PPP as well as the level of risks involved (compared to vertically-integrated forms of broadband provision).

Public private partnerships under conditions of structural separation

New Zealand represents an interesting case of "interventionist" approach towards PPP formation as the national government provided - via a massive public investment - not only incentives for private companies to co-invest, but facilitated the involvement of the structurally separated firm (Chorus) in these partnerships. In contrast to the "third or middle way" approach to NGA development followed by most countries in Europe, whereby the national governments are restricted due to State Aid regulations to play a more active part in the (public) financing of infrastructure development and vertically related supply structures of providing broadband infrastructure have been the rule and functional separation the exception.⁵

In New Zealand, the formation of PPPs started on 21 October 2009 with the New Zealand Government issuing an invitation to potential partners to submit proposals on how they would co-invest with the Government to

⁴ Vertically-integrated firms face different incentives compared to separated one's. When competing on their own infrastructures, the separated firm faces real disadvantages. The competitor benefits from being able to arbitrage on cost using its own network and the purchased wholesale components from the separated firm. The separated firm cannot respond. Neither can it reliably test end consumer preferences as it is not able to have retail customers. This inserts an information asymmetry that provides further advantages to the integrated competitor (who now faces real incentives to distort information provided to both customers and regulators to pursue its own interests) which will typically be aimed at maximising returns on its own investments.

⁵ Vertical integration can be reduced through different degrees of separation of telecom companies' assets. As already highlighted by CAVE (2006), among the less intrusive forms of separation, accounting separation allows to split up transaction and accounting prices. More intrusively, functional separation can be implemented in several forms (e.g. creation of a wholesale division, business separation, legal separation) to gradually split up a vertically-integrated structure along operational practices. Finally, the most intrusive separation is labeled as structural (or ownership) and it is aimed at creating new independent units with separated ownership. Such a remedy to vertical integration leads, however, to a series of regulatory, business and organizational issues to be solved (see NUCCIARELLI & SADOWSKI, 2010).

achieve its Ultra-Fast Broadband objective (the so-called UFB Initiative). The UFB Initiative specified as objective "to accelerate the roll-out of Ultra-Fast Broadband to 75 % of the New Zealand population over ten years, concentrating in the first six years on priority broadband users such as businesses, schools and health services, plus greenfield developments and certain tranches of residential areas" (Crown Fibre Holdings Limited, 2011b). It has been emphasized that very high speed is important rather than universal coverage (JOCK, 2010).

PPPs are defined as an alternative means for public and private stakeholders to generate value by lowering risk and reducing uncertainty for private investment (GOMEZ-BARROSO & FEIJÓO, 2010; NUCCIARELLI *et al.*, 2010). Across different infrastructure industries, there are several categories of risk relevant to the supply of public services. On the basis of previous studies (HODGE & GREVE, 2007; IOSSA & VELEZ, 2007; MUSELAERS & STIL, 2010; OECD, 2008), we made a distinction between the following risks: Statutory and Policy risks; Design, construction, time schedule, and operational risk; Technical risk; Demand and revenue risk; Legislative/Regulatory risk; Financial risk and residual value risk. Within contracts, allocation of risk is achieved via different payment schemes as well as specific clauses that define the liabilities of different parties if specified circumstances should arise. Private partners are better suited to take on technical risk (e.g. choosing the most future proof technology) and to deal with design, construction, time schedule, and operation risk (in implementing and operating the network). Some risks should be shared by the private and the public party in the venture (e.g. financial risks and residual value risks) and are part of intensive negotiation between the different parties.

The risk structure in the vertical integrated case (in which all risks are allocated to private parties) can be inadequate to create sufficient incentives for private investment. To account for the high risks associated with implementing NGA networks, public parties can provide certainty for private parties in reducing revenue and demand risks (by accounting for these long payback periods), lowering legislative and regulatory risks (in introducing a stable, long-term regulatory and legislative framework) and taking care of statutory and political risk (in defining the appropriate structure for the roll-out of the infrastructure in terms of objectives, approvals, etc.) (see table 2).

**Table 2 - Risk allocation in public private partnerships
under conditions of structural separation**

<i>Form of risk</i>	<i>Definition</i>	<i>Risk allocated to</i>	
		<i>Under conditions of vertical integration</i>	<i>Under conditions of structural separation</i>
Statutory and political risk	Extent to which the project meets the relevant public planning objectives, controls, standards, policies and provisions and decided for approval or rejection	Private party	Public party
Technical risk	Extent to which new technologies might substitute for existing technologies, older technologies are used, etc.	Private party	Private party
Design, construction, time schedule, and operation risk	Risks related to designing, building, financing, and operating an infrastructure facility	Private party	Private party
Demand and revenue risk	Risks related to demand and revenue uncertainties	Private party	Private Party
Legislative/regulatory risk	Risks of changes in law or national legislation	Private party	Public party
Financial risk	Exposure to exchange rate fluctuations, etc.	Private party	Public and private party
Residual value risk	Controlling facilities after contract expired	Private party	Public and private party

