

Regulating fibre access networks in New Zealand

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Summary

This paper aims to foster discussion and debate about what regulation, if any, should be signalled now to provide regulatory certainty to parties wishing to co-invest with the government in fibre networks in New Zealand.

The government's commitment to invest \$1.5 billion in open access fibre optic networks promises to bring New Zealand world class communications infrastructure. At the same time, the economics of fibre deployment are challenging, and the new networks will alter the landscape for competition in telecommunications, potentially in both favourable and unfavourable ways. In its role as regulator, as well as through its funding decisions, the government has significant scope to shape the environment for investment and competition in ways that will enhance the success of the initiative.

In this paper we highlight some of the issues that need to be considered as the policy design is being finalised. The paper focuses on the importance of:

- encouraging the choice of network architectures that are supportive of competition
- fostering the development of a vibrant service provider market
- ensuring the current regulatory regime for the copper access network allows for telecommunications investment to be allocated efficiently
- providing long-term regulatory certainty to future fibre investors.

Making the right policy choices in these areas will lay the groundwork for the success of the government's broadband policy.

Acknowledgement

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Introduction

The New Zealand Government has committed to bringing about a step change in the quality of New Zealand's communications infrastructure. The Broadband Investment Initiative (BII) will contribute NZ\$1.5b alongside private investment to build new fibre-to-the-premises (FTTP) access networks covering 75% of New Zealand premises.

The main rationale for the proposal is to bring forward the economic benefits of fast broadband through accelerated fibre rollout, mitigating the economic handicap imposed by NZ's remoteness from the rest of the world.

Another key driver, it seems, is a desire to move beyond the costly and cumbersome regulatory arrangements that have underpinned efforts to improve the quality and price of broadband services to date. The government's investment will be channelled through a set of new regionally-based fibre network companies that will wholesale fibre access services on a non-discriminatory basis. These Local Fibre Companies (LFCs) will not be allowed to offer retail broadband services, and investment from companies with retail broadband operations will be capped to avoid any incentives to favour some access seekers over others.

There has long been dissatisfaction with New Zealand's ranking in international comparisons of broadband speed, penetration and pricing. But the regulatory process for addressing this – opening Telecom's access network to competitors – has often resembled a battle of attrition, fought out via the Commerce Commission's process for determining access terms.

Despite the effort and the controversy, reliance on an incumbent with significant market power to undertake investments in upgrading access network infrastructure has not delivered to the government's expectations.

By embedding vertical separation in the market for broadband over FTTP through the terms of its investment, the government hopes to obviate the need for the complex regulatory interventions of the past.

“By keeping the new fibre business out of retailing, it will have no incentives to act anti-competitively, and there will be little need for regulation of its prices. In fact, there will be considerable initial incentives for it to keep the fibre rental prices low to facilitate use by downstream providers.”¹

Ideally the BII would, at a stroke, solve the problem of both fostering investment in a future-proof high bandwidth access network, while avoiding re-monopolisation of the broadband market.

This would certainly be a desirable result.

But is it realistic? History should teach us that it is not.

¹ New Zealand Government, Broadband Investment Initiative: Draft proposal for comment, March 2009.

Indeed, even the Minister of Communications has acknowledged that this is a significant issue for potential investors.

“Submitters are saying that the effect of regulatory uncertainty may contribute to difficulty in attracting capital (or will raise the cost of capital) ... We have taken these points on board and are looking at the possible ways in which the government could most appropriately provide regulatory certainty in order to improve the investment case”

Hon Steven Joyce, speech at TUANZ Telecommunications Day, May 2009

This is a particularly litigious industry, and it is clear that, despite the best of intentions around vertical separation, there will be disputes about price, access and quality that will need to be addressed.

1. Once fibre networks are established they are likely to be a natural monopoly, similar to electricity distribution networks. This suggests that they may be inclined to raise prices and squeeze the margins of service providers. Even if the government declines to regulate in the short term, investors will demand a risk premium in anticipation of future imposition of price regulation.
2. The type of architecture that “passive” LFCs adopt will ultimately shape competition at the service/retail level. Dark fibre access alone may not be sufficient to promote vigorous competition, as only a small number of service providers will have the scale to light the fibre. In some (low density) areas it may be viable for only one service provider to light the fibre. The government may want to consider mandating wholesale bitstream access. At the very least, they should ensure that network architectures built by LFCs support competition.
3. The impact of the existing regulation of the copper network on future investment in fibre networks needs to be considered. Once fibre networks are established, the justification for regulated access to the copper network is reduced. In the meantime this regulation might promote excessive investment by unbundlers and Telecom in copper-based services that would impair fibre network investment. The balance between current and future investment incentives is critical.

It is our contention that all these issues need to be considered now, before the roll-out gets underway, to avoid repeating the headaches of our recent past caused by trying to regulate after the horse has bolted.

