New Zealand's telecommunications policy - a way forward

A report for Chorus

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Executive Summary

New Zealand has made a commitment to fibre to the premise investment supported by public funding, with further extension of fibre planned and national broadband targets announced on 6 October 2015.

Achieving these objectives efficiently and at least cost to public finances requires a commitment to an approach to fibre regulation from 2020 that supports investment alongside an approach to copper pricing and copper-fibre transition that is supportive of investment and, ultimately, copper retirement.

In relation to the price of copper we propose that it be stabilised as close as possible to the price of the basic fibre product. Given the costs, time and uncertainty involved in resetting the price of copper we propose that the price then be indexed to (at least) the consumer price index indefinitely. This approach is simple and would support fibre investment, copper to fibre migration and, ultimately, copper closure.

In relation to fibre applying cost orientation may prove contentious and complex. Cost orientation also does not allow consumers' valuation of fibre to be reflected in investment decisions. However, should cost orientation be applied we propose that the building blocks method be applied rather than incremental cost and that a revenue cap could be applied to both copper and fibre to reduce complexity and facilitate migration.

Further, we assess layer 1 (passive) unbundling of fibre and conclude that it involves different trade-offs to copper unbundling. Fibre unbundling would offer less by way of opportunities for third party innovation whilst also eliminating service-price differentiation at the wholesale and therefore the retail level due to arbitrage by layer 1 unbundlers. We conclude that layer 1 fibre unbundling is not in the public interest.

Rather than applying cost orientation and layer 1 unbundling we propose an anchor product approach whereby the price of the 30/10 Mbps fibre product is fixed in real terms from 2020 on. We propose that the 30/10 Mbps anchor be applied to all fibre providers nationally. This product would act as a constraint on abuse of market power coupled with flexibility in the specification and pricing of all other service tiers.

As an additional measure to support copper fibre transition, should the wholesale price of copper remain below the 30/10 Mbps fibre product, we propose a transitional anchor product on fibre at a level of service and price corresponding to copper based ADSL i.e. a service level around a ball park of 15/1 Mbps. A sunset clause might be attached to this transitional anchor.

Finally, in relation to fibre, we propose an approach to regulation that supports voluntary long-term agreements regarding wholesale fibre access. Voluntary long-term (seven year) contracts have recently emerged in the Netherlands. Contracts could take the form of two part tariffs with an up-front element and reduced ongoing line charges. This would incentivise retailers to market fibre more aggressively in order to grow the market.

In relation to copper retirement we propose a permissive approach which leaves the decision to Chorus subject to a minimal notice period (the FCC have recently proposed a notice of 6 months for copper retirement) and a requirement that most end users are no worse off – a condition which would be met by the proposed transitional anchor product. If some customers, using legacy services, preferred a longer period for transition they would be free to negotiate extended migration on commercial terms.

1 Introduction

This paper was commissioned by Chorus to consider alternative options for copper and fibre pricing post 2020, the costs and benefits of layer 1 access and network transition and – ultimately –copper retirement. It is a contribution to the Government review of the Telecommunications Act 2001 ("the review").

Whilst the paper draws on lessons from experience, particularly in Europe, the analysis is tailored to the specific circumstances in New Zealand – both in terms of government policy goals and market and regulatory developments to date.

New Zealand has progressed through three distinct phases in terms of regulation with telecoms subject to *ex post* competition law only prior to 2000, "light handed" regulation from 2001 and "heavy handed" regulation from 2008 with publicly funded ultrafast broadband and structural separation of Telecom NZ from 2011 into Chorus (network) and Spark.

Fibre prices are governed by contracts with the government for fibre provision whilst copper prices are governed by regulation. Fibre price contracts expire in December 2019 whilst copper prices have been subject to volatility and have been reduced relative to contracted fibre prices - negatively impacting on copper-fibre transition and the fibre investment business case.

The review is in response to the need for a framework to govern the access market from 2020 and recognition of the need to assess the governance of copper and fibre prices from a holistic perspective to facilitate transition. The review presents an opportunity to resolve these issues and to put in place a stable framework which supports further fibre investment, transition from copper to fibre and ultimately copper retirement.

The appropriate extent of commercial freedom to set prices, and the basis for setting prices determined by regulation, are key considerations. These questions are assessed mindful of the anticipated consequences of alternative options.

2 The objectives and scope of regulation

2.1 Government policy objectives

The Government has a policy objective of improving connectivity including extension of fibre access. Phase one of the ultrafast broadband plan, reaching 75% of New Zealanders, is due for completion in December 2019. Phase two will increase this proportion to 80%, and is planned for completion in 2022 (subject to contract).

On 6 October 2015 the government announced that 99% of New Zealanders should get broadband speeds of at least 50 Mbps by 2025.[1] The remaining 1 per cent of New Zealanders would be assured speeds of at least 10 Mbps by 2025.

2.2 Regulatory objectives

The discussion document raises the possibility of changing the 2001 Telecommunications Act's purpose to *"explicitly promote growth, innovation, and efficient investment in communications markets for the long-term benefit of end users."*

Explicit inclusion of growth, innovation and investment goals would rebalance the focus of regulation away from static considerations alone and towards dynamic benefits – where the greatest benefits are likely to lie. Further, the proposed objective is not innovation and investment *per se*, but innovation and investment for the long-term benefit of end users.

The discussion document also discusses the need for predictability and stability as necessary precursors to innovation, investment and market-entry. Credible commitment, particularly in relation to long-lived assets, is a key ingredient of a healthy market.[2]

2.3 Scope of regulation

Historically telecommunications services were focussed on voice. The focus today is on the provision of ubiquitous broadband access – both fixed and mobile. Further, a diverse and competitive set of network independent applications have developed. The focus of this paper is therefore on broadband access.

The separation of wholesale network access from retail access services in New Zealand provides an assurance of non-discrimination and means that margin squeeze is not a relevant consideration. However, separation may also increase the scope for error in setting access prices since there is no other source of revenue (80% of Chorus's revenue is a function of the regulated copper price[3] whilst Chorus and local fibre company (LFC) fibre revenues are subject to price caps in contracts and may in future be subject to regulation).