In general, the risks in a PPP should be allocated in way that the party which can best bear the risk should also take up responsibility. The responsibility for certain risks is mostly defined in contractual agreements between the public and the private party. If the risks are wrongly allocated, the incentive structure of the PPP is insufficient for the parties involved and the output of the PPP in terms of quantity and quality of service can be negatively affected. Therefore the transfer of the risks to a party which is not the most appropriate to bear the risk can result in inefficiencies of the PPP. Under structural separation, the newly created company can take over part of the private risks ⁶.

⁶ In the case of Chorus, a penalty clause would kick in if uptake is less than agreed in the PPP.

The UFB initiative in the light of governmental efforts and broadband market developments in New Zealand

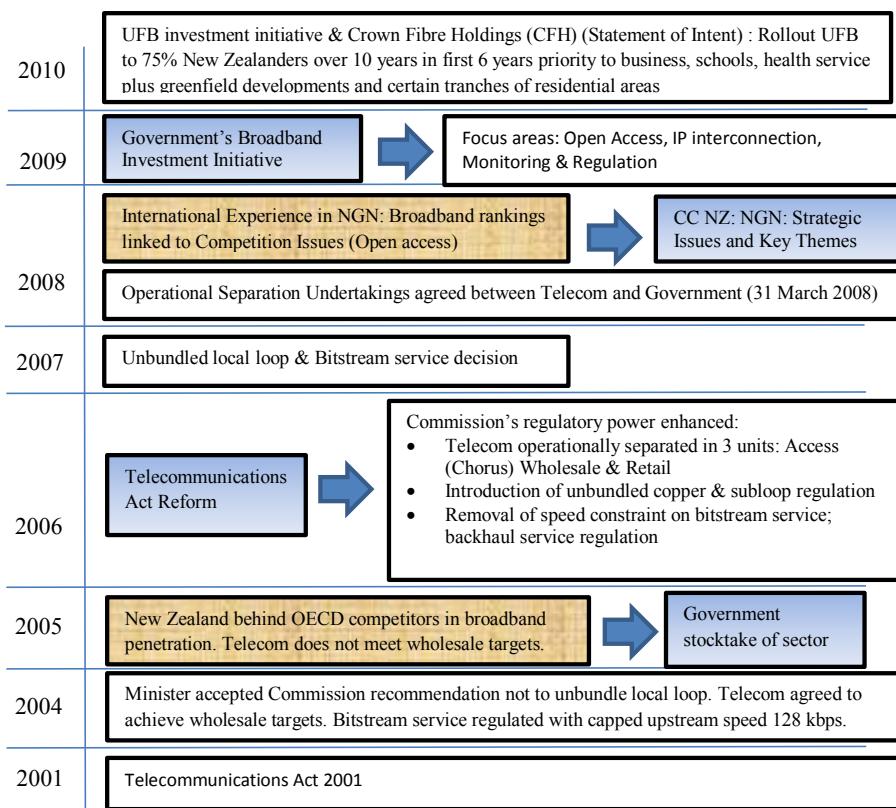
Governmental developments

In contrast to the "third or middle way" approach in Europe, the 'light-handed' regulatory approach prevailing in New Zealand until 2001 changed after a new government took charge, with the implementation of the Telecommunications Act 2001 and the establishment of an industry-specific regulatory body: the Office of the Telecommunications Commissioner. The 2001 Act replaced the 1987 Telecommunications Act with the aim to bring greater certainty, investment, competition and consumer benefits to the telecommunications sector. After the Minister accepted the Commission recommendation in 2004 not to unbundle local loop, a 'Stocktake' of the telecommunications industry by the Ministry of Economic Development in December 2005 changed this decision. The primary focus of the 'Stocktake' was to consider "the broadband market and our broadband performance as a factor in economic performance" (MED, 2006). The recommendations of the Commission led to a reform of the Telecommunications Act. In December 2006, the Telecommunications Amendment Act (No. 2) was passed which included major changes with respect to the Commission's telecommunications regulatory functions. These changes included: the introduction of unbundled copper, subloop regulation and removal of speed constraint on bitstream service; backhaul service regulation. Furthermore, these amendments included the provisions for the operational and accounting separation of Telecom New Zealand (separation in 3 units - Access (Chorus), Wholesale & Retail). In 2007, the Commission took two important decisions on the unbundled local loop (November 2007) and unbundled bitstream access (December 2007) aimed at paving the way for local loop unbundling.