We have been examining both domestic developments and the growing international literature on the regulation of Next Generation Access (NGA) networks.² While there are no obvious conclusions yet from the limited experience of deploying and regulating these networks, our review can illuminate some of the choices and challenges the government faces in achieving its FTTP vision.

² High speed broadband networks including fibre-to-the-node (FTTN) as well as FTTP are generically called NGA networks.

Reconciling the three goals of a) a rapid roll-out of fibre (with high take up to realise the economic benefits) b) limiting government investment to passive assets for which the case for private sector investment is currently weak, and c) ensuring a competitive market for services that does not require intensive regulatory supervision in order to yield satisfactory prices and innovation levels, is very demanding. However, by envisaging the kind of market that will emerge from the government's intervention, anticipating risks, and shaping the initial policy decisions and the longer term regulatory principles with a view to addressing potential pitfalls, the government can maximise the chances of success of the policy.

Main regulatory challenges

It is important to recognise that the issues at stake in regulating emerging NGA networks as compared to legacy networks are only partially applicable. In the legacy environment several factors arguably made regulation easier:

- an existing base of fixed assets has had a long time to generate returns on the original investment
- an established market had been created with a large customer base and well defined products and demand
- many overseas examples of different regulatory approaches were available with some evidence for their impact.

When it comes to NGA networks regulators have to adapt their frameworks for a new technology, anticipate the evolution of markets that are not yet established and reckon with the dynamic effects of regulation on NGA investment.

Perhaps the biggest of these challenges is balancing incentives to invest with promoting competition. With the monopoly copper network there was little tension between these objectives. Faced with competition, incumbents invest more than they would in a monopoly environment, upgrading their equipment to support better service offerings. With NGA investments, investors face:

- **Demand-side risk:** many of the services that may be delivered over NGA networks do not yet exist or are only embryonic. It is hard to assess prospectively what their value will be to consumers
- **Regulatory risk:** investors may require a premium based on the fact that they bear the risk of failure because of low take up but could see their returns truncated by regulation at a later date if they are successful.
- **Potential competition from legacy networks:** NGA investment takes place in the presence of legacy networks and operators that may significantly help or hinder the rollout of fibre.

So while regulators must be sensitive to the risk of excessive market power on the part of access network owners, they must weigh this against the fact that overly stringent regulation will prevent the networks from being built in the first place.

What is more, the technological characteristics of NGA networks change the options available to regulators to promote competition.

On the one hand modern communications networks lend themselves more readily to vertical separation by reducing the technical synergies between the transport and service layers of the network. On the other, unbundling FTTP networks at the passive layer is rendered more difficult by the fact that they have more nodes located closer to the customer. This makes it considerably more expensive for alternative operators, who need to install their own equipment in many more facilities in order to compete.

In comparison to the situation with copper, dark fibre access is more akin to sub-loop unbundling than local loop unbundling. Given the overseas experience that sub-loop unbundling has only proved viable in some areas, the government needs to give careful thought to whether further measures are necessary to promote competition. There is a risk that the government’s open access approach to FTTP will not be reflected in a real choice of service offerings from the consumer perspective.

The importance of getting the regulatory settings right is reinforced by the fact that the business case for investing in FTTP infrastructure is quite challenging. The government is investing \$1.5 billion – about 25-50% of the total amount estimated to be necessary for FTTP rollout³ – and will need to attract substantial private investment. High take up rates, which spread the fixed costs of network build over a large subscriber base, will be essential to achieving prices that are both attractive to consumers and generate healthy revenues for LFCs over time. A robust service provider market that stimulates demand for fibre connections will also be a critical underpinning.

Successful rollout of FTTP can be seen as a virtuous cycle (figure 1) that reconciles the interests of network investors, consumers and service providers.

While private investors and operators will be the key players, the government’s policy settings can influence crucial variables like the competitiveness of the downstream market and the migration of customers from copper to fibre.

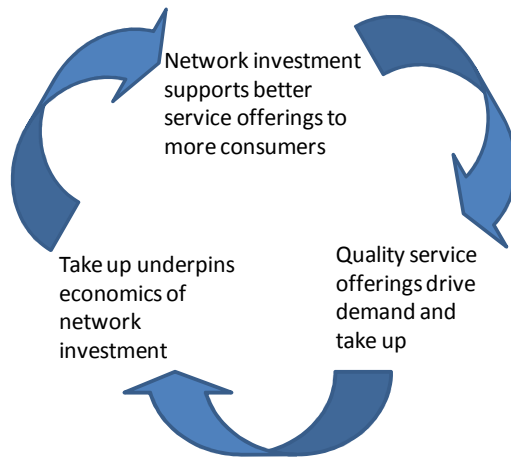


Figure 1: Virtuous cycle for FTTP take up and investment

³ Murray Milner, “Fibre-to-the-Premise Cost Study”, Milner Consulting Limited, 2009.

Network architecture

The network architecture chosen by LFCs will do much to determine the possibilities for competition and regulation down the track. The government needs to carefully consider the implications of different network architectures for the viability of infrastructure sharing, and weigh up the benefits of architectures that are more conducive to competition against the benefits of faster and more extensive network coverage.

