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Final pricing review determination for Chorus' unbundled bitstream access service

[2015] NZCC 38

Pursuant to section 51 of the Telecommunications Act 2001

Final determination

Date: 15 December 2015

The Commission: Dr Stephen Gale

Pat Duignan

Elisabeth Welson

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Acronyms and initialisms

ACCC	Australian Competition and Consumer Commission
Act	Telecommunications Act 2001
ADSL	Asynchronous digital subscriber line
Amendment Act	Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011
ATM	Asynchronous transfer mode
BAU	Business as usual
BBM	Building block model
BEREC	Body of European Regulators for Electronic Communications
BSS	Business support system
BUBA	Basic UBA (as described in section 3 of Schedule 1 (UBA service description) of the UBA STD General Terms)
CAGR	Compound Annual Growth Rate
Capex	Capital expenditure
CEG	Competition Economists Group
CERA	Canterbury Earthquake Recovery Authority
CGPI	Capital Goods Price Index
CI	Confidential information
CNVCs	Commercially non-viable customers
CPE	Customer premises equipment
CPI	Consumer Price Index
CPP	Customised price-quality path
DBA	Danish Business Authority
DORC	Depreciated optimised replacement cost
DPP	Default price-quality path
DSL	Digital subscriber line
DSLAM	Digital subscriber line access multiplexer
EC	European Commission
EDB	Electricity distribution business
EPMU	Equi-proportional mark-up
ESA	Exchange service area
ESP	Efficient service provider
ETP	External termination point
EUBA	Enhanced UBA
FCC	Federal Communications Commission

FDS	First data switch
FPP	Final pricing principle (as set out in Schedule1 of the Act)
FTTH	Fibre-to-the-home
FTTN	Fibre-to-the-node
FWA	Fixed wireless access
GigE	Gigabit Ethernet
GPON	Gigabit Passive Optical Network
HFC	Hybrid fibre-coaxial
HSNS	High Speed Network Service
ILEC	Incumbent local exchange carrier
IM	Input methodologies
IP	Internet protocol
IPP	Initial pricing principle (as set out in Schedule 1 of the Act)
IRD	Inland Revenue Department
ITU	International Telecommunication Union
KSO	Kiwi Share obligations
LAN	Local area network
LAP	Local aggregation path
LCI	Labour Cost Index (as produced by Statistics New Zealand)
LFC	Local fibre company
LFI	Line Fault Index
LME	London Metals Exchange
LRIC	Long run incremental cost
LTE	Long-term evolution
MBIE	Ministry of Business, Innovation and Employment
MDF	Main distribution frame
MEA	Modern equivalent asset
MED	Ministry of Economic Development
MPF	Metallic path facility
NESTF	National Environmental Standards for Telecommunications Facilities
NGA	Next generation access
NPV	Net present value
NRA	National Regulatory Authority
NRC	Non-recurring charges

NZIER	New Zealand Institute of Economic Research
ODF	Optical distribution frame
ODV	Optimal deprival value
OFDF	Optical fibre distribution frame
OFM	Online fault management
OLT	Optical line terminal
OO&T	Online order and tracking
Opex	Operating expenditure
ORC	Optimised replacement cost
POA	Price on application
P2P	Point-to-point
PPI	Producers Price Index
PPP	Purchasing power parity
PSTN	Public switched telephone network
RAB	Regulatory asset base
RBI	Rural Broadband Initiative
RBNZ	Reserve Bank of New Zealand
RFP	Request for proposals
RI	Restricted information
RMA	Resource Management Act
RSP	Retail service provider
SLES	Sub-loop extension service
SLU	Sub-loop UCLL
STD	Standard terms determination
STM	Synchronous transport module
TAMRP	Tax-adjusted market risk premium
TEA	Telstra Efficient Access
TELRIC	Total element long run incremental cost
TSLRIC	Total service long run incremental cost (see meaning in Schedule 1 of the Act)
TSO	Telecommunications Service Obligations (see Part 3 of the Act)
UBA	Unbundled bitstream access (as described in in Schedule 1 of the Act)
UBA STD	UBA standard terms determination
UBS	Unbundled bitstream service
UCLFS	Unbundled copper low frequency service

	(as described in Schedule 1 of the Act
UCLL	Unbundled copper local loop (as described in Schedule 1 of the Act)
UCLL STD	UCLL standard terms determination
UFB	Ultra-Fast Broadband
ULL	Unbundled local loop
ULLS	Unconditioned local loop service
USO	Universal service obligation
VoIP	Voice over internet protocol
WACC	Weighted average cost of capital

Executive summary

X1 This final determination sets prices for Chorus' unbundled bitstream access (UBA) service. The UBA service enables telecommunications retailers to access Chorus' copper telephone lines, electronic equipment and software, to provide fixed-line broadband services to customers throughout New Zealand.

X2 The UBA service has two main components.

X2.1 The unbundled copper local loop (UCLL) component represents the network infrastructure used to connect consumers' homes and workplaces to Chorus' local telephone exchange buildings.

X2.2 The UBA additional costs component (also known as the "UBA increment") represents the electronic equipment, software, and other additional infrastructure required to provide the UBA service over Chorus' UCLL network.

X3 The UBA monthly rental prices we have set are noted in Table X1 below.[1] These prices are the outcome of detailed modelling of the efficient costs of providing the UCLL and UBA services, under an approach referred to in the Telecommunications Act 2001 (Act) as total service long run incremental cost (TSLRIC). Prices have been determined for the next five years (starting on 16 December 2015).[2]

Table X1: Basic UBA monthly rental prices

Service	Year 1	Year 2	Year 3	Year 4	Year 5
Basic UBA additional costs	$11.44	$11.22	$11.01	$10.83	$10.67
UCLL	$29.75	$30.22	$30.70	$31.19	$31.68
Basic UBA (total)	$41.19	$41.44	$41.71	$42.02	$42.35

X4 This determination sets prices for the UBA additional costs component only. Prices for the UCLL component have been determined in parallel with this UBA pricing review determination. Our decision about UCLL prices is explained in a separate determination also published today.[3]

1 Table X1 shows prices for the Basic UBA service only. Basic UBA is the main variant of the UBA service purchased by telecommunications retailers. This determination also sets separate prices for Enhanced UBA services.

2 However, Commissioner Duignan disagrees with this start date, and considers that the new TSLRIC prices should apply from 1 December 2014. This is discussed in paragraphs X40 to X42 below.

3 Commerce Commission "Pricing review determination for Chorus' unbundled copper local loop service – Final determination" 15 December 2015.

X5 The UBA additional costs we have determined are similar to the previous price of $10.92. The previous UBA additional costs were determined by international benchmarking under the initial pricing principle (IPP), rather than detailed modelling of the TSLRIC costs of providing the service in New Zealand.

X6 UBA, together with UCLL, represents a significant part of the costs that make up the retail price of fixed-line broadband packages in New Zealand. The combined UCLL and UBA price of $41.19 in the first year of the regulatory period would represent more than half the cost of a $75 retail service.[4]

X7 This determination ends the UBA pricing review process. We have made our final determination taking into account the views of stakeholders, with assistance from independent expert advisors. We thank all stakeholders for their input throughout this process.

UBA is a wholesale service supplied by Chorus

X8 UBA is a wholesale service provided over Chorus' copper network. The UBA service provides access to Chorus' electronic equipment and software, in addition to the copper lines that connect consumers' homes and workplaces to Chorus' local telephone exchange buildings. A telecommunications retailer can use the UBA service to deliver broadband services to its customers.

X9 Alternatively, a telecommunications retailer can install its own electronic equipment in Chorus' local telephone exchange buildings, and use the UCLL service to deliver services to its customers over the copper lines. This is commonly referred to as "unbundling". From the perspective of a retail telecommunications provider, the UCLL service requires more up-front investment to deliver services to consumers.

X10 Although next generation infrastructure is being rolled out via the ultra-fast broadband (UFB) initiative, Chorus' copper network will remain, for some time, the main infrastructure over which fixed-line telecommunications services are provided to New Zealanders. UBA comprises a significant part of Chorus' business, with regulated copper services (including UCLL and UBA) representing more than half of its revenues.[5]

We have determined UBA prices using TSLRIC

X11 We have determined UBA prices using TSLRIC. The Act requires us to use TSLRIC when determining the UBA additional costs in this review, under the final pricing principle (FPP) for the UBA service. The Act provides us with a particular definition of TSLRIC, which requires us to determine the forward-looking costs over the long run of the UBA increment.

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4 For more details see Commerce Commission "Price trends in retail fixed-line broadband services, 2011 to 2014, and the impact of wholesale price changes" June 2015.

5 Chorus Annual Report 2015, Appendix One.

X12 We have also been guided by economic theory in interpreting TSLRIC. The TSLRIC concept is an economic approach commonly used to set regulated prices for access to telecommunications infrastructure. Under the conventional approach to the TSLRIC concept, prices are based on the costs that a hypothetical efficient operator would incur in supplying the service in the future, using modern technologies, and valuing inputs using current prices. Prices set using the TSLRIC concept allow recovery of the capital costs incurred in building the network, plus the ongoing operating costs.

X13 When determining TSLRIC prices for UBA, we have been guided by the purpose of the Telecommunications Act ("to promote competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand…") and benefits that TSLRIC prices may deliver in the New Zealand context. Potential benefits from setting prices using the TSLRIC concept include encouraging efficient investment, preventing monopoly pricing, and creating incentives to minimise costs.