In changing the Telecommunications Act of 2001, the Government of New Zealand passed in December 2006 a number of amendments aimed at achieving operational separation of Telecom New Zealand (HOWELL, MEADE & O'CONNOR, 2010). The purpose of these changes (see Part 2A of the Act) was: the promotion of competition, the achievement of more transparency, non-discrimination and equivalence of supply in relation to certain services, and to facilitate efficient investment in telecommunications services. In May 2011, a separate agreement between CFH and Telecom Corporation of New Zealand (Telecom NZ) came into existence which required Telecom NZ to structurally separate its wholesale and retail

activities. This separation was undertaken by November 2011 leaving Telecom NZ with retail (and mobile) operations and assigning wholesale activities to Chorus as a facility based provider (See figure 1 for a timeline of major governmental developments).

Figure 1 - Main governmental developments affecting broadband development in New Zealand since 2001



Source: Adapted from FUNSTON, 2010, and own research

Broadband market development

Broadband development in New Zealand has been remarkable since 2002. In terms of broadband density, New Zealand moved from 0.12 broadband connections per 100 subscribers in 2002 (22nd place) to 25.78 broadband connections per 100 subscribers in 2011 (19th place) (OECD, 2013). Interestingly, the growth of the broadband network in New Zealand

has been fostered by just moderate private investment. The development of broadband in New Zealand has since 2002 been driven by the growth of DSL connections with DSL having a market share of 90 percent (compared to other broadband technologies). Cable broadband connections had just a small percentage of the broadband market in 2002 and this percentage has remained rather stable until 2012.

Telecom New Zealand has been the main provider of DSL connections in New Zealand. The company's wholesale broadband service is available nation-wide; in the DSL broadband market the company retails 57 percent of connections (Commerce Commission New Zealand, 2012a).

In December 2011, Chorus announced that the rollout of its FttN network was officially finished. The rollout of the FttN network was part of the operational separation undertakings agreed upon between Telecom New Zealand and the New Zealand government already in 2008. FttN has been important as a backbone for the further extension of broadband connections into the home and the provision of triple-play services.

Recently, mobile broadband based on 3G UMTS has been emerging in New Zealand. Currently, there are three providers in the mobile services market sharing 4.92 million connections (Commerce Commission New Zealand, 2013). Two of them (Vodafone and 2degrees) operate an own GSM network, with 2degrees using the Vodafone network based on roaming in areas where the company does not have coverage. Vodafone and Telecom have nation-wide coverage with their 3G UMTS networks, 2degrees started to serve different areas in 2010 with its own network. Mobile Virtual Network Operators - reselling capacity provided by Telecom or Vodafone - have been insignificant. Mobile broadband has not been a major threat to the fixed broadband providers.

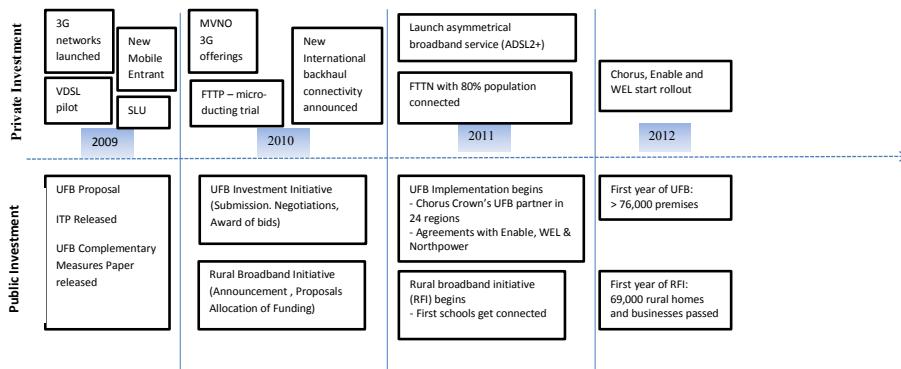
The UFB initiative

In 2009, the New Zealand government established with the Crown Fibre Holdings Limited (CFH) a limited company to manage the \$1.5 billion investment in Ultra-Fast Broadband infrastructure. CFH has been established as the Crown's negotiating and contracting vehicle for PPPs. It received 33 proposals from 18 interested parties by January 2010 to participate in this initiative. On 24 May 2011, the CFH announced that it had completed the selection process for UFB partners in signing contracts with Telecom Corporation of New Zealand and Christchurch City Holdings.

Earlier contracts had been signed with WEL Networks and Northpower in December 2010. Rollout within the UFB framework started in December 2010 (Crown Fibre Holdings Limited, 2011b).