The selection criteria for LFC proposals include the ability of the proposed network topology to support unbundled fibre access. The debate in this area has sometimes been framed as a choice between Passive Optical Networks (PONs) with lower deployment costs and active, point-to-point (P2P) networks that allow unbundling of individual fibres.

This is somewhat misleading as it conflates the network technology with network topology. In general, topology has a life span of 30-40 years, whereas technology only has 5-10 years at most.

Having said that, David Isenberg⁴ argues that New Zealand should aim to build the most future proof, competitor-friendly network that it reasonably can, and that a strong part of the case for public investment is to bridge the gap between architectures that support competition to a greater degree and those that don't. He points out that the cost difference between passive and active architectures – which Dr. Milner's report for the NZ Treasury estimates at 5% for the passive elements of the network – implies that this can be achieved at a relatively modest cost.

We think that it is possible to thwart unbundled fibre access in a P2P network by, for example, locating active electronics in small cabinets close to customer premises.

Conversely, the point-to-multipoint nature of passive networks (PON) does not necessarily preclude unbundling of fibre access. We acknowledge that this is difficult to do today, but may not be so in the future, given the scope for technological improvements in PON such as wavelength division multiplexing (WDM) that support some form of unbundling.⁵

We agree that there are some apparent advantages to P2P networks in terms of throughput and quality of service because of the dedicated fibre link to each customer. P2P networks can also be upgraded one fibre at a time.

⁴ David Isenberg is a US based technologist and telecommunications analyst who has been to New Zealand many times and is very familiar with the NZ telecommunications industry – www.isen.com

⁵ At present WDM is used in network backbones and has not been economic for access networks in most countries, but prices are coming down and WDM-PON is almost a reality as featured in the FTTH Council Europe Conference 2009 <http://fibresystems.org/cws/article/tech/37800>

However, it is sobering to consider the following opinion from one of the leading analysts in this field.

[T]he core of my argument a year ago [was that] incumbents choose PON because, amongst other things, it's hard, and maybe impossible, to unbundle. If I was to rewrite that today, I wouldn't be so bold. A more accurate statement would be that deep-splitted PON is definitely complicated to unbundle, and can even [be] designed to make unbundling impossible. PON vendors say that the same can be said of P2P, which is true in theory. In practice, a homerun infrastructure makes unbundling a lot more manageable provided the COs [Central Offices] are dimensioned correctly to do so. Regardless, regulators in general and Vivian Reding [the European Commissioner for Information Society and Media] in particular are examining PON with a none-too-happy gleam in their eyes for that very reason, and whether right or wrong, it's something that will need to be taken into account, especially if regulation goes beyond frowning and actually regulates.

Benoit Felton, Yankee Group analyst, writing on Fibreevolution⁶

In our view, the Government needs to consider how much it wants to stipulate detailed technical standards/guidelines for network facilities that would promote the development of multiple service providers (e.g. the positioning of aggregation points, the space available in cabinets, etc).

We consider that the real issue is not that LFCs will have an incentive to choose a network topology that makes unbundling difficult in the way that a vertically integrated company would. Rather, they may face weak incentives to choose a network topology that makes unbundling easy.

In fact, in the New Zealand context, difficult decisions may arise in areas where the geography and demographics force a trade-off between deployment costs and the potential to support competition.

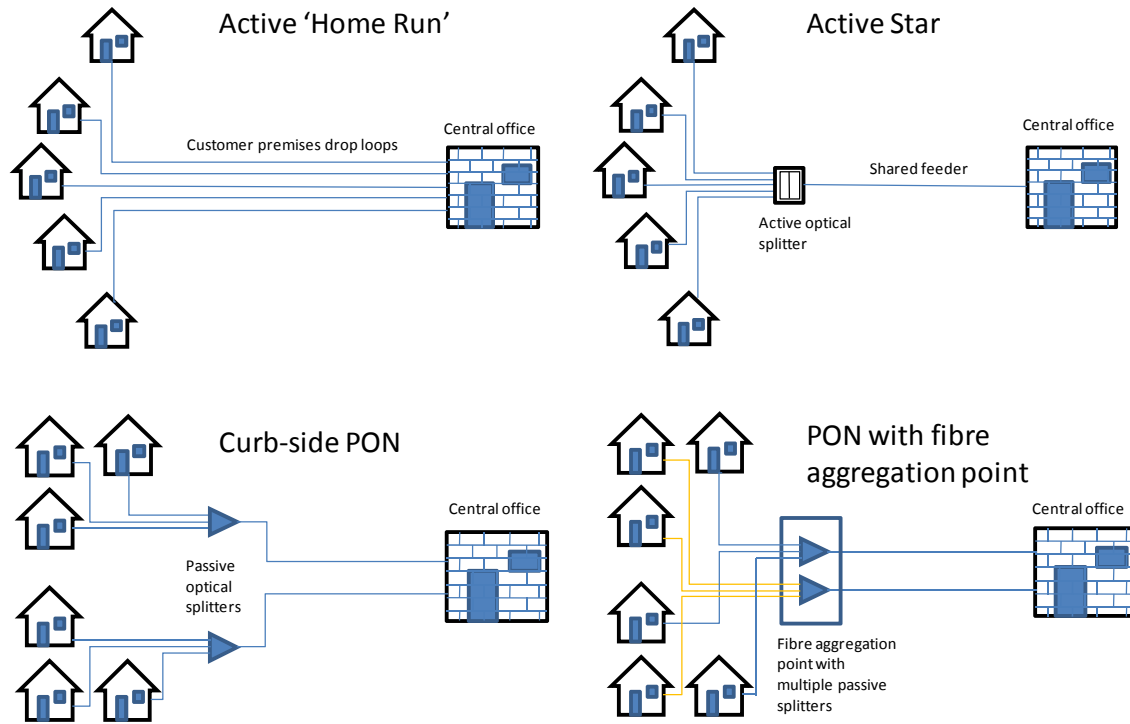
In some areas economic and technical considerations may not support more than one service provider lighting the fibres in a given catchment, in which case sacrificing a theoretical possibility of competition for wider early deployment might make sense.