[1] Amy Adams. 6 October 2015. "Ambitious target set for rural broadband". http://beehive.govt.nz/release/ambitious-target-set-rural-broadband

[2] Witold Henisz. 2002. "The institutional environment for infrastructure investment." *Industrial and Corporate Change* 11(2). http://www-management.wharton.upenn.edu/henisz/papers/ieii.pdf

[3] Chorus. "2014 Annual Report." https://www.chorus.co.nz/file/65886/Chorus-Annual-Report-FY14.pdf

3 Access regulation – conceptual building blocks

3.1 Value of incentives for innovation and investment

The value of an incentive-based approach to innovation, investment and service is that it helps align investor and consumer interests. In turn this:

- Reduces the burden on regulation to second guess and 'engineer' efficient outcomes. With asymmetries of information this is inevitably challenging and necessarily involves a trade-off between rent extraction and efficiency.[4]
- Reduces the need for public subsidy to achieve extension of high speed broadband (a goal of government policy is to deliver 50 Mbps to 99% of households by 2025[5]).

3.2 Value of pricing flexibility & service-price differentiation

A degree of pricing flexibility and scope for service-price differentiation helps ensure appropriate incentives for innovation and investment, but also helps achieve digital inclusion and efficient network transition and rationalisation.

Pricing flexibility allows the investor to experiment with pricing and capture a larger share of the consumer surplus flowing from investment, thereby promoting efficient investment (note that, absent investment, the additional consumer surplus would not be generated). Further, service-price differentiation further helps align investor and consumer interests, as illustrated by Figure 3-2 versus Figure 3-1.

Figure 3-1: Without service-price differentiation

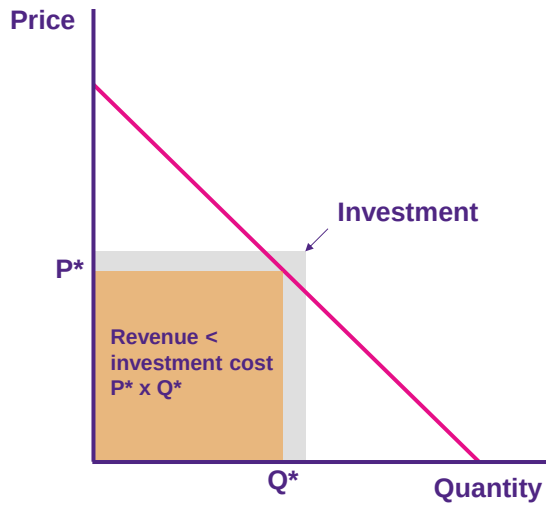
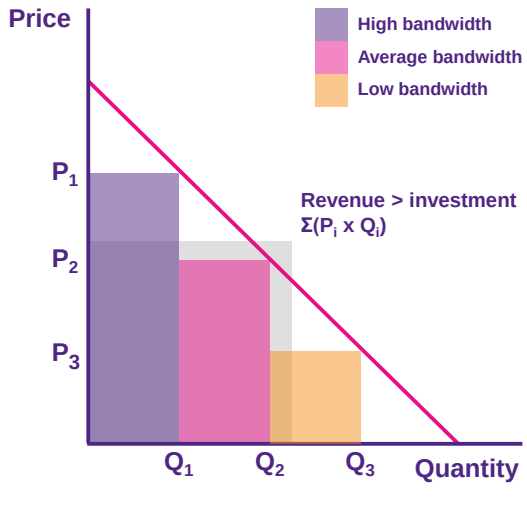


Figure 3-2: With service price differentiation



[4] Jean Tirole. October 2014. "Market power and regulation" http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2014/advanced-economicsciences2014.pdf

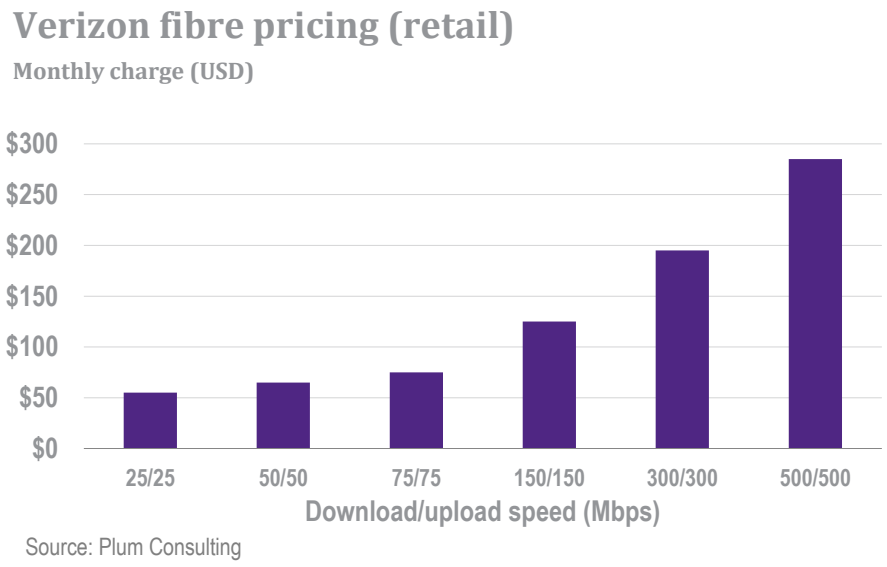
[5] http://www.beehive.govt.nz/release/ambitious-target-set-rural-broadband

Service-price differentiation enables a greater level of efficient investment – that is, investment where willingness to pay exceeds cost. It also makes it possible to offer lower service levels at lower prices – thereby supporting digital inclusion.

In relation to network transition, the price relativity of legacy copper versus replacement fibre is an important instrument in promoting timely transition and – ultimately – legacy network closure. The prospect of network rationalisation also promotes fibre investment via the prospect of lower costs form rationalisation.[6]

In the US, Verizon invested in FTTH from 2007. Average take-up reached 41.4% of premises passed by Q2 2015, with 64% of fibre customers subscribing to packages with download/upload speeds of 50/50 Mbps or more and 23% on the 75/75 Mbps tier. Over time Verizon has maintained a differentiated pricing structure, with experimentation and adaption of service levels and price points, with current pricing in Figure 3-3.[7]

Figure 3-3



Both theory and practice in relation to fibre pricing support scope for service price differentiation.