In the agreement with CFH and Chorus as well as with the LFCs and CFH, 33 priority areas were specified. With respect to these priority areas, Chorus was in charge of implementing the UFB initiative in close to 70 percent of the priority areas, followed by Enable (15.3 percent), WEL (13.7) and Northpower (1.6). Northpower began with the UFB rollout already in December 2010 in Whangarei. In November 2011, Enable followed with rollout fibre in Christchurch with the objective to connect a population of more than 380,000 along with 7,000 businesses, some 1,000 medical centres and 170 schools. Over an eight year period the rollout should be completed. Government investment via CFH in Enable includes NZ \$200 million (Commerce Commission New Zealand, 2012a). Ultrafast Fibre began in April 2012 with the rollout of fibre in Plymouth. Similarly, Chorus commenced with the UFB initiative in April 2012 (Crown Fibre Holdings Limited, 2012). In order to provide fibre based services to end customers, Chorus and the different Local Fibre Companies (in conjunction with CFH) engaged during 2011 in an industry consultation process with potential retail service providers (RSPs) at the Telecommunications Carriers' Forum (TCF) to discuss specific commercial terms of the UFB (see figure 2).

Figure 2 - Timeline private and public investment initiatives in New Zealand since 2009



Source: Adapted from FUNSTON (2010), and own research

The role of PPP's in the UFB initiative

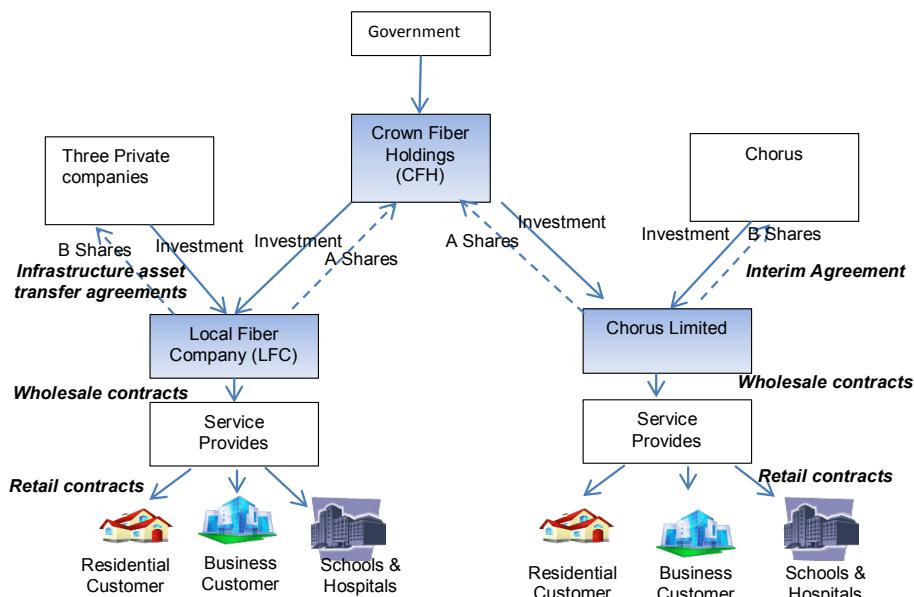
With respect to the UFB initiative, the PPPs between CFH and the four UFB companies (Chorus, UltraFast Fibre Ltd, Northpower and Enable) took very different and complex forms (JOCK, 2010). With UltraFast Fibre Ltd, Northpower and Enable, CFH signed contracts leading to different governance forms compared to Chorus (which came into force as a result of a demerger from Telecom New Zealand). Based on different contractual relationships, CFH has invested NZ \$929 million directly in Chorus with 50 percent being voting shares and 50 percent interest free loans (FLECHTER, 2011). The three other companies formed a joint venture with CFH (see figure 3).

The NZ Government supported the LFCs in deploying UFB initiative with NZ \$1.5 billion. It is expected that with further private investments the overall UFB scheme investments will be a total of around NZ \$3 billion. The different partners in the PFIs are CFH and different private firms (Northpower, UltraFastFibre Limited and Enable) as well as CFH and Chorus. These companies receive a concession for a period of 10 years. The three private firms invest in so-called three Local Fibre Companies ("LFCs"). CFH provides funding of the "communal" infrastructure i.e. voting A shares are issued but no dividends are paid. The companies, in return, fund connection to end user costs leading to the issue of B non-voting 100% distribution shares. The different partner firms receive A shares when refunding CFH for "passing" costs on an end user basis. There is a Government Share, no voting rights or dividends, but the government has veto power. After the period of ten years, A and B shares are converted into ordinary shares. However, the Government Share is not converted (FUNSTON, 2010). Interestingly, the agreements between the CFH and LFCs as well as CFH and Chorus rather differed with respect to their ownership structure and the incentives for the companies involved (see table 3) which created also a rather different allocation of tasks and risks between public and private parties.