However, if the government decides not to require provision of a wholesale bitstream service by LFCs, it will be important to get the network architecture right. Otherwise there could be little scope for competition at the retail level.

⁶ <http://www.fibreevolution.com/2008/04/revisiting-the-pon-vs-p2p-debate.html>

Figure 2 below illustrates different active and passive network architectures. We briefly outline their implications for network costs and the ease of unbundling below.

Figure 2: Active and passive network architectures⁷



1. An active home run architecture uses long fibre drops to the customer premises but provides for ready unbundling
2. An active star architecture uses less fibre, but presents greater hurdles for unbundlers as the active splitters serve fewer households, and there are backhaul costs from the node
3. A curb-side PON is the most economical architecture in terms of fibre but does not allow for unbundling (unless the network owner uses wavelength division multiplexing - as yet not quite mainstream)
4. A PON with fibre aggregation points permits unbundling with lower fibre costs than home run, although low take up or low population densities can nullify some of its advantages

Given the longer fibre runs from the splitter to customers' premises, why would a network owner opt for a topology with fibre aggregation points?

Consider a set up with distributed splitters and low initial take up of FTTP. The splitters must support more premises than are currently connected and each has to be connected to an Optical Line Terminal (OLT) port at the Central Office. So costs of equipment are incurred up front, and are insensitive to the level of take up.

⁷ Anupam Banerjee and Marvin Sirbu, "Towards Technologically and Competitively Neutral Fiber to the Home (FTTH) Infrastructure", Carnegie Mellon University, 2005.

With an aggregation point, the operator adds a new splitter and OLT port once the previous one is 'full.' It is also possible to add equipment of different types (including active equipment) as long as additional feeders from the aggregation point to the central office are available.⁸

Access regime and market structure

A critical feature of the Bill is the government's proposal that LFCs be required to wholesale dark fibre access. The implications of the access regime the government has chosen for downstream competition and a comparison with other possibilities needs to be considered.

The choice of where (i.e. at what layer in the network) to mandate open access has a significant influence on the kind of broadband market that emerges. Open access could occur at any of the following levels:

- Conduit and collocation facilities
- Dark fibre leasing, or optical layer unbundling (in PONs)
- Data link layer (Layer 2) e.g. Ethernet bitstream
- Network Layer (Layer 3) e.g. IP bitstream

Access at each level will yield different outcomes in terms of competition, innovation and consumer choice in the downstream market.

Regulators generally adopt the principle of encouraging competition at the deepest level of the network that it is sustainable. Thus they have preferred competition based on passive inputs. The validity of this view seems to have been borne out by the experience of LLU, which has led to better prices and services than bitstream access in many jurisdictions. Competitors choose their own transmission technology, are not bound by the network owner's investment timing decisions, and have full flexibility over product configuration. This has accelerated investment by incumbents who face the risk of being pre-empted in technology upgrades by new entrants.

However the advantages of competition based on passive inputs may be diminished in the NGA environment. The costs of competition based on passive inputs are likely to be higher due to:

- Higher costs of deployment for network topologies that support unbundled fibre access
- More locations in which competitors have to install their own equipment

On the other hand, with Next Generation Networks, which are characterised by the independence of the transport and service layers of the network, the scope for innovation based on active inputs will be much greater.⁹

The UK's communications regulator, Ofcom, has concluded that wholesale active products will be essential for ensuring competition in an NGA environment.

⁸ Ibid.

⁹ Next Generation Networks and Next Generation Access networks are conceptually distinct. The former are packet-switched networks capable of delivering many different kinds of services (voice, data, and video) over the same transport technology. NGA networks are defined more by their bandwidth. There is however a synergy, in that NGAs have the capacity to deliver multiple services through the one 'pipe.'