X14 We have also considered the relativity between UCLL and UBA prices, as required under the Act. The relative prices of these two services will affect the investment decisions of telecommunications companies, particularly about whether to unbundle or to use UBA to deliver retail broadband services.

X15 We had previously set UBA additional costs by international benchmarking under the IPP. Benchmarking under the IPP is intended to be a relatively quick and low-cost approach to setting regulated prices, compared to the detailed TSLRIC cost modelling required under the FPP.

X16 Affected parties are able to apply for a pricing review under the FPP, if they are not satisfied with the outcome of the IPP. We started the UBA FPP process after receiving five applications for a pricing review, following our November 2013 UBA benchmarking determination.

X17 In 2011 the UBA pricing principle changed from a retail-minus approach, to a cost-based methodology.[6] This change in pricing approach was introduced by the 2011 changes to the Act, reflecting the structural separation of Telecom New Zealand. The UBA price was frozen under the retail-minus methodology until 1 December 2014, when the IPP price we determined in November 2013 took effect.

Our approach to TSLRIC modelling for the UBA increment

X18 We engaged TERA, a French-based economic cost modelling consultancy firm, to build a TSLRIC model for the UBA increment. The TSLRIC model that TERA built reflects decisions we made about the design and costing of the network used to determine the UBA additional costs.

X19 At the high level, the cost modelling process had three key stages.

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6 We determined the retail-minus UBA prices by starting with Telecom's retail prices and deducting the costs avoided by providing the wholesale UBA service rather than retail services.

X19.1 We determined the design of the hypothetical network, including the number of customers to be served, the network technologies to be modelled, and the location/quantity of assets required.

X19.2 We calculated the UBA additional costs based on this network design, to derive a central TSLRIC estimate.

X19.3 We considered whether we should adjust our central TSLRIC estimate to best promote competition for the long-term benefit of end-users of telecommunications services.

X20 When we did the modelling, we used inputs from objective sources where possible. We used geospatial specialists to map the optimal path of the network; obtained trenching costs from local civil engineering specialists Beca; and received expert advice from Dr Martin Lally and UK-based consultancy Oxera about the cost of capital for the assets involved. To build the TSLRIC model, we used TERA's international engineering and modelling expertise for costing equipment and combining all the inputs.

We have designed a hypothetical efficient network to supply the UBA increment

X21 Before we could determine the hypothetical efficient operator's network for the UBA increment, we had to consider the underlying network it would be additional to. We decided that the appropriate underlying access network is primarily copper-based. This reflects a fibre-to-the-cabinet deployment similar to Chorus' existing copper network.

X22 We consider that determining the UBA additional costs based on an underlying copper access network will best promote efficient investment decisions from telecommunications companies, including enabling efficient "build or buy" decisions. This is because decisions from telecommunications companies, about whether to invest in their own infrastructure through unbundling (to "build") or (alternatively) purchase UBA (to "buy"), are made in respect of Chorus' existing copper access network.[7]

X23 Starting with an underlying copper access network, we then modelled the efficient costs incurred in supplying the UBA increment. The model was based on a hypothetical efficient network built using modern equivalent assets. This meets the TSLRIC definition, which requires us to determine forward-looking costs over the long run.

[7] That is, a potential unbundler compares the cost of installing its own equipment on the existing copper access network against the TSLRIC of the additional costs of the UBA service.

X24 Based on our analysis, we made the following decisions about the design of the hypothetical efficient network used to supply the UBA increment.

X24.1 The network connects every address with an active UBA connection, and serves demand for all active UBA connections on Chorus' network. We consider that modelling Chorus' actual network footprint and level of demand best preserves incentives for unbundling to occur where efficient.

X24.2 An Ethernet-based layer 2 aggregation network is used to transport data traffic to the handover point for the UBA service.[8] Ethernet is the most efficient and best performing layer 2 technology available to provide the UBA service.

X24.3 The existing location of active assets in Chorus' copper network is used. However, we have optimised the routes taken by cables, the number of assets required to meet demand at each location, and the size of Chorus' local exchange buildings.

X24.4 We have not incorporated re-use of Chorus' existing copper network assets when designing the modelled network. This is to help avoid the risk of suppressing or undermining efficient network investment in unbundling by access seekers (which would not have access to these assets). This approach is consistent with our framework of modelling the forward-looking costs incurred over the long run by a hypothetical efficient operator building and operating a new telecommunications network from scratch. Consistent with this framework, we have allowed for some infrastructure sharing with other utilities, such as electricity companies, where these assets can be accessed.[9]

We estimated the additional costs of a hypothetical efficient operator to supply UBA

X25 Having designed a hypothetical efficient network to supply the UBA increment, we then determined the costs for each network element.

X26 When determining these costs, we have valued assets at their current (or replacement) cost, which reflects the cost of replacing an asset at today's prices. This is in contrast to an historic cost approach, which reflects the actual cost of an asset when originally installed.

X27 Valuing assets at their replacement cost is consistent with forward-looking costs incurred over the long run, as required by TSLRIC. This is also consistent with the conventional approach to TSLRIC modelling, and the objectives of TSLRIC-based prices more generally. As noted above, conceptually this approach is intended to promote efficient investment decisions by telecommunications companies considering whether to buy access to existing infrastructure, or to build their own alternative infrastructure.

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8 Layer 2 is the data link layer of the seven layer OSI model of computer networking. UBA is a layer 2 service. UCLL is an example of a layer 1 service. Layer 1 is the physical layer.

9 In particular, we have assumed 5% of underground infrastructure sharing with electricity distribution businesses.

X28 While factors such as the mandatory national averaging of UBA prices may compromise the direct link to efficiency, we consider it important to respect the conceptual basis of the TSLRIC methodology. This is particularly important for confidence in the New Zealand telecommunications regulatory framework, given the scale of investment involved in the UFB initiative (including further investment being sought to extend the UFB coverage area), likely future regulatory processes, and the corresponding investment by retail telecommunications providers.

X29 We made the following key decisions when estimating the costs the hypothetical efficient operator would incur in supplying the UBA increment.

X29.1 Trenching costs were based on independent estimates from a local civil engineering expert, Beca. Beca's analysis, based on a range of data sources, is broadly consistent with information on UFB trenching costs provided by Chorus. Although the extent of trenching required for UBA is far less significant than for UCLL, trenches and ducts are required to house the cables between the active equipment used to deliver the UBA service.

X29.2 A post-tax allowed rate of return on capital of 5.56% was used. This was estimated using the simplified Brennan-Lally version of the capital asset pricing model, which reflects New Zealand's taxation system. We received independent expert advice from Dr Martin Lally and Oxera to assist us when estimating the allowed rate of return. As discussed below, we considered adjusting the allowed rate of return, but determined that this was not warranted in the circumstances.

X29.3 We excluded costs associated with network elements that exist as a direct result of the Rural Broadband Initiative subsidy received by Chorus – specifically, upgrades to active cabinets and DSLAMs on the edge of the network.[10] This is to avoid Chorus over-recovering its costs through UBA prices.

X29.4 We based the ongoing operating costs associated with the day-to-day running of the network on the operating expenditure noted in Chorus' financial accounts. We considered Chorus' actual operating expenditure to be appropriate, given we have assumed the underlying access network used when modelling UBA to be similar to Chorus' existing copper network.

We have not adjusted our central TSLRIC estimate

X30 Some uncertainty is inherent in TSLRIC modelling, because of the many judgements involved when building the model. We considered whether to adjust our central TSLRIC estimate due to this uncertainty. Specifically, an adjustment may be warranted where the costs are asymmetric – that is, where the costs to consumers from setting the price too low are likely to be significantly greater than the costs from setting the price too high (or vice versa).

[10] Consistent with the TSRLIC modelling for UCLL, we assumed the hypothetical efficient operator receives a similar level of capital funding to Chorus, to the extent it applies to provision of the regulated service.

X31 We have not adjusted our central TSLRIC estimate up or down. We found no basis for making an adjustment to better promote competition for the long-term benefit of end-users, ensure appropriate pricing relativity between UCLL and UBA, or address any potential bias about inputs into the TSLRIC model.

X32 In reaching this view, we carefully considered submissions that questioned whether we should make an adjustment to signal sufficient returns to investment (through the allowed rate of return on capital), or encourage benefits associated with faster migration to UFB. We took into account independent expert advice from Professor Ingo Vogelsang, Professor Carlo Cambini, Professor Ian Dobbs, and Oxera.

X33 We followed the same approach as used in the energy sector when we considered adjusting the allowed rate of return on capital for UBA.[11] However, we reached a different conclusion due to the different context and evidence in this case.

We made several changes to the TSLRIC model following the July draft determination

X34 The UBA additional costs we have determined are between $0.15 and $0.29 higher than in our July 2015 draft determination (depending on the year of the regulatory period). We made several changes to the model and its inputs after considering stakeholders' views. Some of these changes caused the price to go up, and some caused the price to go down, but overall they led to this slight price increase.

X35 The most significant changes since the July 2015 draft determination are:

X35.1 trenching costs have been updated;[12]

X35.2 the cost of capital decreased, largely due to a fall in interest rates since July; and

X35.3 we made other technical improvements and corrections to the model, as suggested by stakeholders.