3.3 Trade-offs involved with cost orientation

Cost orientation has been widely applied as a principle of regulation. However, cost orientation has disadvantages:

- It is not straightforward to apply in practice and is open to dispute. There is no generally agreed basis for establishing the level of actual costs (with sunk costs in particular open to dispute) or replacement costs (with questions around the extent of optimisation given changes in technology and demand over time).

[6] Plum Consulting. February 2015. "Leaving a legacy: enabling efficient network transition" http://www.plumconsulting.co.uk/pdfs/Plum_February_2015_Leaving_a_legacy.pdf

[7] http://www.verizon.com/about/investors/quarterly-reports/2q-2015-quarter-earnings-conference-call-webcast

- It may not adequately reflect risk since demand risk - the risk of a shortfall in demand relative to expectations - is not fully reflected in standard approaches to estimating the cost of capital.[8] Unlike utilities demand risk exists with fibre
- It blunts incentives for efficient operation and investment since value (as opposed to cost) has a limited bearing on decisions when cost orientation is applied. With limited competition prices will differ from costs consistent with efficiency doe to "information rents".

In Europe, where cost orientation has had a strong tradition in telecommunications regulation, there have been moves to reduce reliance on cost orientation in relation to fibre investment. In 2009 Ofcom signalled fibre pricing freedom given the 'anchor product'[9] constraint from regulated copper loop based ADSL service.[10] BT announced its intention to invest coincident with the Ofcom signal.[11]

Ofcom formally adopted fibre-pricing freedom in 2010,[12] and reaffirmed the approach in 2014 whilst noting that:[13]

> *"Our approach to anchor pricing ensures that BT has an incentive to undertake investment required to improve service characteristics which are directly related to customers' willingness to pay for improvements in quality…"* Paragraph 7.130

In September 2013 the EC recommendation on costing and non-discrimination also allowed, subject to conditions, for fibre pricing freedom:[14]

> *"In view of the benefits of pricing flexibility in these circumstances, under the recommended approach, wholesale access prices for passive NGA wholesale inputs or non-physical or virtual NGA wholesale inputs offering equivalent functionalities are deemed to be sufficiently constrained (i.e. price-related competition problems are considered to be effectively addressed) when: (i) there is a demonstrable retail price constraint resulting from the infrastructure competition or a price anchor stemming from cost oriented wholesale copper access prices, and (ii) the ex ante economic replicability test is in place in those cases where wholesale price regulation should not be imposed, and (iii) there is an obligation of providing wholesale access services on the basis of EoI. In other words, where EoI is applied and NRAs consider that the above competitive safeguards are in place, they should not impose a regulated access price for those NGA wholesale inputs."* Paragraph 52

These developments, and the supporting analysis that led to them, support a conclusion that the application of cost orientation to fibre does involve trade-offs in terms of incentives to invest, and that

[8] Ruback, Richard S. October 2010. "Valuation when Cash Flow Forecasts are Biased." http://www.hbs.edu/faculty/Publication%20Files/11-036.pdf

[9] Brian Williamson. October 2013. "Anchor product regulation – Retrospective and Prospective". SSRN. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2336963

[10] Ofcom. March 2009. "Delivering super-fast broadband in the UK Promoting investment and competition." http://stakeholders.ofcom.org.uk/binaries/consultations/nga_future_broadband/statement/statement.pdf

[11] http://news.bbc.co.uk/1/hi/technology/7919904.stm

[12] Ofcom. October 2010. "Review of the wholesale local access markets" http://stakeholders.ofcom.org.uk/binaries/consultations/wla/statement/WLA_statement.pdf

[13] Ofcom. June 2014. "Review of the wholesale broadband access markets" http://stakeholders.ofcom.org.uk/binaries/consultations/review-wba-markets/statement/WBA-Statement.pdf

[14] European Commission. September 2013. "Commission recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment". C(2013) 5761. https://ec.europa.eu/digital-agenda/en/news/commission-recommendation-consistent-non-discrimination-obligations-and-costing-methodologies

substitution pressure from current generation broadband may provide sufficient price constraint to prevent monopoly abuse.

3.4 Trade-offs involved with layer 1 passive access

Layer 1 unbundled access to copper loops has been a mainstay in the development of competition in many countries. It has also arguably facilitated innovation by freeing competitors, for example, to adopt more advanced ADSL. This did involve a trade-off, not necessarily evident at the time unbundling was introduced, namely that those reliant on unbundled local loops might resist the transition to fibre. As Martin Cave noted:[15]

> *"An unbundler which has sunk investment in building out to the exchange or cabinet will face a low marginal cost in supplying its customer with a UCLL-based, as compared with a fibre bitstream product. It will therefore have an incentive to keep the customer on the copper connection, rather than promote a switch to fibre. This aim can be achieved by cutting prices selectively to potential switchers, or simply by not promoting fibre."*

With fibre this concern arguably does not arise as a transition to something other than fibre is not envisaged. However, other trade-offs are involved in providing layer 1 access for fibre which either did not apply or were less material for copper loop unbundling.

With copper loop unbundling the main forms of service differentiation were contention, data caps, technology (with the shift to ADSL2+) and customer service. Whilst service-price differentiation based on speed was tried in a number of markets it arguably wasn't credible given the significant variation in speed over individual copper lines.

However, for commercial fibre deployments speed-price differentiation has proved important, with different speed tiers offered to all customers – for example, Verizon in the US. Layer 1 unbundling would undermine this form of differentiation.

The reason for this is that if an unbundled product is available which offers the full capability of fibre at a single wholesale price, then any retailer who attempts to charge a premium for the highest possible speed will be undercut and one who charges less for a lower speed value package will not find it viable (illustrated in Figure 3-4).