There is limited experience of dark fibre unbundling around the world, making it difficult to assess how effective it is at promoting competition. Dutch regulator OPTA published its decision of wholesale pricing of access to fibre networks in December 2008.

Rabobank telecoms analyst Henk Doorenspleet points out “the question remains if there will be sufficient appetite for dark fibre.” He notes that “lighting fibre is an activity whereby traditional telecoms economics rule: it is about scale and operational excellence. ... a passive operator will only have a very limited number of tenants in a market.”¹⁰ If this applies in the Netherlands, where broadband penetration is high, and competition between telcos and cablecos is strong, it will undoubtedly apply in New Zealand.

We don’t think there is a clear-cut answer to the question of the best layer at which to mandate open access but government should carefully consider the pros and cons of the various alternatives.

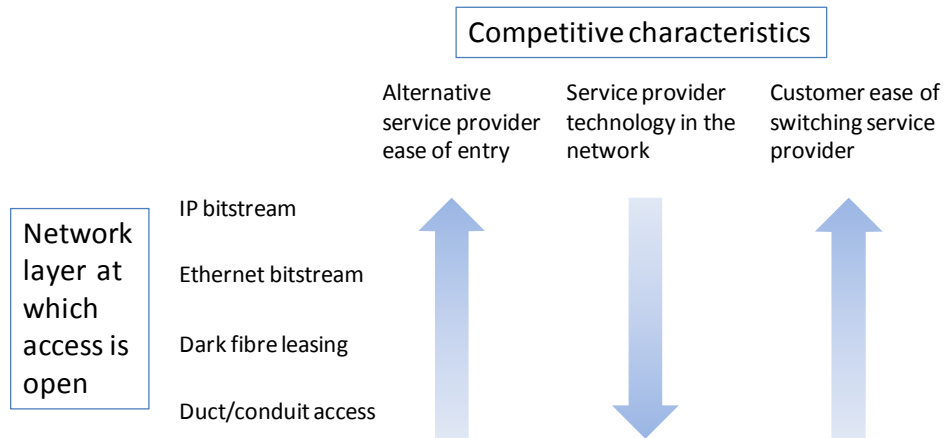
There will inevitably be trade-offs. However, if the shortcomings of the preferred approach can be identified beforehand, these can be factored into the government’s investment decision-making so as to avoid unsatisfactory outcomes. For instance, the government might look more favourably on proposed LFC business models that include provision of wholesale bitstream products.

Figure 3 (below) illustrates the relative merits of access at various layers. Open access dark fibre permits competing link layer technologies, ensuring that there is an incentive for companies that light the fibre to upgrade to technologies that support higher bandwidths as services that utilise more bandwidth become available. At the same time, there are likely to be relatively high barriers to entry and high costs of switching if consumers want to change service provider, because operators must install their own Customer Premises Equipment.

At the other end of the spectrum, Layer 3 open access allows for many service providers, and makes it possible for consumers to purchase different services from several providers at one time. However, the wholesaler’s choice of link layer technology might preclude some innovative service offerings and there may be a lack of competitive pressure to maintain quality of service.

¹⁰ Henk Doorenspleet, “Regulating Networks in the Next Generation Access Era”, RaboCom Spring 2009 – Volume 14, Rabobank International, 2009.

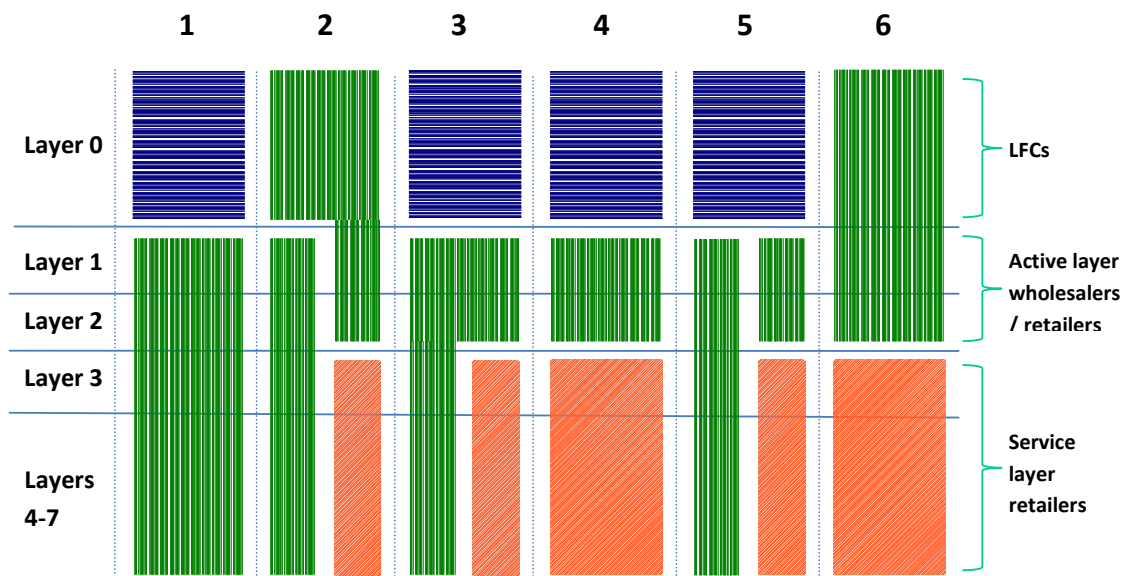
Figure 3: Results of competition at different network layers