X36 We recognise that the aggregate UCLL and UBA price for 2016 is $41.19, which is $3.69 higher than the current entry level UFB wholesale price of $37.50.[13] The UFB price covers largely urban areas comprising 75% of New Zealand, whereas the aggregate UCLL and UBA price that we have set in this pricing review determination is a geographically-averaged price covering both urban and non-urban areas.

X37 Our model allows us to calculate the equivalent TSLRIC derived price for urban areas which relates to 72% of lines. The combined UCLL urban and UBA price is $31.60 in 2016, below the current UFB price.

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11 We currently apply an uplift to our best estimate of the cost of capital for energy businesses regulated under Part 4 of the Commerce Act, to help minimise the risk of significant costs to consumers associated with outages on energy networks.

12 In particular, there were largely offsetting changes to trenching costs due to amendments to the duct sizes used and the weightings applied to different trenching methods.

13 From the 1st July 2016 the price increases by $1 and the consequential price differential to the equivalent wholesale regulated product reduces by $1 for the remainder of 2016.

We have also determined non-recurring charges for UBA

X38 This determination also sets non-recurring charges for UBA. These non-recurring charges (NRC) enable Chorus to recover costs associated with one-off events (or events that occur irregularly), such as new connections.

X39 In determining the non-recurring charges, we started with current rates from Chorus' service companies, and applied adjustments based on both international task times and national labour rates (where possible). Overall, these adjustments have reduced the forecast non-recurring charges.

We have not backdated prices

X40 The UBA prices we have determined will take effect from 16 December 2015, and will not be backdated. If implemented, backdating would have compensated Chorus for the difference between the previous UBA price ($10.92, set under the IPP) and the higher TSLRIC prices set in this determination.[14]

X41 Having considered the likely impact on Chorus, investors, retail telecommunications providers and end-users, the majority view (of Commissioners Gale and Welson) is to not backdate prices. On balance, we consider that backdating would not promote competition for the long-term benefit of end-users in this case.

X42 Commissioner Duignan disagrees with this assessment, and considers that the TSLRIC prices should take effect from 1 December 2014. This would have resulted in access seekers compensating Chorus for the difference between IPP and FPP prices over the past year.

[14] However, if the FPP price was lower than the IPP, backdating would have involved Chorus compensating its customers (telecommunications retailers) for the price difference.

Chapter 1: Introduction and process

Purpose of this determination

1. This determination sets the price for the UBA service provided by Chorus, using the final pricing principle (FPP) as set out in the Telecommunications Act 2001 (Act).

2. For UBA the FPP is "the price for Chorus's UCLL network plus TSLRIC of additional costs incurred in providing the unbundled bitstream access service"[15] (as defined in the Act), which we discuss in Chapter 2. We took the price for the UCLL service and added to it the TSLRIC of the additional costs incurred in providing the UBA service. In this determination we are only pricing the "additional costs" component of providing the UBA service (which is the "UBA increment").

3. After having conducted a number of consultation rounds throughout the UBA pricing review determination process, we have determined:

   3.1 the TSLRIC prices for monthly recurring charges for the UBA service;

   3.2 the TSLRIC prices for non-recurring charges (NRC) for the UBA; and

   3.3 our decision on backdating.

4. We have determined the following monthly recurring charges for the Basic UBA service:[16]

Table 1.1: Monthly recurring charges for the UBA service

National (geographically averaged)	Year 1	Year 2	Year 3	Year 4	Year 5
Basic UBA additional costs ("UBA increment")	$11.44	$11.22	$11.01	$10.83	$10.67
UCLL (as set in the UCLL determination)	$29.75	$30.22	$30.70	$31.19	$31.68
Basic UBA (total)	$41.19	$41.44	$41.71	$42.02	$42.35

15 Telecommunications Act 2001, Schedule 1, Part 2, Subpart 1.

16 As explained in Chapter 4, we have also set prices for the Enhanced UBA variants specified in the UBA STD.

5. NRC are charges levied on access seekers to recover time and material costs incurred outside of the UBA monthly recurring charges. They apply to one-off transactions which are used to instigate, modify or cancel either an individual UBA service or a common component of the UBA service. NRC are listed in the UBA STD. Examples of NRC include new connections, service transfers, and relinquishments.

6. In determining TSLRIC-based NRC we took into account Chorus' service company costs with an efficiency adjustment based on task times seen in other jurisdictions. We have also had regard to differences in labour productivity in the jurisdictions considered. Overall these adjustments have resulted in a 26% reduction in forecast NRC costs. Chapter 6 explains the scope, approach, and modelling choices we used to set prices for NRC.

7. The final prices that we have set in this pricing review determination are not to be backdated.[17] Although we have discretion to implement backdating, we consider that backdating would not best give effect, or be likely to best give effect, to section 18. Commissioner Duignan considers backdating to 1 December 2014 should apply. Chapter 7 explains our approach to backdating.

8. As explained further below, we consulted on issues for the UBA and UCLL services at the same time.

Background

The UBA service

9. The UBA service is a designated access service described in the Act as follows:[18]

Chorus's unbundled bitstream access

Description of service:	A digital subscriber line enabled service (and its associated functions, including the associated functions of operational support systems) that enables access to, and interconnection with, that part of a fixed PDN that connects the end-user's building (or, where relevant, the building's distribution frame) to a first data switch (or equivalent facility), other than a digital subscriber line access multiplexer (DSLAM) To avoid doubt, unless otherwise requested by the access seeker, the supply of this service must not be conditional on a requirement that the access seeker, end-users, or any other person must purchase any other service from the access provider

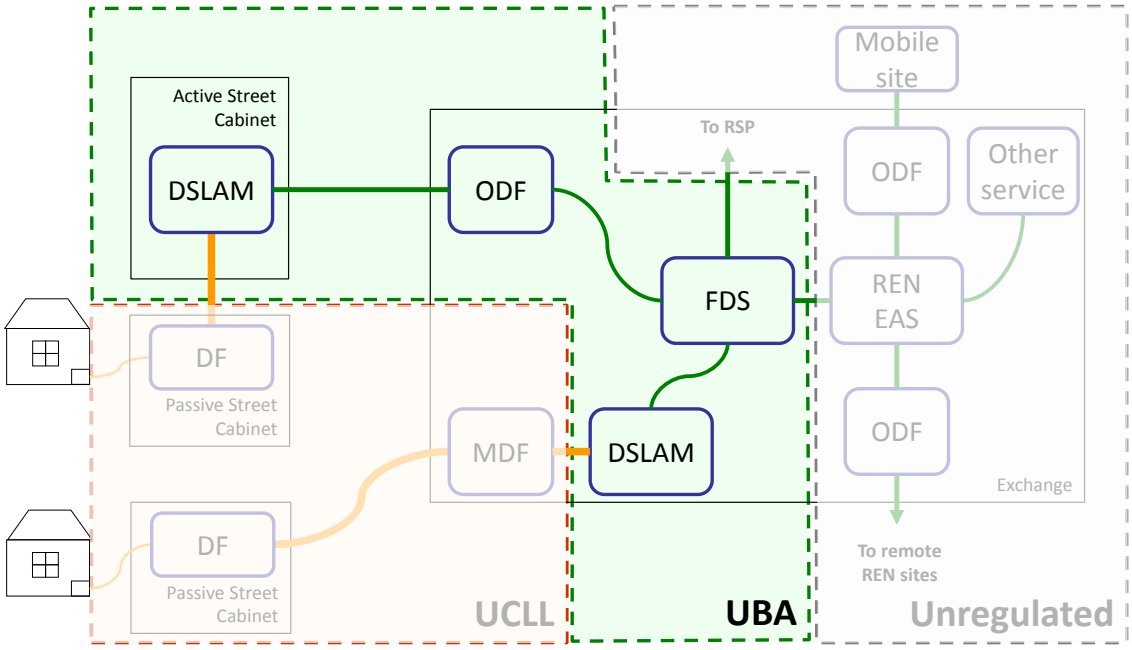
10. The scope of this determination is limited to determining the cost of the "UBA increment". Therefore, because we are concerned only with identifying the TSLRIC of the UBA increment, whenever we refer to the UBA network or UBA service we are

17 Backdating means to set an earlier start date for the FPPs than the date of this final determination.

18 Schedule 1, Part 2, Subpart 1.

(unless otherwise indicated) referring to the core network highlighted in green in Figure 1.1 below.[19]

Figure 1.1: Core network model scope



Developments since the Telecom-Chorus separation date

11. Since December 2011 (the "Telecom-Chorus separation date"), Chorus has operated the fixed-line access network that carries voice and data traffic between local exchanges and end-user premises in New Zealand. This is sometimes referred to as the "copper network", with each individual link referred to as a "local loop".

12. Access seekers who wish to offer broadband (internet) services using the copper network may do so by purchasing the UBA, UCLL, or SLU services from Chorus. These services are regulated under the Act.

13. An access seeker may take the UCLL or SLU service and install its own equipment in the exchange (UCLL) or cabinet (SLU). This is often called "unbundling". Alternatively, they may take the UBA service.

14. When Chorus provides the UBA service, Chorus handles the broadband traffic between the end-user and the handover point on behalf of the access seeker. That is, Chorus manages and provides access to the local loop, the exchange or cabinet (and the equipment in it, including a DSLAM), and the aggregation path to transport the broadband traffic to the "data switch" containing the handover point. The UBA service allows an access seeker to offer a broadband service to end-users without needing to install its own broadband equipment. The UBA increment is the cost that unbundlers avoid by installing their own DSLAM equipment in Chorus exchanges and/or cabinets.