[15] Martin Cave. June 2012. "Regulating the price of copper in New Zealand." https://www.chorus.co.New Zealand/file/48859/Chorus-Attachment-5---Martin-Cave-report.pdf

Figure 3-4: Arbitrage eliminates service-price differentiation with layer 1 access

The September 2013 EC recommendation on costing and non-discrimination also recognises the need for differentiation at the wholesale level to support retail differentiation:

> *"…pricing flexibility at wholesale level is necessary to allow both the access seeker and the SMP operator's retail business to introduce price differentiation on the retail broadband market in order to better address consumer preferences and foster penetration of very high-speed broadband services"* Paragraph 49

Speed-price differentiation must exist at the wholesale level to be sustainable at the retail level, and this is viable for the network owner as they can recover common costs via differentiated prices across the entire wholesale customer base. Layer 1 unbundling would therefore involve a significant trade-off in terms of weakened investment incentives since overall demand and revenue will be lower, and reduced scope to offer entry level packages which would support digital inclusion.

The loss of speed-price differentiation may also limit the scope for fixed access to compete at the margin with mobile only. Not only is mobile access becoming more capable with 4G and, in future, 5G; but the unit cost of carrying data over mobile networks is also declining with more efficient technology and additional spectrum. Layer 1 unbundling would therefore hamper the ability of fixed to compete with mobile only, thereby increasing demand risk.

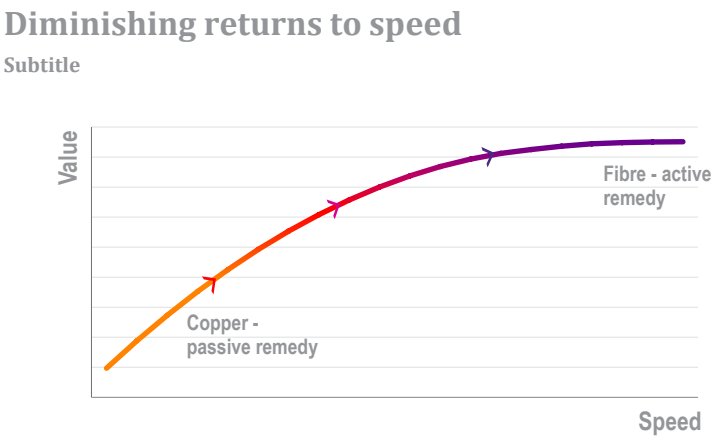
On the other hand, the absence of layer 1 access for fibre could limit the scope for independent innovation at either end of the fibre to offer higher speeds. However, both the options for innovation and their economic value differ between fibre and copper networks in ways that alter the balance of costs and benefits from unbundling.

In relation to options for innovation we note that a larger set of options is available to the network operator than 3rd parties. The network operator could increase speed and capacity either by changing terminal equipment (upgrading to NGPON2 which utilises wave division multiplexing – in essence multiple laser light colours) or by reducing the number of splits a GPON network, say from 32:1 to 16:1 (whilst options exist for a 3rd party to introduce additional splits they would involve higher costs). The network operator is therefore able to consider the full set of upgrade options whilst a 3rd party is not.

In relation to the value of third party innovation, the incremental payoff from higher speeds is likely to diminish – perhaps rapidly beyond the 10-100 Mbps range. Whilst there is considerable uncertainty regarding the value of future bandwidth there are reasons expecting diminishing returns: the set of applications dependent on ever higher speeds narrows, some applications may be approaching the

resolution limits of our senses (e.g. 4K video), evidence regarding willingness to pay suggests diminishing returns[16] and download time savings from successive speed doublings are half those from the preceding doubling (growth in streaming is also reducing the importance of download times). Diminishing returns are illustrated in Figure 3-5.

Figure 3-5



Source: Plum Consulting

Finally, layer 1 unbundling may impact on retail competition. Unbundling may advantage larger retail players over smaller ones given the potentially need for investment in terminating equipment to compete (particularly when regard is given to the tendency of unbundling to unravel service-price differentiation).

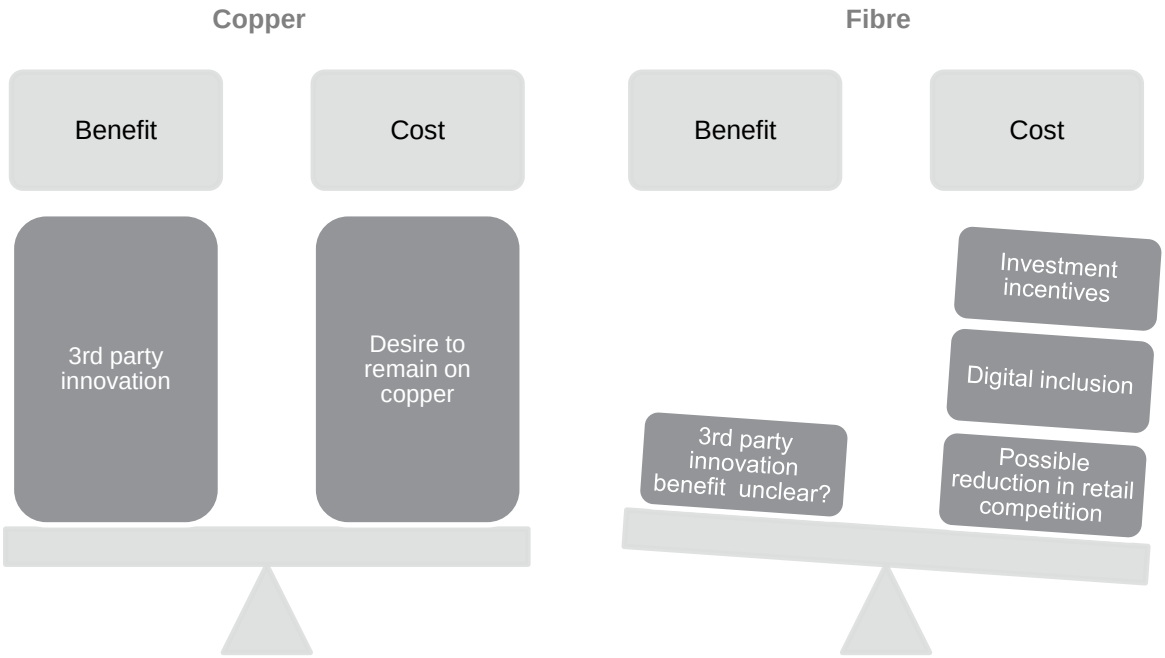
This may have been viewed as a virtue in the copper era since it involved a step up the so called "ladder of investment". However, in a fibre era, particularly with public funding of regional fibre networks, there may be little prospect of a move beyond layer 1 unbundling to investment in parallel fibre network infrastructure. Unbundling may also raise switching costs if terminating equipment is retailer specific. Layer 1 unbundling may therefore have a negative impact on retail competition.