Much of the risks of the UFB project are related to the complex structure of the different shareholdings themselves in terms of documentation, technical details, financing, agreements with retail service providers etc. For example, the operation phase of the project gave rise to different risks compared to the construction phase. During the construction phase, the high installation costs incurred by Chorus at NZ \$3200 (€1876) increased the revenue and demand risks. As LFCs and Chorus are rewarded on the basis of providing broadband acces on the wholesale level in a particular area, the

incentive of getting homes "connected" lies with the retail service companies. But the incentives of retail service companies to provide fibre services at home are not only depending on prices for wholesale access but also price differentials with other broadband (and copper) services. In addition, the nature of risks alters over the duration of the project. For example, it still remains unclear to what extent the development of mobile 3G and 4G will affect technical, demand and revenue risks. The conversion from A and B shares to ordinary shares with government poses financial risks for the companies. The conversion requires that the A and B shares match the rights of ordinary shares which involves a number of legal issues such as a resolution (which has to be agreed upon at the shareholders meeting), changing articles in contractual agreements, filing the shares, obtaining class consent, etc. Even in the case that these transaction costs have no negative effect on the weight of ordinary shares, there still is high uncertainty surrounding the credit ratings of the companies after conversion and the stockholder value of the company.

Figure 3 - Contracting and control of UFB investment



With respect to the UFB initiative, the specifications of the technologies used can be found in the different Network Infrastructure Project Agreements between LFCs and CFH as well as between Chorus and CFH. The criterion used to guarantee technology neutrality as long as both PON

and Point-to-Point architectures are used for UFB and the deployment meets agreed standards. In other words, LFCs and Chorus both deploy wholesale access based on a variety of fibre technologies. The coverage analysis has been included in the different Network Infrastructure Project Agreements of the LFCs and Chorus and actually meant geographical coverage.

**Table 3 - Different forms of PFI's in New Zealand:
Partnering firms, coverage and retail service providers**

	<i>Chorus Limited</i>	<i>Northpower</i>	<i>Ultrafast Fibre Limited</i>	<i>Enable Networks Limited</i>
Industry	Telecom	Electricity Utility	Electricity Utility	Council owned
Public investment	CFH is investing in Chorus Limited in form of debt and equity			
Partner / Private Company	Chorus New Zealand's largest telecom utility company	Electrical contracting business and delivers fibre services as well as owning a FTTP network in the Whangarei region	Waikato Networks Limited has one shareholder, WEL Energy Trust, a community trust that represents interests of local community	Christchurch City Council
Ownership of partner	Private	Trust owned	Trust Owned	Council Owned
Number of coverage areas (in %)	24 (69.4 %)	1 (1.6%)	6 (13.7%)	2 (15.3%)
Coverage areas	Ashburton, Auckland, Blenheim, Dunedin, Feilding, Gisborne, Greymouth, Invercargill, Kapiti, Levin, Masterton, Napier Hastings, Nelson, Oamaru, Palmerston North, Pukekohe, Queenstown, Rotorua, Taupo, Timaru, Waiheke, Waihuku, Wellington, Whakatane	Whangarei	Hamilton (incl. Cambridge & Te Awamutu), Tauranga, Tokoroa, New Plymouth, Hawera and Wanganui	Christchurch (including Rolleston) and Rangiora
Retail Service providers	66 RSPs	18 RSPs (e.g. 2degrees, Uber Group*, Vector Fibre and Orcon*)		21 RSPs (e.g. 3T The Total Team, Business IT and allPlus)

Statutory and political risks: Crown Fibre Holdings (CFH)

The statutory and political risks have been specified by the CFH in the Statement of Intent 2011–2014 (Crown Fibre Holdings Limited, 2011a). CFH has tried to minimize the political risks by defining statutory rights in relying

on a "statutory framework that applies to it, including (but not limited to) the Public Finance Act 1989, the Crown Entities Act 2004 and the Companies Act (Act) 1993."

Furthermore, "Under the Act, the Board, each Director and each Shareholding Minister has the rights, powers, duties and obligations set out in the Act, except to the extent that they are negated or modified, in accordance with the Act, by CFH's constitution."

In addition, "The (Ministry of Education) MED will be responsible (and CFH will not be responsible) for all regulatory and Government policy matters relating to the UFB Objective" (Crown Fibre Holdings Limited, 2011a).

CFH will manage and monitor the Crown's co-investment with UFB partners in order to achieve the Government's UFB Objective. It takes responsibility for selection process of UFB partners; appropriate measures of co-investment have still to be developed. CFH is expected to be "eventually" commercially viable and provide "a commercial return on the Crown's investment, and operate as a successful business, when directed by the Shareholding Ministers and the Minister for Communications and Information Technology" (Crown Fibre Holdings Limited, 2011a).