[19] As explained in Attachment B (MEA for UBA), we have modelled the MEA for the UBA service based on the underlying copper access network.

15. In 2011 the Government implemented the UFB initiative, which aims to expand and develop New Zealand's broadband services. The UFB initiative resulted in changes to the Act (as explained below).

16. At that time, the UFB initiative involved the deployment of a fibre-to-the-home (FTTH) network, covering 75% of New Zealand's population.[20] Partial Government funding for the period between construction of the new network and migration of end-users to it assisted the deployment. Depending on the region, Chorus or one of the three local fibre companies (LFC) is deploying the FTTH network.

17. Following Telecom's decision to participate in the UFB initiative, the Act was amended:[21,22,23]

    17.1 Chorus was structurally separated from Telecom on the Telecom-Chorus separation date.

    17.2 Chorus was prohibited from providing retail services, and entered into undertakings to provide wholesale services on a non-discriminatory basis.[24]

    17.3 The structural separation meant a retail-minus approach could no longer be used to determine the price for the UBA service. This is because under a retail-minus pricing principle, the wholesale price that Chorus could charge for the UBA service would be derived from prices of retail services which Chorus was prevented from supplying. As a result, Chorus' revenue would be determined by the retail prices of independent operators.[25]

    17.4 Chorus' UBA price temporarily would continue to apply to existing lines until three years from the separation date (that is, until 1 December 2014).[26] From the end of that period, the price set by the new IPP or FPP (as applicable) for the UBA service would apply,[27] and for this purpose we were required to review the UBA STD under section 30R of the Telecommunications Act in order to implement the new cost-based pricing principles.[28] The purpose of

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20 In late 2014 the Government announced its intention to expand the UFB project to reach at least a further 5% of the population (being 80% in total) (http://www.crownfibre.govt.nz/ufb-initiative/ultra-fast-broadband-extension/).

21 *Chorus* v *Commerce Commission* [2014] NZCA 440 at [16].

22 Telecommunications (TSO, Broadband, and Other Matters) Amendment Bill 2010 (250-2) (select committee) at 1–2.

23 Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011 (the 2011 Act).

24 Section 51 of the 2011 Act, inserting new part 2A into the 2001 Act, including new subpart 3 (line of business restrictions).

25 The 2011 Act specified that Chorus' UBA price set in Telecom's standard terms determination of 12 December 2007 was to continue to apply to existing lines until three years from the 30 November 2011 separation of Chorus and Telecom (1 December 2014) – section 79(2) of the 2011 Act.

26 Telecommunications (TSO, Broadband and Other Matters) Amendment Act 2011, section 79(2).

27 Section 79(3).

28 Section 77 of the Telecommunications (TSO, Broadband and Other Matters) Amendment Act 2011. We were required to make reasonable efforts to complete the section 30R review before the expiry of 1 year from separation day (ie, 1 December 2012) and any FPP price review, if sought, by 1 December 2014. In

the UBA price freeze was to insulate Chorus and access seekers (particularly unbundlers who may have made investment decisions based on the level of the UBA price) from an immediate potential price drop and provide them with time to enable them to adapt to the new pricing principle.[29]

17.5 In the 2011 amendments, Parliament created the new unbundled copper low frequency (UCLF) service. The UCLF service enabled access seekers including Telecom (now Spark) to supply a voice service to end-users, in circumstances where Telecom was prevented from purchasing the UCLL service until 1 December 2014.[30]

17.6 Parliament also introduced two new clauses to Schedule 1 to the Act. Clause 4A required the Commission to determine a geographically averaged price for the UBA, UCLL, and UCLF services. Geographically averaged prices took effect from separation date for the UBA and UCLF services, but not until 1 December 2014 for the UCLL service.[31] Clause 4B concerns double recovery, and is discussed elsewhere in this determination.

17.7 Section 18(2A) was inserted,[32] in particular in connection with the UFB initiative, providing that consideration must be given to the "incentives to innovate that exist for, and the risks faced by, investors in new telecommunications services that involve significant capital investment and that offer capabilities not available from established services."

Review of the Act

18. The Ministry of Business, Innovation and Employment (MBIE) is currently conducting a review of the Act to assess "whether the current regulatory framework for telecommunications in New Zealand is the optimal one for competition, investment and innovation after 2020".[33]

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the result, we completed the section 30R review on 5 November 2013, and this decision completes the FPP price review that was sought.

29 Ministry of Economic Development "Regulatory impact statement: regulatory issues resulting if Telecom becomes a partner in the ultra-fast broadband initiative" 11 April 2011, paragraphs [45]-[52].

30 See the description of the UCLL service in schedule 1, part 2, sub-part 1 of the Act.

31 Commerce Commission, Decision No. 739: "Final decision in relation to the review of the UCLL, UBA and Sub-loop Services standard terms determinations (STDs) for the purpose of implementing clause 4A of the Telecommunications Amendment Act 2011" 24 November 2011, paragraph [52]; sections 73 and 74 of the Telecommunications (TSO, Broadband and Other Matters) Amendment Act 2011.

32 Section 19 requires us to consider "the purpose set out in section 18". That purpose is found in section 18(1). Section 18(2) and (2A) identify particular matters that we must take into account when making the overall consideration of what promotes competition for the long-term benefit of end-users.

33 MBIE "Telecommunications Act review: Public Questions and Answers", p. 1.

19. Some submitters suggested that we should take into account this review (and its possible outcomes) when making our determination.[34] However, we are required to apply the law as it currently stands. Our assumptions or decisions cannot be influenced by a policy process that may result in amendments to the Act yet to be decided or enacted.

Process to date

We determined an updated benchmarked price for the UBA service

20. Prior to the structural separation of Chorus and Telecom on 1 December 2011, the Act provided for the UBA price to be determined on a "retail-minus" basis. The Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011 (Amendment Act) changed the UBA pricing principle from retail-minus to a forward-looking cost-based price.

21. The new IPP required us to set a benchmarked price based on cost-based prices in comparable countries. The Amendment Act froze the retail-minus prices for three years, so that the new forward-looking cost-based price would only apply from 1 December 2014.[35] The frozen retail-minus price for the UBA increment was $21.46.

22. On 5 November 2013, we set IPP prices for the additional cost component of the regulated monthly recurring UBA service charges as follows:[36]

Table 1.2: Monthly recurring IPP prices for UBA additional cost component

	UBA additional cost component	UCLL component[37]	Total monthly price
BUBA	$10.92	$23.52	$34.44
EUBA 40	$13.25	$23.52	$36.77
EUBA 90	$13.82	$23.52	$37.34
EUBA 180	$14.85	$23.52	$38.37

23. In December 2012 we also set a new IPP price for the UCLL service monthly charge.

34 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, p. 5; and Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015 at [2.c], [133] and [134].

35 Telecommunications (TSO, Broadband, and Other Matters) Amendment Act 2011, s 77(2).

36 Commerce Commission "Unbundled Bitstream Access Service Price Review, Decision [2013] Final determination to amend the price payable for the regulated service Chorus' unbundled bitstream access made under section 30R of the Telecommunications Act 2001" (5 November 2013), NZCC 20, paragraph [7].

37 The UCLL component was determined by our December 2012 UCLL IPP.

Our consultations during the process to determine TSLRIC cost-based prices for the UBA service

24. In January 2014 we received five applications for a pricing review determination of the prices we set for the UBA service.[38] In February 2013 we received applications for a pricing review determination for the UCLL service in accordance with the UCLL FPP.

25. Chorus, in parallel with its FPP application, appealed our UBA IPP determination to the High Court under section 60 of the Act. Chorus' appeal was dismissed,[39] as was Chorus' subsequent appeal of the High Court judgment to the Court of Appeal.[40]

26. In February 2014 we released a UBA process and issues paper, which set out our preliminary view on the modern equivalent asset (MEA) for the additional costs component of the UBA service, and our proposed timetable for completing the FPPs for the UBA and UCLL services.[41] The UBA process and issues paper also sought the views of parties on the conceptual issues associated with the TSLRIC methodology raised in the December 2013 process and issues paper on the UCLL service, but in relation to the UBA service.[42]

27. From this point on, we have since consulted on issues for the UCLL and UBA services at the same time. As explained further in this Chapter, our consultation process was a critical factor in developing the reasoning that underlies our thinking.

28. Following our consideration of submissions and cross submissions, in March 2014 we published further consultation papers which sought views on:[43]

    28.1 the role of relativity in our price setting process;[44] and

    28.2 the preliminary legal views of our external legal counsel Dr James Every-Palmer on: (i) the relevant considerations for determining the MEA for the UCLL service; and (ii) considerations relevant to backdating the FPP prices.

29. Also in March 2014 we published a technical consultation paper on our proposed framework for estimating the weighted average cost of capital (WACC) for the UBA and UCLL pricing reviews.[45]

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38 Applications were received from Chorus New Zealand Ltd, Telecom New Zealand Ltd (now Spark New Zealand Ltd), Vodafone New Zealand Ltd, CallPlus Ltd and Orcon Ltd. Orcon has since withdrawn its application. This has not affected the scope of our pricing review determination.

39 *Chorus v Commerce Commission* [2014] NZHC 690.

40 *Chorus v Commerce Commission* [2014] NZCA 440.