To sum up, the trade-off involved in layer 1 unbundling differs between copper and fibre. With fibre the foregone opportunity for service-price differentiation reduces investment incentives and undermines scope for entry level packages, whilst the benefit of third party innovation in terminating equipment may be smaller than for copper, may involve an efficiency cost given that third parties have a smaller set of options for innovation than the network operator and may also impact negatively on retail competition.

The trade-offs involved in layer 1 unbundling for copper and fibre respectively in comparison with bit-stream or virtual unbundling are illustrated in Figure 3-6.

[16] Michael Vertigan et al. August 2014. "Independent cost-benefit analysis of broadband and review of regulation. Volume II - The costs and benefits of high-speed broadband." https://www.communications.gov.au/sites/g/files/net301/f/Cost-Benefit_Analysis_-_FINAL_-_For_Publication.pdf

Figure 3-6: Trade-off in layer 1 unbundling differs between copper & fibre



Further, the desire to delay fibre migration by those who have invested in copper unbundling is a reason to discourage - rather than promote - copper unbundling now that fibre has been deployed in New Zealand.

3.5 Conclusion

The copper-fibre price relativity is important for customer transition and investment returns and, ideally, copper and fibre are both not regulated (or not regulated in their entirety under the anchor regulation approach). However, if all services are regulated a stable approach is required which, to the extent possible, assures investors of cost recovery including a return on capital.

Speed-price differentiation for fibre supports investment, transition and digital inclusion, and speed-price differentiation is not compatible with Layer 1 access. Efficient differentiation and its evolution over time are more likely outcomes if not all fibre prices are regulated.

Finally, whilst local loop unbundling may offer benefits at an early stage of basic broadband development it should not be promoted once fibre is deployed. Rather, copper retirement should be permitted to allow joint running costs to be phased out.

4 Evaluation of alternatives

In this section we evaluate a range of options for regulation of fibre and copper broadband access.

We do not consider the option of no *ex ante* price control for fibre, beyond noting that reliance on *ex post* competition law alone proved unsustainable in New Zealand.

Taking account of the objectives and goals of policy and regulation in New Zealand, the history and current position and the analysis of conceptual building blocks we consider and evaluate the following options in relation to future fibre pricing:

- An anchor product approach whereby a single fibre product is price regulated and network operators are free to set other service-price points subject to the discipline of the anchor price.
- Voluntary long-term contracts negotiated between access seekers and access providers.
- Long term regulatory undertakings or contracts.
- A 'utility style' revenue cap for fibre.

In addition, we consider the transition from copper to fibre and, ultimately, the possibility of copper retirement.

Finally, we consider the question of what remedy should apply in different areas, namely where Chorus provides copper and fibre and where Chorus faces platform competition from cable (in Christchurch and Wellington) and/or Local Fibre Companies (LFC's).

4.1 Anchor product regulation

Under the anchor product approach a basic product at an entry level price provides a discipline against monopoly abuse whilst leaving a degree of commercial freedom regarding higher specification services and prices. "Anchor product" regulation was conceived as an intermediate option between no ex ante price control and full cost orientation for fibre.[17]

As originally conceived the anchor product was a virtual product over fibre offering a similar speed to copper at the same price in the UK. In practice, Ofcom relied on the existing copper "anchor product" to justify not applying cost orientation to fibre (in the UK copper-based ADSL exists alongside VDSL). The advantages of the anchor product approach are discussed in Figure 4-1.

[17] Brian Williamson. 2014. "Anchor product regulation – a new regulatory tool." Info, Volume 16(5). Working paper: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2336963

Figure 4-1: The advantages of anchor product pricing[18]

It allows efficient technology choice by both suppliers and downstream users:

> *"Where there is a set of services we propose to control, it is generally efficient to reflect differences in demand (especially the responsiveness of demand to prices) or costs in relative prices. BT is generally better placed than Ofcom to do this." Paragraph 7.74*

> *"…controlling all the different products separately would reduce BT's ability to respond, for example, to unanticipated changes in relative costs or in the demand for services." Paragraph 7.76*

It encourages innovation in alternative solutions:

> *"Anchor pricing has good incentive properties. It allows the dominant provider the flexibility to charge more to reflect any enhanced functionality of the new service. In turn, this creates the incentive for the investment required to advance service characteristics which are directly related to customers' willingness to pay for improvements in quality." Paragraph 7.112*

It minimises the information informational burden:

> *"If we were going to apply separate controls, we would have to decide an efficient allocation of common costs. This would require extensive analysis based on detailed information on the costs and demand for individual services. This is not likely to be a practical or desirable proposition." Paragraph 7.75*

Whilst the anchor product in the UK is ADSL, the possibility of moving to a virtual anchor on fibre should copper retirement occur has been discussed by Ofcom and the European Commission. In the costing and non-discrimination recommendation the EC note that:

> *"If the product offered by the SMP operator on the legacy access network is no longer able to exercise a demonstrable retail price constraint on the NGA product (for example in the event of a copper switch-off), it could in principle be replaced by an NGA-based product that is tailored to have the same product features."* Paragraph 56

The anchor product approach is an option for fibre regulation in New Zealand post 2020. Given the timing, and investment in FTTH, if anchor product pricing were adopted a virtual anchor on fibre would be preferable to a copper anchor product since it would anticipate the possibility of copper closure.

We note that a virtual anchor product would not be compatible with layer 1 access. The reason for this, as discussed in the previous section, is that layer 1 access would lead to arbitrage which would undermine service-price differentiation. The impact of layer 1 access on differentiation and investment incentives has been noted also by HSBC Global Research:[19]

> *"We continue to regard unbundling as inimical to investment, through the tendency to undermine the capability of operators to price segment the market, a vital element of flexibility if operators are to justify substantial infrastructure deployment…"* Page 11

Finally, we note that the anchor product approach is compatible with a possible longer term evolution towards long-term contracts or a revenue cap i.e. the alternatives are not necessarily mutually exclusive.