Risks and contractual agreements: Local Fibre Company (LFC)

There are a number of contracts which are relevant for LFCs in the case of Northpower in particular the Network Infrastructure Project Agreement and Schedules which specifies, in detail, the design, construction, time schedule and operation risk (Whangarei Local Fibre Company Limited, Northpower Limited, & Crown Fibre Holdings Limited, 2010b), the Network Infrastructure Asset Transfer Agreement which specified the financial risks (Whangarei Local Fibre Company Limited, Northpower Limited, & Crown Fibre Holdings Limited, 2010a), the competitive risks in case of open access (Whangarei Local Fibre Company Limited, 2010). Similar contracts have been drawn up for the other two companies (UltraFast Fibre Ltd and Enable).

Design, construction, time schedule, and operation risk

Furthermore, as specified in the Network Infrastructure Project Agreement part Background sub F, Northpower would "own and control the Network in the Coverage Area, [and] would be solely responsible for the Design and Build and takes the risk of any cost and time overruns and any

failure to comply with the Requirements." (Whangarei Local Fibre Company Limited *et al.*, 2010b). Furthermore, the company would take responsibility (and risks) for the contracts drawn up with "subcontractors (including for civil works) as required to build the New Infrastructure for delivery". In addition, the firm "will be responsible as primary obligor for all work carried out, and materials used or infrastructure provided, by any subcontractor" (Whangarei Local Fibre Company Limited *et al.*, 2010b). In the part Delivery of the agreement, further obligations for Northpower have been specified with respect to compliance with the network deployment plan, delays and damages (6.2) (Whangarei Local Fibre Company Limited *et al.*, 2010b). In addition the "risk in, and title to, each item of Equipment comprising the New Infrastructure will pass to the LFC on payment of the full Charges (or, if relevant, the Initial Cash Payment)." (6.3)

Interestingly a number of risks have already been specified within the contracts with LFCs with respect to statutory and political risks (mostly been taken by CFH and different ministries); Design, construction, time schedule, and operation risk (taken by the LFC). A number of other risks (like financial risks or residual value risks) have not sufficiently been specified yet. Further specifications will probably been done during the time the project progresses.

Risks and contractual agreements: Chorus

Contracts between Chorus and CFH have been initiated with respect to the Network Infrastructure Project Agreement which specifies, in detail, the design, construction, time schedule and operation risk (Telecom Corporation of New Zealand Limited & Crown Fibre Holdings Limited, 2011) and the competitive risks based on open access (Chorus, 2011). In addition, there is an Interim Period Agreement, which specifies the financial risks for Chorus (Crown Fibre Holdings Limited & Telecom Corporation of New Zealand Limited, 2011).

In the opening of the Network Infrastructure Project Agreement ("Background"), the document specifies design, construction, time schedule and operation risks in the following way: Chorus "takes the risk of any cost and time overruns and any failure to comply with the Requirements. The Company will enter into such subcontracts (including for civil works) as required to build the New Infrastructure. The Company will be responsible as primary obligor for all work carried out, and materials used or infrastructure provided, by any Subcontractor or Group Company" (Crown Fibre Holdings

Limited, 2011a). These risks are further defined in part 6 of the contract ("Performance").

The agreement acknowledges that there are some technical risks involved (part 7 "Improvements") with respect to "(a) improvements, developments and changes in technology, processes, practices, standards, architectures, interfaces and methodologies; (b) any changes in the Company's technology strategies and policies; and (c) opportunities with third parties" which might have a "significant effect on the Network (including Equipment and Software) or the O&M Services (Improvements), including by improving efficiency, effectiveness, productivity or customer service or by reducing any costs or related risks." (Telecom Corporation of New Zealand Limited & Crown Fibre Holdings Limited, 2011). However, undertakings against these risks are not discussed but problems should be resolved based on reporting and regular consultation (7.3).

Interestingly, there is a part in the Network Agreement which obligates Chorus to "proactively identify, assess and monitor operational, technical, commercial and other risks in relation to the Network and take action to minimise those risks to a level that is reasonable in the circumstances (including by the preparation of contingency plans)" (Telecom Corporation of New Zealand Limited & Crown Fibre Holdings Limited, 2011).

With respect to demand and revenue risks, the agreements specifies that Chorus should provide "industry's best practice fibre optic communications infrastructure network in the Coverage Area and generate widespread uptake of services (including Layer 1 Services and Layer 2 Services) in the Coverage Area." However, the uptake of services based on fibre will be the task of independent retail service providers who will assume the demand risk.