41 Commerce Commission "Determining a TSLRIC price for Chorus' unbundled bitstream access service under the final pricing principle – Process and issues paper" (7 February 2014).

42 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" (6 December 2013).

43 Commerce Commission "Further consultation paper on issues relating to determining a price for Chorus' UCLL and UBA services under the final pricing principle" 14 March 2014; and Commerce Commission "Further consultation paper on issues relating to determining a price for Chorus' UCLL and UBA services under the final pricing principle – supplementary paper" 25 March 2014.

44 Section 19(b) of the Telecommunications Act 2001, together with Schedule 1, requires us to consider the relativity between the UCLL service and the UBA service regarding the application of section 18.

30. Following submissions and cross submissions on our WACC technical consultation paper, we published advice we had received from:

    30.1 Dr Martin Lally, reviewing submissions on our proposed approach to estimating the cost of debt;[46] and

    30.2 Oxera Consulting (Oxera), reviewing the company-specific components of the WACC for the UBA and UCLL, such as the asset beta and leverage components.[47]

31. Two workshops were held by Commission staff, on 19 December 2013 and 28 March 2014, to help interested parties to understand TSLRIC better.

32. In April 2014 we held a modelling methodology presentation for interested parties with our external consultants, TERA Consultants (TERA). At that presentation, TERA shared its knowledge and experience about TSLRIC cost modelling processes.[48]

33. In June 2014 we published a TSLRIC literature review on UBA and UCLL costing, prepared by TERA.[49]

34. In July 2014 we published a regulatory framework and modelling approach paper, seeking views on the following:[50]

    34.1 our preliminary view of the regulatory framework for our UBA and UCLL TSLRIC cost modelling exercise; [51]

    34.2 our preliminary views on a number of fundamental assumptions for the development of a TSLRIC cost model for the UBA and UCLL services; [52]

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45 Specifically, the paper: (i) sought views on the approach to estimating certain WACC parameters for the UCLL and UBA services; (ii) discussed the linkages with the cost of capital input methodologies (IMs) we determined under Part 4 of the Commerce Act 1986; and (iii) highlighted issues on which we would be seeking independent expert advice.

46 Dr Martin Lally - Capital Financial Consultants Ltd "Review of Submissions on the Cost of Debt and the TAMRP for UCLL and UBA services" 13 June 2014.

47 Oxera "Review of the beta and gearing for UCLL and UBA services" June 2014.

48 Building a TSLRIC model is a significant undertaking. We appointed TERA to develop our TSLRIC models given its recent experience in building TSLRIC models in other jurisdictions. TERA were selected for the role after the following process: we issued a request for proposals (RFP) for modelling consultants on 22 January 2014, asking for proposals by 14 February 2014. Commission staff reviewed the proposals with input from a co-opted Australian Competition and Consumer Commission (ACCC) staff member. We identified a shortlist of consultants to interview in Wellington in the week of 10 March 2014. Based on these interviews and the review of proposals, we identified TERA as our preferred consultant.

49 TERA Consultants "TSLRIC literature review on UBA and UCLL costing approaches" June 2014.

50 Commerce Commission, "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014.

51 These included the role of section 18, our TSLRIC objectives, our requirement to set forward-looking costs and the implications of this on the potential re-use of Chorus' assets, as well as additional legal requirements.

52 Including the choice of the MEA, demand, depreciation, tax, price profiles, and cost allocation.

34.3 our preliminary views on backdating and the length of the regulatory period;

34.4 our revised process, which we updated in response to: (i) concerns raised by parties during the March 2014 consultation; and (ii) requests to consider additional matters as part of the TSLRIC cost modelling exercise; and

34.5 expert papers prepared by Professor Ingo Vogelsang and TERA.

35. After our consultation on the July 2014 regulatory framework and modelling approach paper, we began modelling the TSLRIC cost of the UBA and UCLL services.

36. In September 2014 we published an open letter to parties in response to concerns expressed in submissions and cross submissions on our July 2014 regulatory framework and modelling approach paper.[53] We highlighted that:

36.1 we were consulting more extensively than we were legally obliged;

36.2 we had shared aspects of our framework as those emerged and developed, and shared a more complete picture as some of our views crystallised; and

36.3 our approach to consultation was adopted to help parties develop their understanding and keep them engaged throughout the process, rather than working in isolation and only sharing our fully developed thinking at the final stages of the process.

37. Also in September 2014 we released a consultation paper on our proposed approach to setting prices for NRC in the UCLL and UBA.[54]

38. In December 2014 we published our draft determination paper for the UBA service.[55,56] The draft total monthly price of the Basic UBA service was $38.39: this price included the UCLL component ($28.22) and the UBA increment ($10.17).

39. In December 2014 we also published our draft determination paper for the UCLL service.[57] Our draft decisions were:

39.1 the proposed monthly rental price for the UCLL service was $28.22; and

39.2 the proposed monthly rental price for the SLU service was $14.45.

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53 Commerce Commission "Open letter to parties regarding process" 5 September 2014, p. 2.

54 Commerce Commission “Consultation on setting prices for service transaction charges for UBA and UCLL services” 25 September 2014. The paper set out our preliminary views, and sought submissions, on (i) the non-recurring charges; (ii) the appropriate approach to setting prices for the non-recurring charges; and (iii) whether we can merge some non-recurring charges into other charges.

55 That draft determination did not set out the non-recurring charges and our approach to backdating.

56 Commerce Commission “Draft pricing review determination for Chorus’ unbundled bitstream access service” 2 December 2014.

57 Commerce Commission “Draft pricing review determination for Chorus’ unbundled copper local loop service” 2 December 2014. This draft determination paper did not include our draft decisions on non-recurring charges or our approach to backdating.

40. We emphasised that these prices were not final, and that the purpose of these drafts was to seek input from stakeholders. Matters that might impact on the final price that we still needed to work through with industry were identified. In particular, these draft determinations did not contain our decisions on the proposed pricing of NRC or whether we proposed to backdate the recurring prices.

41. At the same time, we published two reports submitted by Chorus on its own cost model prepared by its experts Analysys Mason.

42. On 19 December 2014, we published a process and issues update paper for the UBA and UCLL review determinations where we: [58]

    42.1 provided an update on the process, including granting an extension of one month for submissions on the UBA and UCLL draft determination papers, to allow interested parties to make considered submissions; and

    42.2 shared our emerging views in favour of backdating and sought submissions.

43. We received submissions and cross submissions on the draft determination papers for the UBA and UCLL services between February and May 2015.[59,60]

44. On 2 April 2015 we published a paper:[61]

    44.1 outlining the process and agenda for the upcoming conference; and

    44.2 updating parties on our proposed approach to testing and quantifying the need for any potential uplifts to the TSLRIC price for UCLL and/or the mid-point WACC estimate for UCLL and UBA. This was accompanied by a paper from Professor Carlo Cambini.[62]

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58 Commerce Commission "Process and issues update paper for UCLL and UBA pricing review determinations" 19 December 2014.

59 In 3 February 2015 Vodafone requested an extension to the deadline for cross submissions on geospatial modelling, which we allowed (Vodafone "Deadline for submissions on UBA and UCLL FPP draft determinations – request for extension to deadline for cross submissions" 3 February 2015 and Commerce Commission "Request for extension to deadline for cross submissions: UBA and UCLL FPP draft determinations" 5 March 2015).

60 We received letters from Vodafone and Spark expressing concern that the CEG cross submission introduced new material, and about being unable to respond to CEG's evidence (Spark "UBA and UCLL Draft FPP Review Cross submission – CEG Uplift report" 31 March 2015; and Vodafone "Admission on CEG Report in Cross submission Process" 31 March 2015). We accepted that not allowing other parties to this process the opportunity to cross-submit on CEG's evidence before releasing our further draft determinations might create fairness issues. Therefore, we decided to allow time for parties to cross-submit on CEG's evidence (Commerce Commission "Agenda and topics for the conference on the UCLL and UBA pricing reviews" 2 April 2015, paragraphs [18]-[22]).

61 Commerce Commission "Agenda and topics for the conference on the UCLL and UBA pricing reviews" 5 March 2015" 2 April 2015.

62 Prof. Carlo Cambini "Economics aspects of migration to fibre and potential welfare gains and losses from an uplift to copper prices" 15 March 2015.

45. On 14 April 2015 we published:

    45.1 a report from TERA with questions regarding Chorus' model;[63] and

    45.2 a report from Analysys Mason on Chorus' UCLL and UBA models.[64]

46. From 15 April 2015 to 17 April 2015 we held a conference, the purpose of which was to clarify and test matters that arose during the submissions process. The conference transcript is available on our website.

47. In May 2015 we received submissions on our proposed analytical frameworks for considering an uplift to the TSLRIC price and/or WACC.

48. On 5 July 2015 we published our further draft determination paper for the UBA service,[65] which is our statutory draft determination.[66] Our July 2015 further draft determination proposed the following prices for the UBA service:

Table 1.3: Further draft monthly recurring charges for the Basic UBA service

Service	Year 1	Year 2	Year 3	Year 4	Year 5
Basic UBA additional costs ("UBA increment")	$11.15	$10.97	$10.80	$10.65	$10.52
UCLL (as set in the July 2015 further draft determination, subject to the final determination)	$26.74	$27.18	$27.63	$28.09	$28.56
Basic UBA (total)	$37.89	$38.15	$38.43	$38.74	$39.08

49. The UBA charges in the July 2015 further draft determination also included NRC.[67]

50. Attached to the July 2015 UBA further draft paper we also published a number of papers prepared by our expert consultants, including:

    50.1 a model reference paper, a model specification paper (public and confidential versions), and model documentation paper (public and confidential version) for the recurring charges cost model prepared by TERA;

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63 TERA "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services - Questions regarding Chorus model" January 2015.