To develop a clearer sense of the likely outcomes of the BII we think it is worth considering the downstream market structures that might emerge from the government’s proposal as it stands.

Several possibilities are presented in Figure 4 below.

Figure 4: possible market models (1-6)



Blue/Horizontal Hatch – Dark Fibre only

Green/Vertical Hatch - Lit Fibre

Orange/Diagonal Hatch – Services

- In model 1 the LFC provides dark fibre only, while retailers light the fibre as well as offering services to end users. In this case there may be a small number of retailers with the scale and customer base to light the fibre, and there would be costs to switching provider as each retailer would install its own customer premises equipment. This could result in an oligopolistic market with limited service offerings at relatively high prices.
- In model 2 the LFC provides dark fibre and wholesale bitstream access (in this case at Layer 2, but it could be layer 3). Barriers to entry for service providers are lower, but greater care is required in ensuring non-discriminatory access at the dark fibre level so LFCs cannot favour their downstream operations.
- In model 3, services providers operating at Layer 3 and above could buy wholesale bitstream access from network operators that also have retail customers. In this case it is easy to imagine that the wholesaling companies would have an incentive to favour their own downstream operations.
- In Model 4 has a split between the active wholesale and retail levels. This could be considered unlikely unless the government mandates bitstream access by firms that light the fibre, as telcos with retail operations are likely to be among the few organisations with the scale and expertise to light the fibre.
- In Model 5 the LFC leases dark fibre to active product wholesalers and retailers that light the fibre themselves. This could be an attractive outcome from the government's perspective, as there would be a wholesale lit fibre market and few incentives for the dark or lit fibre wholesalers to engage in discriminatory practices.
- Model 6 is ruled out in the BII proposal by the requirement to wholesale dark fibre, but was advocated by some of the submitters on the BII as a better alternative to dark fibre access. The service provider market would be quite competitive, but the LFCs may have limited incentives to upgrade their networks in response to growing demands for bandwidth or other quality of service attributes.

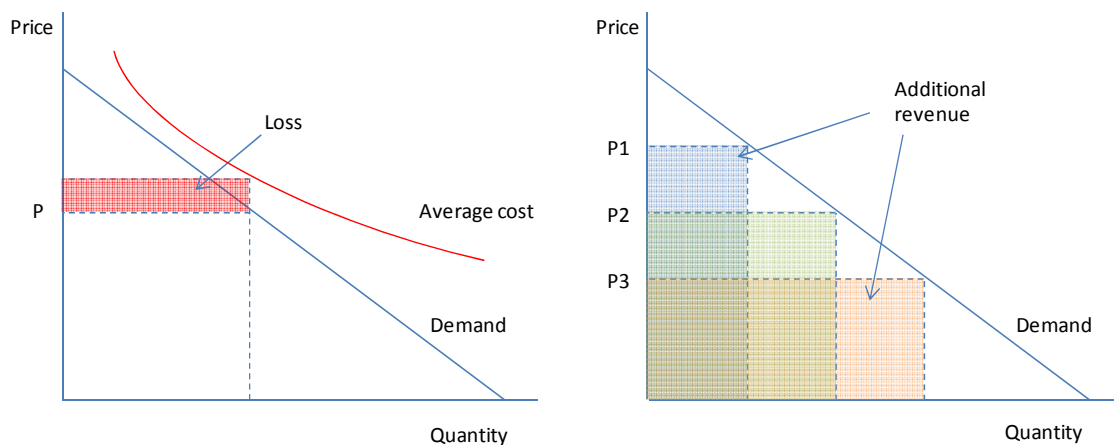
In our view the government has an interest in ensuring a robust wholesale bitstream market. In some areas it may not be economically viable for a second service provider to install its own equipment to service a small number of customers. Even in areas where competition to light the fibre is sustainable a new entrant without access to reasonably priced wholesale bitstream products might be unable to build the customer base to justify dark fibre leasing.

Whether a competitive wholesale bitstream market emerges depends on which of the scenarios above eventuates. The likelihood of these scenarios depends in turn on factors like the network topologies and technologies chosen, and economies of scale and scope in lighting the fibre and providing retail services. It would be wise to explore these issues carefully before committing to a particular approach. This may require a significant analytical exercise, but in light of the scale of the government's financial commitment, even a small improvement in investment and regulatory decision making would be justified.