[18] Ofcom. July 2013. "Review of the Wholesale Broadband Access Markets - Consultation." http://stakeholders.ofcom.org.uk/consultations/review-wba-markets/.

[1919] HSBC Telecoms, Media & Technology. 24 September 2015. "UK Telecoms – Reviewing the Review".

4.2 Long-term undertakings or contracts

Kocsis *et al* (2015) discuss the prospect of negotiated access in the context of the fibre access market in the Netherlands.[20] In July 2015 the network operator KPN announced that they had entered into seven year contracts for VDSL access on a VULA basis with access seekers.[21] Contracting parties welcomed the agreement.[22] The regulator welcomed the arrangement:[23]

> *"The Netherlands Authority for Consumers and Markets (ACM) welcomes the arrangements made between Dutch telecom company KPN and rival companies Tele2, Online and Vodafone about access to KPN's network. These arrangements create certainty in the telecommunications sector for an extended period of time, which is positive for investments in telecom networks."*

Another example of a market governed predominately by long-term contracts is the broadcast transmission market in the UK. As part of merger undertakings in 2008 an adjudicator was appointed with emphasise on commercial settlement over regulation:

> *"The adjudication process should be seen by Arqiva and its customers as a fall-back option; customers are expected to first undertake bilateral negotiations with Arqiva on a good faith basis with a view to entering into commercially negotiated contracts. Only where a satisfactory agreement cannot be reached should customers then turn to the dispute process. The Adjudicator has the right to resolve disputes only where it can be proven that reasonable attempts have been made, without success, to negotiate terms commercially."*

Long-term contracts could play a role in the New Zealand market in the lead up to and post 2020. Long-term contracts might be given the space to develop commercially, or via a mediated approach.

One option would be to set the non-contract price for access to an anchor product, leaving other products and longer-term arrangements as a matter for negotiation. The possibility of more comprehensive regulation would remain as a backstop option, with an intermediate option of mediation.

Commercial contracts tailored to the interests of access providers and different access seekers might also differ, for example, in the extent of risk sharing via up-front versus ongoing charges per customer. An advantage of a two part price structure is that it gives retailers an added incentive to promote fibre and grow the market – since the payoff from outperforming relative to anticipated fibre adoption is greater.

However, not all retailers would necessary prefer a higher reward-higher risk contract and different contracts (or sets of contracts) should be assessed on their merits rather than viewed as discriminatory *per se*.

Risk sharing incentive contracts, via upfront payments and lower ongoing per customer payments, could also help overcome barriers to migration from copper to fibre since the incremental cost of a

[20] Kocsis, Bijl, Noll and Tieben. "Reconsidering *ex ante* Regulation in the Dutch Electronic Communications Market". *Communications and Strategies*. Volume 98 (2).

[21] KPN. 20 July 2015. "KPN reaches agreement on fixed network access." http://corporate.kpn.com/press/press-releases/kpn-reaches-agreement-on-fixed-network-access.htm

[22] Tele2. 20 July 2015. "Tele2 signs new fixed broadband contract with KPN." http://www.tele2.com/media/press-releases/2015/tele2-signs-new-fixed-broadband-contract-with-kpn/

[23] ACM. July 2015. "ACM gives Dutch telecom companies room for making arrangements". https://www.acm.nl/en/publications/publication/14547/ACM-gives-Dutch-telecom-companies-room-for-making-arrangements/

fibre customer could be lower than a copper customer (including, potentially, customers on existing unbundled local loops).

4.3 Revenue cap

Given the anticipated natural monopoly characteristics of fibre access in New Zealand the discussion document suggests that a revenue cap may be appropriate post 2020 (the possibility of maintaining a threat of regulation is also considered). Possible pricing methodologies – TSLRIC versus the building block methodology (BBM) - are also assessed.

We compare TSLRIC and BBM costing methodologies in Table 4-1.

Table 4-1: Alternative costing methodologies

Option	Comment
Replacement cost (TSLRIC) based approach	A replacement cost methodology is supported on grounds that it mimics a competitive market. However, aside from practical constraints, mimicking a competitive market may be an unrealistic goal as – with monopoly – information rents are a necessary counterpart of incentives for efficient investment and operations. The modelling utilised to estimate LRIC costs is also open to manipulation and may systematically underestimate realistic costs if an optimal network configuration at each point in time is assumed. In practice the application of LRIC based costing may or may not allow recovery of costs when replacement costs change over time.[24]
BBM - utility style RAB based approach	This approach, whereby investment is added to a regulatory asset base (RAB) and prices are set to allow a return of and on capital, is applied in relation to utility regulation. Under this approach existing assets are never revalued. However, adoption of this approach does not resolve the question of how the initial RAB is determined as, for example, some costs may be depreciated in an accounting sense but nevertheless used and useful. In the UK the privatisation value of businesses was used as a benchmark in setting the initial RAB. Further, whilst a RAB based approach may reduce regulatory risk (the risk of *ex post* expropriation via price setting), it does not eliminate risk. For a utility service such as water almost all households purchase the service and there is no competition. Broadband access, on the other hand, is not adopted by all, fixed access competes at the margin with wireless and ultrafast broadband competes with copper based broadband (as long as they coexist). The latter risk can be reduced by allowing copper closure on commercial terms, but also by applying an overall revenue cap to copper and fibre.