64 Analysys Mason "Report for Chorus to provide to the Commerce Commission - Response to TERA questions regarding the Chorus UCLL and UBA models" 29 January 2015.

65 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 5 July 2015.

66 Section 47(a) of the Act.

67 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 5 July 2015, Chapter 5.

50.2 a paper summarising changes made to the recurring charges cost model since the December 2014 UBA draft determination prepared by TERA;

50.3 a methodology paper prepared by TERA for the NRC cost model;

50.4 a paper reviewing submissions on the December 2014 UBA draft determination paper prepared by TERA;

50.5 a paper prepared by TERA reviewing the Analysys Mason cost models;

50.6 a paper prepared by TERA on international comparators;

50.7 a paper prepared by Beca that responded to submissions on the corridor cost analysis;

50.8 a report on the corridor cost analysis new rates and general recommendations prepared by Beca;

50.9 a paper outlining the corridor cost analysis of trenching and ducting rates in New Zealand prepared by Beca;

50.10 a paper prepared by Professor Ingo Vogelsang responding to comments on his 25 November 2014 paper, "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand", published with our December 2014 draft determination;

50.11 a paper on potential welfare gains and losses from an uplift to copper prices prepared by Professor Carlo Cambini;

50.12 a paper prepared by Professor Ian Dobbs, commenting on the application of the Dobbs 2011 model;

50.13 a paper prepared by Oxera, reviewing submissions on WACC;

50.14 a paper prepared by Oxera, providing advice on whether a WACC uplift might be appropriate;

50.15 a paper prepared by Professor Ingo Vogelsang, reviewing the Oxera advice on a WACC uplift;

50.16 a paper prepared by New Zealand Institute of Economic Research (NZIER), providing advice in response to submissions about price trends; and

50.17 a model prepared by NZIER that outlines historical series and data trends.

51. In July 2015 we also published our further draft determination paper for the UCLL service. The further draft total monthly prices for the UCLL and SLU services were the following:[68]

Table 1.4: Further draft monthly recurring charges for the UCLL and SLU services

National (geographically averaged)	Year 1	Year 2	Year 3	Year 4	Year 5
UCLL	$26.74	$27.18	$27.63	$28.09	$28.56
SLU	$11.66	$11.79	$11.92	$12.05	$12.19

52. We received submissions and cross submissions on the July 2015 further draft determination papers for UBA and UCLL services between August and September 2015.

53. We received about 50,000 emails prompted by a campaign launched by Spark. We welcomed greater consumer participation in the determination process. We have reviewed these emails and considered the relevant ones in our decision-making process. We note that:

    53.1 nearly all of the 50,000 emails seemed to be automatically generated in May, June and July 2015, after submitters entered an e-mail address into a form on the Spark website;[69]

    53.2 we acknowledged receipt of these emails,[70] following which we received approximately 20 emails in response;

    53.3 we reviewed these emails. We did not publish them. We believe that some people might not have had the expectations that their views would become public. Also, some of the emails contain offensive language[71] and/or were

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68 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 5 July 2015.

69 The content of the emails was "To Whom It May Concern. I wish to voice my disapproval of the proposed Chorus copper network price increase. This move would make the price Chorus charge 80% higher than that of comparable countries. I believe internet access in New Zealand should be available to as many people as possible, and I think the proposed increase of prices by Chorus will have a negative effect on accessibility. Please take my view into account when weighing this very important decision. Sincerely, [name of the person]".

70 The content of these emails was: "Thank you for your email. The Commission welcomes submissions on its review of the prices that Chorus charges for its local copper lines and broadband service. The next window for receiving submissions is following the release of the further draft determinations on 2 July 2015. We will have regard to your email at that time. Further information on the pricing review, including the process to date, and our future timetable, can be found at http://www.comcom.govt.nz/unbundled-copper-local-loop-and-unbundled-bitstream-access-services-final-pricing-principle/. Regards, Commerce Commission".

71 Unpublishable.

submitted by consumers who did not fully understand the task we were given by Parliament;[72]

53.4 we also received approximately 30 submissions using another template letter which seemed to have been provided by Spark;[73]

53.5 from July 2015 (ie, after the further draft papers were published) to November 2015, we received about 2,200 emails. Again, we believe the emails were automatically generated when Spark customers added their e-mail addresses to a form on the Spark website;[74]and

53.6 nearly 2,000 of these emails appeared to be made up or incorrect e-mail addresses, as our acknowledgements of these either bounced back as undeliverable or prompted queries along the lines of "how did you get my e-mail address?"

Criticisms regarding our process

54. Some submitters criticised our decision-making process.

55. We were conscious of the need to strike a balance between giving parties an adequate opportunity to contribute and the need to make a decision promptly in the interests of giving market participants certainty. We approached the determination process with an open mind, and adjusted our process, decisions and reasons in response to submitters' contributions.

56. We therefore disagree with criticisms from some participants about our process. We respond to some particular criticisms below.

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72 eg, emails (i) asking "Why are you setting prices the of broadband, since when did you become a price regulator?" (sic) and (ii) arguing that "their are some countries that give concessions to Pensioners. If New Zealand did this. then perhaps the Providers would retain more of their customers instead of losing them" (sic).

73 Submissions available at http://www.comcom.govt.nz/regulated-industries/telecommunications/regulated-services/standard-terms-determinations/unbundled-copper-local-loop-and-unbundled-bitstream-access-services-final-pricing-principle/.

74 The content of these emails was: "Dear Commissioners YOU HAVE A CHANCE TO MAKE NEW ZEALAND'S INTERNET FAIRER. Thanks for highlighting the Be Counted campaign in your recent update – it's great to be part of a campaign that is having a real impact on New Zealand's future. It's also great that you've taken back-dating off the table. Spark has said it'll pass that value back to its customers in a fair and transparent way if you confirm your decision. I understand the Commission says our country's geography means it costs more to provide broadband here, but there is still more you can do to better protect the interest of customers in your final decision. Your proposed broadband line charges are still around $4 a month per line above current charges – making our line charges much higher than comparable countries. The outcome of having higher line charges simply harms New Zealand internet and phone users and transfers benefits to Chorus. These charges put our country at a significant disadvantage and cannot be the right outcome for New Zealand. Prices for internet services have been coming down in recent years – and these reductions have been matched by increases in data allowances and increased services. This has been great for customers like me. I hope you'll continue to defend the interests of ordinary internet and phone users and reduce the line charges we pay to connect to the world. Thank you. [name of the person]"

Speed of the decision-making process

57. Some submitters criticised the speed of our decision-making process. We responded to these criticisms in the July 2015 further draft determinations.[75]

58. We reconsidered our process again before this making this final determination. For transparency, we explain below the reasons why we consider our process was sound and appropriate.

59. Chorus favoured a speedier decision-making process.[76] Wigley and Company argued that our process was conducted too quickly. [77,78] Spark recognised the balance that we attempted to strike, submitting that the "Commission has been right to permit time to properly consider the issues as this is an important decision".[79]

60. Wigley and Company also submitted that we were required to hold a conference after the July 2015 further draft determinations because the December 2014 draft determinations did not qualify as the "statutory draft determination" required by the Act.[80]

61. As explained in the July 2015 further draft determinations:

    61.1 we believe that our timetable and consultation process has been appropriate;

    61.2 we have conducted a number of consultation rounds throughout this pricing review determination process. We have consulted more extensively than we were legally required. We have consulted to the extent we considered to be necessary for the development of our thinking;[81] and

    61.3 we were not required to hold a conference after the July 2015 further draft determinations.[82] We accepted that in many previous processes we held conferences after the statutory drafts. However, in this process we considered it appropriate to hold the 15 April 2015 to 17 April 2015

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75 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 5 July 2015 at [62]-[66].

76 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations", 20 February 2015, paragraph [72].

77 Mr Wigley confirmed to us towards the end of the consultation process that Wigley and Company submissions were presented on behalf of InternetNZ, Consumer, TUANZ and CallPlus.

78 eg, Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015 at [10.9].

79 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015 at [1].

80 ie, Letter from Wigley and Company to Stephen Gale (Telecommunications Commissioner) enquiring if we will revisit our timetable (13 March 2015) and "Commentary on behalf of consumer interests on Commerce Commission paper dated 2 April 2015 as to TSLRIC and WACC uplifts" 13 April 2015.

81 This is consistent with the views expressed by us during the process (eg, Commerce Commission "Open letter to parties regarding process" 5 September 2014, p. 2).

82 As previously explained by us to Wigley and Company (Commerce Commission "RE: FPPs" 24 September 2014).

conference after the detailed December 2014 draft determinations but before the further draft determinations published in July 2015.[83]

Engagement in writing with "substantive submissions"

62. Wigley and Company also submitted that:[84,85,86]

62.1 we are legally obliged to engage in writing with "substantive" submissions;

62.2 as a consequence of the alleged failure to address all matters and adequately engage with submissions we had not produced "statutory draft determinations" that complied with the Act; and

62.3 in the absence of statutory draft determinations the "purported final determinations would not be lawful either and the Commission would need to start over with statutory draft determinations".