Two further considerations about the government's proposed access regime are worth emphasising:

- The development of a wholesale bitstream market could be impeded by the existence of multiple LFCs and operators with different standards. The lack of a consistent standard for wholesale bitstream products could discourage service providers (who would face higher costs for serving customers across different networks) and impede downstream competition. The government may wish to follow the lead of Ofcom, which is promoting the development by industry of a standard for Ethernet bitstream (called Active Line Access) that retains as much as possible, the level of innovation supported by passive access.¹¹
- The requirement to provide dark fibre prevents network owners from practicing price discrimination which may adversely affect the case for investment. Fibre network owners face a (fixed) cost per home passed and a (variable) cost per home connected. A dark fibre retailer can offer only one price, which must be at least the average of these two costs. A bitstream wholesaler on the other hand can offer two or more products: for example, a high bandwidth product, which retailers would use to create plans for heavy users, and a low bandwidth product for regular users. As a result, it could charge above the average cost to for users with a higher willingness to pay, but offer a lower price to more price-sensitive consumers – above the marginal cost of connection but below the average cost. (See figure 5). By price discriminating in this way the network owner can theoretically provide services to more consumers while achieving higher profits, thereby justifying wider network rollout.

Figure 5: Price discrimination



The figure on the left illustrates the case where a network operator can only offer one service at one price (as would be the case for a dark fibre retailer). In this illustration there is no price at which revenues are sufficient to cover total costs. If the network were built, it would make a loss. Potential investors who anticipated this state of affairs would not invest.

The figure on the right shows the case where the network operator can charge users different rates based on their willingness to pay. This would probably involve charging for different plans based on their bandwidth. (In the case of a lit fibre wholesale, the price of different wholesale products would

¹¹ Ofcom, "Ethernet Active Line Access: Updated Technical Requirements", 2009.

be passed through to consumers by retailers). This allows the network company to generate additional revenue and make a profit, justifying investment.

Transitional regulatory arrangements

The government's decisions to regulate Telecom's access network – appropriate at the time - could have significant implications for the price and quality of services, the success of its fibre investment and the overall efficiency of investment in telecommunications sector.

Telecom is in the process of rolling out FTTN, as required by its Operational Separation undertakings, and will be able to deliver higher bandwidths than exchange-based DSL, which is now being offered by Telecom's competitors as a result of Local Loop Unbundling (LLU).

US technologist and telecommunications analyst David Isenberg views FTTN as an obstacle rather than a stepping-stone to FTTP. He sees the purported cost savings as minimal from a societal perspective and the main motivation behind FTTN roll-out on the part of network owners as being to stifle competition. He has reiterated a point he made to the TUANZ Telecommunications Day in 2008: "copper is a word that should be banned from polite conversation" about the future of broadband.

In a scenario where there is regulation for copper, but not for fibre, competition against fibre networks could be more intense because Telecom is committed to invest in its network and provide unbundled access to it. This raises the question of whether competing access networks are likely to be viable in the New Zealand context or would represent inefficient overbuild.

- On the one hand, in the absence of price regulation, inter-platform competition could act as a competitive restraint on pricing of fibre access services. It should be noted that competing (copper and cable) networks have proved viable in other markets e.g. Canada.
- On the other hand, competition between two networks delivering similar services could prove unstable as the network with more subscribers enjoys significant utilisation leverage. A network with more subscribers can spread its fixed costs over a larger customer base, and therefore can profitably offer services at a lower price. In the New Zealand context, Telecom's FTTN network might enjoy a built-in advantage that could impair fibre penetration rates sufficiently to undermine the LFCs' business model. Dark fibre-based retailers *might* be able to differentiate themselves by offering services that use bandwidths only available over fibre, but in the early stages of fibre rollout, customers' willingness to pay for such services is highly uncertain. In a perverse way, the Government requirement to speed up Telecom's FTTN rollout could undermine the Government's own broadband rollout initiative.

This suggests that government should be considering a range of policy measures prior to the finalisation of the Bill to ensure that the "new entrant" LFCs do not face excessive or inefficient levels of competition. These could include

- utilising Telecom's (Chorus or the Group) infrastructure as the basis for an FTTP rollout, either through a partnership arrangement or acquisition in a way that satisfies the open access requirements of BII, to avoid unnecessary duplication.
- accelerating the review of policies that require Telecom to meet its obligations under the Telecommunications Service Obligations (TSO).
- reviewing those parts of the Separation Undertakings that commit Telecom to cabinetisation which seem to work at cross purposes to promoting fibre uptake.

By signalling a willingness to progress these issues, the government could promote businesses using regulated wholesale products to migrate to fibre. This could enhance the business case for LFCs and improve the chances of realising the government's objectives. This scenario would depend, however, on unbundlers having a viable migration path, i.e., either the scale to install their own electronics in the FTTP networks or access to an appropriately priced and specified wholesale bitstream product. As discussed in the previous section, the lack of such products could undermine the government's goals.