If a revenue cap is adopted then a regulatory asset base (RAB) that is periodically updated to reflect prudent and efficient capex is in our view superior to TSLRIC based approach. Commenting on the development and role of the RAB approach Jon Stern noted that:[25]

> *"In the UK, RAB protection has become the de facto major perceived underpinning of investor expectations for UK infrastructure industries, particularly against retrospective 'asset-taking' and prospective asset-stranding."*

[24] Mandy, D and Sharkey, W. September 2003. "Dynamic Pricing and Investment from Static Proxy Models". FCC Working Paper 40. https://apps.fcc.gov/edocs_public/attachmatch/DOC-238934A2.pdf

[25] Oxera. February 2014. "The regulatory asset base and regulatory commitment" http://www.oxera.com/Latest-Thinking/Agenda/2014/The-regulatory-asset-base-and-regulatory-commitmen.aspx

> *"…the role of the RAB as a commitment device derives from the quality of its implementation plus the predictability and integrity of the process by which it is revised or redefined, rather than from the definition of the RAB per se."*

However, given the ongoing dynamics of fibre expansion and potential fibre upgrades, we are not necessarily convinced that "utility style" regulation is appropriate, at least in the immediate post 2020 timeframe. As Ofcom note:[26]

> *"the communications sector is different to utilities. The communications sector is characterised by a continual evolution in technologies and service capabilities, matching changing consumer demand and differentiated willingness to pay for different features."* Paragraph 1.22

Further, the discussion document notes that:

> *"Getting wholesale prices 'right' is now more important than ever because, unlike when the Act was first drafted, structural separation means regulated entities now have very few other opportunities to generate revenue."* Page 19

Given the ongoing evolution of the network and demand expected in 2020 we think getting wholesale prices right, including motivating efficient investment and operations (via information rents) is a heavy burden for regulation. Getting prices right, in our view, implies leaving some scope for commercial experimentation, service-price differentiation, negotiation and the prospect of additional returns to motivate efficiency. We therefore consider that the decision as to whether to impose a comprehensive revenue cap should be weighed carefully.

If a BBM approach was adopted an initial RAB would need to be set. One basis for doing this would be to set a RAB consistent with existing revenues, required revenues or a valuation approach to be determined. Initial valuation should be consistent with the concept, introduced by Ofcom's Chief Economist, of *"'Dynamically efficient value'"* which *"depends on what is required to avoid expropriation of assets"*.[27]

A revenue cap based on the BBM method might also be applied to copper and fibre collectively, or to individual services. A flexible cap applied to copper and fibre would have the advantage of accommodating the uncertain transition from copper to fibre better than individual caps, since an assessment of joint and common costs is not required as they move - with the customer - from copper to fibre. Further, an overall cap may allow service price differentiation, provided layer 1 unbundling is not imposed.

Nevertheless challenging questions would remain, for example, whether a common approach should be applied nationally and if so, what approach would be applied ultimately to LFCs. The desire for a degree of uniform pricing and application of the BBM approach would appear, ultimately, to be incompatible.

Finally, we note that the anchor product approach and/or contracts might alleviate the need for an explicit revenue cap from 2020. If it were later decided that it would be appropriate to move to utility style regulation then actual and anticipated revenues should be considered in assessing the initial RAB.

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[26] Ofcom. July 2015. "Strategic review of digital communications – Discussion document." http://stakeholders.ofcom.org.uk/binaries/consultations/dcr_discussion/summary/digital-comms-review.pdf

[27] Peter Culham (Ofcom's Chief Economist). November 2012. "Pricing access networks in the transition to NGA". ECTA conference presentation.

4.4 Transition and copper pricing

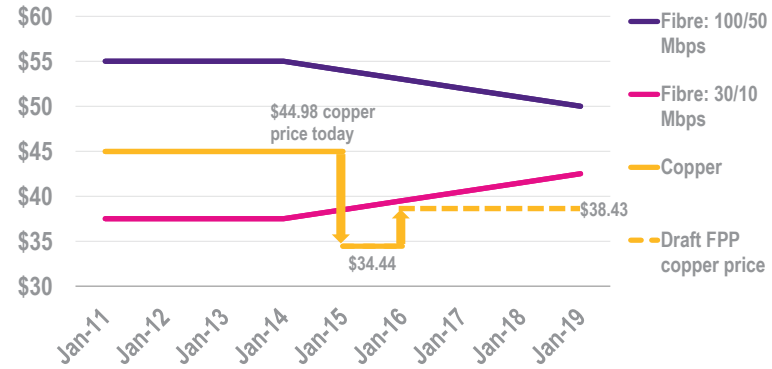
In relation to copper and the interdependency with fibre the discussion document notes that:

> *"The setting of copper prices has been an ongoing source of debate…This uncertainty has a negative effect on incentives for investment and innovation, with flow on effects for consumers."* Page 15
>
> *"…the relative price of copper services should not inefficiently provide incentives for RSPs or network owners to delay migration to [ultra-fast broadband] UFB services."*; and *"Any decision on changes to the access and pricing regime will be based on a holistic view of the interdependencies between UFB and copper networks."* Page 66
>
> *"..we note there may be a case for deregulation of copper services in areas where a suitable fibre replacement is available."* Page 81

Proposals over recent years saw a substantial reduction in the proposed price of copper (with the recent upward movement in the proposed price still leaving it below the previous level (Figure 4-2).

Figure 4-2

Fibre and copper pricing in NZ



Source: Plum Consulting

In order to facilitate transition a copper price close to, and ultimately exceeding, the base fibre product price would be ideal. Maintaining, rather than collapsing, the fibre service-price gradient, would help. Restoring the copper price, or at least putting it on an upward gradient over time, would also help.

We propose that, beyond the completion of the current exercise, the price of copper no longer be subject to review and revision but should be treated as a safeguard cap and subject to an CPI+ price control.[28] In areas where fibre is available, the copper price control could later be relaxed or removed once volumes sufficiently decline, or after a set period of time. In addition, we propose that copper upgrades including VDSL and G.Fast, not be subject to price controls.

[28] An example of a safeguard cap is the 55 pence cap applying to second class stamps in the UK (which also acts as an 'anchor product for first class stamps which are not price controlled). http://stakeholders.ofcom.org.uk/binaries/consultations/review-of-regulatory-conditions/statement/statement.pdf

In relation to the price of fibre we propose that service-price differentiation be maintained and that, post 2020, greater freedom to differentiate be allowed. This proposal is not consistent with introducing layer 1 fibre unbundling. Further, whilst service-price differentiation could apply consistent with a revenue cap it would be preferable to allow pricing freedom on higher speed tier services.