63. Wigley and Company submitted in particular that its April/May submission had not "been dealt with" in the July 2015 further draft determinations,[87,88] and that we had pre-determined the outcome of the process.[89]

64. We received and reviewed about 240 submissions and cross submissions during our consultation process. These submissions and cross submissions contained more than 6,000 pages. We published two comprehensive drafts addressing relevant submissions and cross submissions. Our UBA and UCLL final determinations (which contain our decisions and reasons) have more than 850 pages.

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83 We note that the conference is an additional consultation step not required by the Act. That is because we have, in terms of section 50 of the Act, consulted with persons other than parties to the determinations by inviting written submissions on our papers from all persons Section 50 of the Act: "If the Commission considers that persons, other than the parties to the determination, have a material interest in the matter to be determined, the Commission must, before preparing a determination under section 51, either consult those persons or hold conferences in relation to the matter" (emphasis added).

84 ie, Letter from Wigley and Company to Stephen Gale (Telecommunications Commissioner) enquiring if we will revisit our timetable (13 March 2015) and "Commentary on behalf of consumer interests on Commerce Commission paper dated 2 April 2015 as to TSLRIC and WACC uplifts" 13 April 2015.

85 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015 at paragraphs [3.4] and [3.11]).

86 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015 at [1.28] and [4.9].

87 Wigley and Company referred to the "11 April submission" and to the "11 May submission" in different parts of his August 2015 submission ("Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015 at paragraphs [1.2], [2.7] and others). We note that Wigley and Company did not present any submission dated 11 April 2015, but rather dated 13 April 2015. We understand that Wigley and Company was referring to his "Supplementary Submission on Commission's "Analytical Frameworks for Considering an Uplift to the TSLRIC Price and/or WACC"" dated 11 May 2015.

88 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015 at paragraphs [1.2]).

89 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015 at section 10.

65. We have taken our consultation obligations seriously, and carefully considered all submissions. In many cases our decisions and reasons evolved in response to them.

66. However, we do not consider that we are obliged by the Act or the general law to expressly address every point in every submission in either our draft or our final determinations.

Quantification of the impact of our decisions

67. Wigley and Company argued that we must quantify the impact of our decisions.[90,91] In particular, Wigley and Company argued that that we were required to conduct a "real world evidence based quantitative" cost-benefit analysis of the impact of our decisions, including whenever we applied section 18.[92]

68. Our view is that quantifying the benefits and detriments of our decisions can be a valuable part of our analysis where doing so is feasible and useful.

69. For instance, a number of sensitivity analyses in TERA's model specification report show how varying certain inputs can impact on the resulting TSLRIC price.[93]

70. However, we do not consider a quantitative cost-benefit analysis of every decision is helpful or necessary. Many of the choices we have been required to make cannot be reduced to quantitative terms, and therefore could not be meaningfully quantified in isolation.

71. Further, we are often required to balance disparate or abstract considerations that cannot be directly compared. These include, for example, the section 18 purpose statement, and the benefits of adopting an internally consistent model.

72. Even so, we have considered in particular the impact of the final TSLRIC price on the promotion of the section 18 purpose statement, and have undertaken quantitative analysis of whether an adjustment to the TSLRIC price and/or WACC was appropriate.

Criticisms on the transparency of our models

73. WIK and Analysys Mason submitted that parts of our July 2015 model were not transparent.[94,95] We disagree.

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90 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [6.8] to [6.16] and letter from Wigley and Company to Stephen Gale (Telecommunications Commissioner) enquiring if we will revisit our timetable (13 March 2015).

91 Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations", 13 August 2015 at paragraphs [4.9]).

92 eg, Wigley and Company "Commentary on behalf of consumer interests on Commerce Commission paper dated 2 April 2015 as to TSLRIC and WACC uplifts" 13 April 2015; Wigley and Company "Supplementary Submission on Commission's "Analytical Frameworks for Considering an Uplift to the TSLRIC Price and/or WACC" 11 May 2015 at item 4.

93 TERA "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services *Model Specification*" December 2015, section 10.5.

74. We have provided the relevant information to interested parties to comment on our modelling decisions. TERA conducted workshops with industry participants early in the process, when TERA explained how the first draft of the model was constructed. This was intended to help interested parties to interact with the model.[96]

75. Our December 2014 drafts and July 2015 further drafts included the reasons for our modelling decisions,[97] and a TERA report outlining the modelling changes made between our December 2014 drafts and our July 2015 further drafts. TERA's report highlighted changes made to the model in response to submissions.[98]

76. We have carefully considered all alleged errors that parties identified in TERA's model. Even so, as Chorus and Analysys Mason have pointed out, "a number of what WIK calls modelling "errors", such as fibre cabling costs and alleged double counting of joint costs, are in fact valid modelling assumptions".[99]

77. On WIK's specific criticism on the lack of transparency of the geospatial work,[100] we note that all relevant underlying data was supplied to the interested parties.

    77.1 We gave interested parties the opportunity to ask modelling questions outside of submissions, and we provided answers to all queries.[101]

    77.2 We published a document describing the production environment used to create the road and building network model.[102]

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94 eg, WIK "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" at [234].

95 Analysis Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" 11 August 2015 at item 2.3, p. 8.

96 At the Industry Kickoff workshop on 9 April 2014 TERA presented an overview of the intended modelling approach. On 2 December 2014 TERA presented the modelling approach and assumptions used for the December 2014 draft determinations.

97 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 5 July 2015, Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 5 July 2015.

98 TERA "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services *Implemented modelling changes*" June 2015.

99 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015 at [41].

100 eg, WIK "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" at [15].

101 Commerce Commission "FPP further draft model questions" 4 August 2015.

77.3 Nominated counsel of interested parties were supplied with a geospatial dataset that contained the spatial definition of the road segments and the buildings.

77.4 At least one submitter, Analysys Mason, commented extensively on the geospatial work.[103]

78. Finally, TERA has advised us that we were very transparent compared to other countries. In its experience, we are the only regulator that shares source data (obtained through section 98 notices) with the nominated counsel of interested parties. TERA also informed us that in some countries interested parties cannot access the models (eg, Luxembourg). In other countries, only the incumbent can access the regulator's model (eg, Romania and Croatia), and in other countries interested parties are only given access to high level figures of the regulator's models on request (eg, Ireland).

79. Transparency and openness are very important aspects of our decision-making process. We appreciated the extensive submissions from interested parties and their experts about our models. These submissions were a key element in the developing of our reasoning and decisions.

Other data and expert advice used as part of our pricing review

80. As noted above, we contracted TERA Consultants to assist in developing a cost model that has informed our determination of a TSLRIC price for the relevant services, and to advise on some other technical aspects of our determination. Although we relied on TERA's technical expertise in constructing the model, we maintained close oversight of that process. TERA's cost model was ultimately a tool which we used to help us in making our decisions.

81. We also sought specialised expert views on specific topics from Professor Ingo Vogelsang, Dr Martin Lally, Professor Carlo Cambini, Professor Ian Dobbs, and Oxera Consulting (Oxera).

82. We sourced information from a number of experts to provide inputs for our TSLRIC model. These included:

82.1 geospatial data from Corelogic and Landcare Research;

82.2 trenching and duct cost data from Beca; and

82.3 price trend data from Statistics New Zealand, World Bank, NZIER, and Bloomberg.

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[102] Commerce Commission "The Geographic Information System modelling environment for the Unbundled Copper Local Loop and Unbundled Bitstream Access services final pricing principle" 24 July 2015.

[103] Analysis Mason "Report for Chorus UCLL and UBA FPP further draft determination submission – PUBLIC *11 August 2015*', pp. 5-11.

83. As part of our modelling, we also sourced data on Telecommunications Service Obligation (TSO) areas from earlier internal analysis that we carried out.[104]

84. In addition, we sourced extensive information from certain parties (including Chorus, Vodafone, and LFCs) to help us with modelling. We used compulsory information notices issued under section 98 of the Commerce Act 1986.[105] We also note that interested parties supplied their own data and models.

Structure of this document

85. This determination has seven Chapters.

    85.1 This Chapter 1 contains an introduction and explains the process which has culminated in this final determination.

    85.2 Chapter 2 outlines the regulatory framework under which we are required to set a TSLRIC price for the UBA service.

    85.3 Chapter 3 explains our approach to determining the cost of providing the UBA service. We describe the steps we have taken to determine the annualised TSLRIC cost, and summarise the decisions we have made at each step.

    85.4 Chapter 4 explains how we have converted TSLRIC costs into a monthly unit price, and set the prices for the UBA STD services.

    85.5 Chapter 5 explains our approach to price adjustments that we consider best give, or are likely to best give, effect to the section 18 purpose statement, having considered matters including relativity.

    85.6 Chapter 6 explains our approach, reasons, and decisions about the determination of NRC for the UBA service.

    85.7 Chapter 7 explains our approach, reasons, and decisions about backdating.

86. The Attachments to this determination (and the Attachments of the UCLL final determination where relevant) then discuss our approach in more detail, including the reasons for individual decisions on key inputs to our TSLRIC model.

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104 See Commerce Commission "Determination for TSO Instrument for Local Residential Service for period between 1 July 2002 and 30 June 2003" 24 March 2005.