Chorus and CFH have been careful in negotiating the details of the financial agreement to mitigate different forms of financial risk. A first requirement in the Interim Period Agreement was, the requirement of structural separation, i.e. the splitting up of one company "focusing on the supply of fixed access and aggregation services in New Zealand and the other [...] focusing on fixed, mobile and ICT products and services." (Crown Fibre Holdings Limited, 2011a). Furthermore, the document tried to exclude political risks (e.g. change in taxation or legislation) from the risk portfolio of the company (7.2 Modifications to Bill or Tax Rulings). In addition, the agreement specified that the regulatory risks will be the responsibility of the

public party. In this context, the document characterized these risks in the following way:

"Officials advised us that the reason for introducing a forbearance period is to achieve lower prices, by removing the risk premium; that is, investors would be more comfortable with lower returns initially because there is no risk that these returns would be undercut by regulation for the duration of the forbearance period".

As a result a number of undertakings have been defined with respect to non-discrimination, unbundling, open access and the LFC dealings in relation to UFP partners at arms-length (Crown Fibre Holdings Limited & Telecom Corporation of New Zealand Limited, 2011).

In contrast to the agreements with LFCs, the contracts between Chorus and CFH have been more detailed with respect to a number of anticipated risks (e.g. technical risks) and statutory (or political) risks. As Chorus has a different company structure and strategy, in particular with respect to legacy assets, the definition of financial risks and residual value risk has been much more prominent compared to the contracts drawn up for the LFCs. However, LFCs and Chorus are exposed to demand and revenue risks as retail service providers are responsible for the marketing of retail fibre connections. Even if there are a number of safeguards in the different agreements with CFH, Chorus is currently exposed to a growing regulatory and political uncertainty combined with increasing risks related to the design, construction, time schedule, and operation of the UFB project. The regulatory and political risks are related to the future of regulation of Chorus (e.g. with respect to the height of wholesale access prices) as well as to predicted returns of the UFB project as anticipated by different political parties in New Zealand. This higher uncertainty has prompted a capital flight as foreign investors are not anymore sure about the expected returns and viability of the company. Since its listing as a separate company in November 2011 until June 2013, foreign investment in Chorus has been reduced from 75 of the register to just 45 percent (SMELLIE, 2013). To make things worse, the higher costs of installation of the NZ \$3.5 bn (€2.05 bn) project have been fully allocated to Chorus and are not compensated by higher earnings or revenues (SMELLIE, 2013) leading to increasing demand and revenue risks for the company. As a publicly traded company, Chorus has seen a decrease in its stockmarket value since end 2012 (with the announcement of lower than expected wholesale prices for copper by the Commerce Commission) and reduction in forecasts of future revenue streams.

The wholesale pricing structure

The current pricing structure as suggested by retail service providers does not allow for consumers to distinguish between the advantages of having fibre based services compared to using (only) bitstream access. It currently seems that fibre access is considered by consumers as just another higher segment in the existing broadband market based on speed.

The Commerce Commission has recognized this problem in arguing that wholesale prices for access to copper are critical for migration towards fibre networks. Currently these prices are higher compared to equivalent fibre wholesale price. The wholesale monthly price for unbundled basic access (UBA) offered by Chorus for new lines is at NZ \$44.98 (€26.20) (Commerce Commission New Zealand, 2012b). There are government proposals to reduce this price from 2014 onwards to NZ \$32.45 per month (€19.00) with entry-level monthly wholesale prices for fibre are at NZ \$37.50 per month (€21.95) and NZ \$42.50 per month (€24.88) (Ministry of Business, 2013). This would mean less of a cut in wholesale prices of NZ\$12.00 (€7.02) compared to the original proposal by the Commerce Commission in 2012 (Commerce Commission New Zealand, 2012b). However, it is expected that reducing wholesale price of copper broadband based on xDSL services would dissuade consumers from switching to the government-backed ultrafast broadband network.

In a recent move (June 2013), Enable, Ultrafast Fibre and Northpower Fibre announced that their wholesale price for residential fibre services will be at NZ \$39.95 (€23.39) per month (for a 50 Mbps download / 20 Mbps upload connection) which is still NZ \$2.34 (€1.37) more than their base plans for other broadband services. This move parallels Chorus plans from April 2013 to reduce wholesale access (for a 50/10 connection) to NZ \$40.20 (€23.53). These plans have to be put in the context of Chorus' offerings for ADSL2 connections, which are currently at 10 Mbps; rollout of higher speed VDSL connections has just started. As retail broadband prices together with data caps are set by retail Internet Service Providers (ISPs) such as Worldnet or Orcom current offerings for entry level broadband connections at NZ \$69 (€40.98) or NZ \$75 (€43.90) with datacaps of 30 G. This should make fibre connections more attractive for retail consumers.