A fibre anchor product could be established based on the 30/10 Mbps service from 2020. However, this may prove insufficient to promote migration. Alternative options including implementing a fibre anchor product that more closely reflects ADSL based copper service characteristics, perhaps around 15/1 Mbps[29] and at a price point designed to support copper-fibre migration[30]. Such a fibre transition anchor product might be the only controlled price, or might sit alongside a 30/10 Mbps anchor. The approach is broadly consistent with the possibility raised in the discussion document that:

> *"…Chorus and LFCs could be required to provide a regulated service that met certain standards, regardless of whether that service was delivered over copper or fibre."* Page 67

The FCC in the US has clarified the position regarding legacy service and network retirement (Figure 4-3).[31] Regulatory approval is not required provided customers are given (limited) notice and not made worse off (mirroring the anchor product concept). We consider that as much scope as possible should be allowed, along these lines, for permissionless innovation.

Figure 4-3: The FCC's approach to copper retirement

The FCC does not require regulatory approval for the retirement of legacy services if the transition does not create a "discontinuance, reduction or impairment of service".

Providers seeking to retire copper must give at least 180 days' notice to interconnecting carriers and non-residential retail customers, and 90 days' notice to residential retail customers. The notice needs to be direct, clear and technology-neutral. *De facto* retirement – that is, allowing copper to degrade – is also covered by these requirements.

Incumbent providers that discontinue a TDM-based service must also give competitive carriers "reasonably comparable wholesale access on reasonably comparable rates, terms, and conditions" - on an interim basis. This measure is intended to preserve competition in the market.

The "reasonably comparable wholesale access" requirement allows for flexibility and is intended to be interpreted on a case-by-case approach. Nevertheless, the FCC set out five questions they will consider in assessing whether a wholesale access is "reasonably comparable":

- Will the price per Mbps increase?
- Will a provider's wholesale rates exceed its retail rates?
- Will comparable basic services be available?
- Will bandwidth options be reduced?
- Will service quality be impaired?

[29] This would need to be assessed in relation to the distribution of speeds over ADSL and the point in the distribution at which to set the anchor. The maximum speed for ADSL is 24/1 Mbps. In the UK 90% of ADSL customers had an average speed of less than 15 Mbps in November 2014. Ofcom. February 2015. "UK fixed-line broadband performance." Figure 4.1. http://stakeholders.ofcom.org.uk/binaries/research/broadband-research/november2014/Fixed_bb_speeds_November_2014.pdf

[30] The relevant price point for an end user is the retail price. We note, in relation to the comparatively small share of local loop unbundling in New Zealand, that consideration in setting such an anchor price might need to be given to the incentive for unbundlers – in addition to users – to migrate.

[31] FCC. August 2015. "Policies and Rules Governing Retirement of Copper Loops by Incumbent Local Exchange Carriers." FCC 15-97. https://www.fcc.gov/document/fcc-releases-rules-spur-technology-transitions-protect-consumers

Regarding copper retirement, we propose that Chorus be free, with the constraint of a comparatively short notice period, to determine when copper is retired. This approach is consistent with efficiency since Chorus is in a position to assess the network cost savings from retiring copper.[32] Further, given information asymmetries, freedom to close copper and the opportunity for commercial negotiation and payment for extended service, may be the only way of reaching an efficient outcome.[33]

Policy should also permit, but dictate the timing, of copper retirement (we note that a fixed policy schedule for copper retirement proved problematic in Australia).

4.5 Possible differentiation of regulation by area

The discussion document considers the possibility of a differentiated approach to regulation and pricing noting that:

> *"…there may be different competition concerns in areas where Chorus owns both the copper and fibre access service compared to where LFCs are competing with Chorus." Page 78.*
>
> *"In our view, having geographically-averaged wholesale prices across the country continues to be desirable…However, we note that under any cost-oriented regulatory regime involving different suppliers (for example, Chorus and LFCs) it would be challenging to achieve total geographic consistency in pricing."* Page 65

Where LFCs compete with Chorus we propose that regulation be rebalanced as fibre is rolled out towards the long-term monopoly service, namely fibre. Chorus would be free to compete utilising ADSL and/or VDSL, or to retire copper service.

Consistent with the overall approach we propose a consistent anchor product could be specified for both LFC and Chorus fibre areas with pricing freedom for other products. This approach would also provide a degree of consistency nationally whilst allowing network operators to recover differential costs via the pricing of higher tier products.

[32] Plum Consulting. February 2015. "Leaving a legacy".
http://www.plumconsulting.co.uk/pdfs/Plum_February_2015_Leaving_a_legacy.pdf

[33] The scope for commercial negotiation to reach an efficient outcome is illustrated by the US Navy's Space and Naval Warfare Systems Command paying for extended support for Microsoft Windows XP.
Ars Technica, June 2015. "Navy re-ups with Microsoft for more Windows XP support." http://arstechnica.com/information-technology/2015/06/navy-re-ups-with-microsoft-for-more-windows-xp-support/

5 Suggested way forward

5.1 Copper

The first step is to arrive at a national copper price – ideally as close as possible to the 2020 fibre price for 30/10 Mbps service. Once a price is established we propose that no further benchmarking or cost modelling be undertaken in relation to copper. We propose an indefinite CPI+ price cap for basic copper service

Copper upgrade products – VDSL or G.Fast - should not be subject to price controls.

Post 2020 we propose that Chorus be free to retire copper at comparatively short notice. Retailers and their customers would of course be free to negotiate a copper life extension on commercial terms.

5.2 Transition

A rising price of copper, as above, would encourage migration to fibre. At some point – either a point in time or when a residual copper share threshold is reached – the copper price control might be removed or relaxed where fibre is available.

To facilitate transition and copper retirement a transition anchor product on fibre is proposed with a price and specification matching that of copper ADSL, perhaps around 15/1 Mbps. The transition anchor could be subject to a sunset clause.

5.3 Fibre

Wherever fibre is available the following would apply to the fibre provider (either Chorus or the local fibre company):

- To preserve service price differentiation, and the associated benefits of differentiation for investment incentives and digital inclusion, a layer 1 product should not be introduced.
- A fibre anchor product at 30/10 Mbps is proposed with a CPI+0 price cap applying from 2020. This would provide a uniform wholesale product nationally.
- Commercial freedom to determine and price fibre services other than the anchor products. This could see different prices for other tiers of service in different areas.
- Freedom to negotiate long-term contracts including, potentially, differentiation by customer.

A revenue cap would remain a longer-term option. If a revenue cap were adopted we support the utilisation of the building blocks approach and an initial asset valuation that provides consistency for investors.