Regulation of fibre monopolies

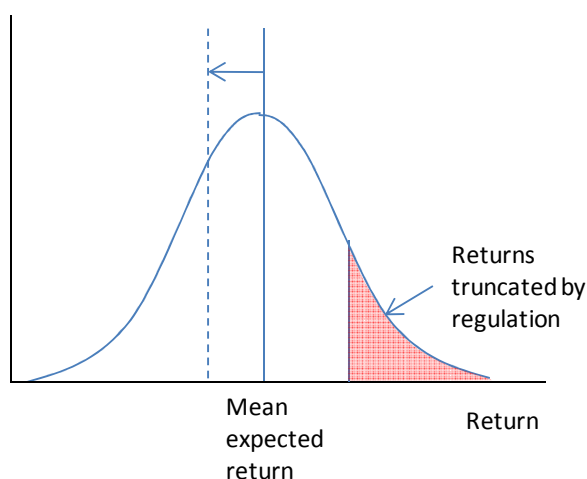
Depending on how government addresses the issues raised in the previous section, there may be little need for regulation in the initial stages of FTTP rollout, as there will be competing access infrastructure and, with a limited suite of services, consumers will be relatively price-sensitive. Over time, however, retailers will introduce new services that customers value and that utilise the higher bandwidths available over fibre.

This could leave LFCs with significant market power. If, as many observers expect, broadband becomes a utility as basic and ubiquitous as electricity, some level of price regulation seems inevitable eventually.

The BII consultation paper suggests that provisions of the Telecommunications Act and Commerce Act could be invoked down the track to curb monopolistic practices. This creates a potential problem for investors in LFCs facing an uncertain future. The government could be left scrambling to introduce a regulatory regime after the horse has bolted. It may be necessary to pre-empt this by developing a more specific regulatory framework now.

If the government declines to regulate beforehand, investors, anticipating future regulation, will demand a premium for regulatory risk on the grounds that returns would effectively be capped should the investment succeed, but they would still be exposed to losses in the event of low take up.

Figure 6: Truncation of expected returns through regulation¹²



The government could mitigate this uncertainty by developing a new approach to regulating NGA network monopolies. Simply extending the regulatory framework applied to the copper access network is unlikely to be supportive of investment and is technically more difficult as discussed earlier.

The cost-based approach to pricing access to Telecom's network made sense, as their passive infrastructure was already in place, making return-on-investment considerations (for much of the passive elements) moot. Given the uncertainty about demand for NGA-based services, however, cost-based approaches to fibre access under-price the risk faced by investors providing capital to build new access network infrastructure.

There are several other possibilities to explore:

- A cost-based approach with an adjustment for the project-specific cost of capital as proposed by the Netherlands. This would give investors confidence that they can achieve a reasonable return, but the information requirement for the regulator to determine the risks associated with different projects is high
- A returns-based adjustment for a symmetric 'fair bet', as proposed by the UK regulator, OFCOM. Price controls would be increased should the rate of return exceed expectations, but lowered should the rate of return fall short. This ensures that investors do not face the problem of asymmetric price regulation. However, achieving symmetric outcomes in the case that the investment makes a loss is difficult.
- Regulatory holidays as promoted by Germany. Under this approach LFCs would be required to provide non-discriminatory access, but at unregulated prices for a specified period of time. However, this is at odds with the New Zealand government's overall approach to

¹² Ofcom, "Future broadband: Policy approach to next generation access", 2007.

competition policy.¹³ Furthermore determining the right length for such a holiday is very difficult in any case.

- If a bitstream access model were to be used for LFCs, other regulatory remedies might be available. For example, Ofcom has proposed a system of ‘anchor product’ regulation, which would require NGA network operators to offer specified products (meant to replicate existing copper-based products) at regulated prices, while leaving them free to price new products as they please. A regime like this could be adapted to wholesale bitstream.

Conclusion

Next generation access networks are in the early stages of development around the world. While there is little doubt as to their importance in the long run, the economic, commercial and regulatory issues surrounding their deployment and operation are still up in the air. Successful fibre roll out in New Zealand will demand careful analysis and innovative thinking from government and private investors about their business models and policy frameworks.

The broad thrust of the government’s policy (the focus on fibre and open access networks) makes a great deal of sense. But much will hinge on the specifics of the government’s investment criteria and its longer-term framework for regulating fibre networks.

As this paper has shown, there are few clear-cut answers about the best way to balance investment incentives and competition in NGA networks. In all likelihood, New Zealand will need to develop a unique set of solutions tailored to our geography, market demographics and service providers’ capabilities. Getting these choices right will be crucial to bringing world class communications infrastructure to New Zealand.

The time to start thinking about those choices is sooner, rather than later.

¹³ BII paper – “there will be no “regulatory holiday” for the LFCs – that would require legislation and would be inconsistent with the government’s overall approach to competition policy and law”

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