Competition from mobile broadband

Currently there is just limited competition from mobile ultra-fast broadband in New Zealand as new mobile technologies such as Long Term Evolution (LTE) or 4G as these technologies appeared just recently (2013) in the market. However, there are complementarities with respect to fixed ultra-fast broadband and mobile ultra-fast broadband emerging for Telecom in the near future. Currently it can be expected that there might be some fixed infrastructure competition in the regions where Chorus is not the UFB provider, but this remains to be seen considering the current regulatory discussion (Ministry of Business, 2013)

Expectations about returnable assets

There are some concerns with respect to returnable assets of the UFB initiative. It is originally been anticipated that Chorus will return funds to CFH from 2025 onwards, with all funds likely to be returned to CFH by 2036. To reach these objectives it will become important that Chorus will be able to reach the anticipated targets with respect to rollout, cover its current operating costs and that retail service companies generate sufficient take-up of fibre based services.

By August 2012, the UFB project exceeded its one year-one rollout target by more than 6,000 premises, leading to an expansion of the fibre network to more than 76,000 premises across New Zealand. During the period, June 2011 and June 2012, 76,311 premises have officially been passed by the UFB network (originally planned: 70,000), with some 28,435 premises passed during the fourth quarter of this first year of the UFB initiative. Furthermore, the Rural Broadband Initiative delivered over the first period faster broadband to 69,000 rural homes and businesses, leading to some 585 schools which now have fibre connections past the school gate. In addition, four hospital connections have been completed (ADAMS, 2012). By June 2013, Chorus claimed that it has passed 207,500 premises (Communications Day, 2013).

To cover its operating costs, Chorus received last year NZ \$929 (€545) million in interest-free loans and non-voting shares from the CFH, but spent an average NZ \$3200 (€1876) to pass each premise. It seems that due to the high installation costs, the UFB initiative is currently underfunded with Chorus unable to cover its operating costs (SMELLIE, 2013).

In addition, actual uptake of fibre based services is still trailing a long way behind. At the end of the first year of the UFB initiative only 1,233 users had been connected to the UFB with 155 of these users connected in the most recent quarter (Communications Day, 2012). By June 2013, there were 20,400 brownfields premises activated (12.5% of those passed), and 13,200 greenfields premises activated (30% of those passed). To complicate matters, a number of premises are unable to provide new fibre based services and require additional maintenance work. These effects are on a third of the brownfields rollout and more than a quarter of the fibre premises in total (Communications Day, 2013).

■ Summary and conclusions

As discussed above, the key to success of PPPs lies in the ability to allocate the tasks and risks in a way that the party which can best bear them should take up responsibility to execute them. If the risks are wrongly allocated, the incentive structure of the ventures is insufficient for the parties involved and the output of the ventures in terms of quantity and quality of service can be negatively affected.

The paper has examined, in greater detail, the structure of agreements and risk allocation of PPPs in New Zealand. The three joint ventures (between LFCs and CFH) share a number of characteristics in particular with respect to statutory and political risks (responsibility of CFH and different ministries); and design, construction, time schedule, and operation risk (taken by the LFCs). For a number of other risks (like financial risks or technical risks), they are not sufficiently specified yet. The contracts between Chorus and CFH have been different with respect to a number of anticipated risks (e.g. technical risks), statutory (or political) risks, financial risks and residual value risks. Over the past year, Chorus - as a regulated company - has increasingly been exposed to political and regulatory risks due to regulatory discussions on wholesale prices as well as different expectations of political parties with respect to the anticipated returns from the UFB project.

As LFCs and Chorus take up responsibility for installation of fibre at the premises only, they are exposed to demand and revenue risks because these risks are allocated to retail service providers. Shifts in the wholesale pricing structure for copper based broadband access as well as for

wholesale broadband have negatively affected the incentives of retail service providers to offer fibre based services. Furthermore, the rising costs of installation posed growing risks for Chorus with respect to design, construction, time schedule, and operation of the ultrafast broadband network. As these risks have to be taken solely by Chorus without being compensated in terms of revenue growth, there is a threat of commercial failure of the UFB project partly due to government intervention.

Under conditions of structural separation, the PPPs in the UFB initiative in New Zealand have taken a very specific form aimed at providing incentives to market parties. By splitting up wholesale and retail functions in the provision of high speed broadband, it can be concluded that PPPs have sufficient incentives to deliver fibre to the curb. However, actual uptake of fibre based connections by subscribers is still trailing indicating that incentives provided by the PPPs are insufficient for private companies (RSPs) to sell these services. During further rollout of the UFB initiative, it has to be seen whether these trends persist. It currently seems that due to the particular risk structure of fibre investment (in particular, demand and revenue risks), PPPs which are based on a vertically-integrated supply structure are more appropriate to address these risks. However, structural separation might have some positive effects at later stages on fibre rollouts. Under conditions of installed fibre connections (homes passed), there is an important function for retail firms to "develop" the market with new innovative service concepts to ensure that these services are also getting connected.

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