105 Section 98 of the Commerce Act 1986 applies under section 15(f) of the Telecommunications Act 2001.

87. With this paper we are publishing some papers prepared by our expert consultants. These papers include:

87.1 a model reference paper (public version only), model specification paper (public and confidential versions), and model documentation paper (public and confidential versions) for the recurring charges TSLRIC model prepared by TERA;

87.2 a list summarising changes made to the TSLRIC models since the July 2015 UBA further draft determination prepared by TERA;

87.3 a methodology paper for the NRC TSLRIC model (public and confidential version) prepared by TERA;

87.4 a paper reviewing and responding to submissions on the July 2015 UBA further draft determination paper (public and confidential version) prepared by TERA;

87.5 a paper reviewing and responding to submissions on the July 2015 report "International comparison of TSLRIC UCLL and UBA costs and prices" (public version only), prepared by TERA;

87.6 a paper responding to submissions on the corridor cost analysis (public version only), prepared by Beca;

87.7 analysis outlining the corridor cost analysis of trenching and ducting rates in NZ (public version only) prepared by Beca;

87.8 a paper prepared by Professor Ingo Vogelsang reviewing submissions on the July 2015 UBA further draft determination paper; and

87.9 a paper providing advice in response to submissions regarding price trends prepared by NZIER.

88. A separate paper explaining how we have calculated the WACC for the UCLL and UBA services has been published alongside this final determination. Attached to this paper, we have also published papers prepared by our expert consultants, including:

88.1 a review of submissions on the WACC parameters for UCLL and UBA prepared by Oxera;

88.2 a paper reviewing submissions on whether a WACC uplift is appropriate for UCLL and UBA prepared by Oxera; and

88.3 a review of submissions on the appropriate risk-free rate and tax-adjusted market risk premium (TAMRP) for UCLL and UBA prepared by Dr Martin Lally.

89. We will issue a consolidated and updated STD for the UBA (and any other affected STD) so as to ensure it is consistent with this determination. For the avoidance of doubt, the FPP prices and any relevant conditions that update these STDs will be in place from 16 December 2015.

Chapter 2: Our regulatory framework for carrying out the UBA pricing review determination

90. This Chapter outlines our regulatory framework under which we are setting a price for the UBA service using TSLRIC ("our regulatory framework").[106,107] In this Chapter we address:

    90.1 the Act's definition of TSLRIC ("definition of TSLRIC" or "TSLRIC");

    90.2 section 18 considerations;

    90.3 the TSLRIC objectives/outcomes that we considered when exercising our judgement;

    90.4 our approach to implementing TSLRIC, including:

        90.4.1 the characteristics of the hypothetical efficient operator and the hypothetical efficient operator environment; and

        90.4.2 the concept of a MEA;

    90.5 evidential matters;

    90.6 other relevant considerations;

    90.7 additional legal requirements under the Act; and

    90.8 the *Vodafone TSO* case.[108]

91. In the following paragraphs we provide a high level summary of our regulatory framework.

92. Our regulatory framework is based on the legal requirements of the Act.

    92.1 The Act requires us to apply the FPP of TSLRIC; unlike the regulatory context in some other jurisdictions, we do not have discretion to select a different pricing principle during the course of a pricing review. The definition of TSLRIC refers to forward-looking costs over the long run of the total quantity of facilities and functions that are incremental to the UBA service, plus a reasonable allocation of forward-looking common costs. We are required to implement the form of TSLRIC defined in the Act, and we discuss its particular requirements, including that it be forward-looking and over the long run, in this Chapter.

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106 Unless otherwise stated, "TSLRIC" in this determination means the Act's definition of TSLRIC.

107 There are some aspects of this framework which are more nuanced in respect of NRC. This is further explained in Chapter 6.

108 *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138, [2012] 3 NZLR 153.

92.2 The Act also requires us to make the determination that, in our view, best gives or is likely to give effect to the section 18 purpose statement. As the Court of Appeal has explained, it is reasonable to assume that Parliament has chosen the pricing principle (in this case, TSLRIC) because it is consistent with, and will implement, the purpose statement in section 18, and determination of the FPP in accordance with the statutory definition of TSLRIC will itself involve implementation of the section 18 purpose.[109] In other words, setting a price based on TSLRIC will generally promote competition for the long-term benefit of end-users. We considered section 18 throughout in respect of our individual modelling decisions. In some cases, we have found that the primary effect of an individual modelling decision on the section 18 purpose was its impact on the final price, since it is generally the price itself that will promote competition for the long-term benefit of end-users.

93. The definition of TSLRIC provides some guidance on the various choices that needed to be made in determining TSLRIC in the modelling environment (eg, through the reference to terms such as "forward-looking" and "long run"). Nevertheless, the definition is not prescriptive in respect of many of the decisions that we need to make, and requires us to exercise our judgement in relation to a considerable number of modelling decisions. Therefore, we also looked to other relevant considerations to guide our modelling decisions.

94. Since many of the terms contained in the definition of TSLRIC are terms of economic theory, this economic theory helped us to interpret TSLRIC. Economic theory related to the TSLRIC concept shows that there are a range of efficiency-enhancing objectives/outcomes that this pricing principle can achieve. In making individual modelling choices to determine TSLRIC we considered these objectives/outcomes.

95. Taking into account the economic theory of the TSLRIC concept, and its implementation by regulators elsewhere, we considered the various approaches to implementing TSLRIC. Our approach estimates forward-looking, long run, efficiently incurred, incremental costs by postulating a hypothetical efficient operator building and operating a new network using a MEA to provide the relevant regulated services. Use of the hypothetical efficient operator and MEA concepts is a conventional approach to the implementation of TSLRIC, and we considered that these concepts would assist us to create a model that would implement the section 18 purpose statement. These concepts were helpful as a guiding principle to inform our modelling decisions, although we remained open to revisiting our approach in the context of individual modelling decisions and overall.

96. In some cases, we have also taken into account real-world evidence as a guide to our implementation of TSLRIC in relation to modelling decisions on matters that were, to some extent, objectively measurable. In these instances we exercised our judgement as to what provided the best objectively measurable data.

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109 *Chorus Ltd v Commerce Commission* [2014] NZCA 440 at [153].

97. We were also informed by additional legal requirements of the Act, such as (among others) the requirement to avoid double recovery, the requirement to set a national geographically averaged price, and the requirement to consider relativity between the UCLL and UBA services.

98. Finally, we consider that our approach to determining TSLRIC is consistent with the principles to be derived from the Supreme Court's judgment in the *Vodafone TSO* case. In particular, we followed the approach laid down by the Court in relation to network optimisation by incorporating new technologies into our model where appropriate, and in the statutory context of this determination we are satisfied that our decision on asset valuation will best promote the section 18 purpose statement.

The definition of TSLRIC

We must determine a price in accordance with TSLRIC

99. In this pricing review determination we must apply the final pricing principle (FPP) as set out in Schedule 1 of the Act. More specifically, section 52(a) of the Act requires that:

> A pricing review determination must include—
>
> (a) the price payable for the designated access service, which, in the opinion of the Commission, is determined *in accordance with*—
>
> > (i) the applicable *final pricing principle* (as affected, if at all, by clause 2 or clause 3[110] of Schedule 1).[111] (emphasis added)

100. The FPP for the UBA service is:[112]

> The price for Chorus's unbundled copper local loop network plus TSLRIC of additional costs incurred in providing the unbundled bitstream access service.

101. We take the price for the UCLL service and add to it the TSLRIC of the additional costs incurred in providing the UBA service. In this pricing review determination we are only pricing the "additional costs" component of providing the UBA service (otherwise known as the "UBA increment"). The UBA increment reflects the additional costs to supply the UBA service over and above the UCLL service, including the cost of assets such as electronic equipment.

102. The FPP for both UBA and UCLL is based on TSLRIC, so much of the framework within which we make our decisions is the same.

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110 Clauses 2 and 3 are not relevant for this FPP.

111 The provision also mentions "any regulations that relate to the applicable final pricing principle or, if there are no regulations, any requirements of the Commission". There are no such regulations and no requirements of the Commission other than those set in this determination.

112 Telecommunications Act 2001, Schedule 1, Part 2, Subpart 1.

103. TSLRIC is an acronym for an economic concept: "total service long run incremental costs". The Act provides us with a particular definition of "TSLRIC":

> TSLRIC, in relation to a telecommunications service,—
>
> (a) means the forward-looking costs over the long run of the total quantity of the facilities and functions that are directly attributable to, or reasonably identifiable as incremental to, the service, taking into account the service provider's provision of other telecommunications services; and
>
> (b) includes a reasonable allocation of forward-looking common costs.

TSLRIC contains several elements

104. The definition of TSLRIC contains several elements:

104.1 forward-looking costs;

104.2 over the long run;

104.3 of the total quantity of the facilities and functions;

104.4 that are directly attributable to, or reasonably identifiable as incremental to, the service, taking into account the service provider's provision of other telecommunications services; and

104.5 a reasonable allocation of forward-looking common costs.

105. We discuss each of those elements further below.

Forward-looking costs

106. The TSLRIC acronym (total service long run incremental costs) does not specifically refer to "forward-looking" costs. As we discuss later, forward-looking costs are typically considered to be an implicit component of the economic interpretation of the TSLRIC concept. However, the Act does not leave this implicit, but rather explicitly includes the concept of forward-looking costs in TSLRIC.

107. In 2002, we defined forward-looking costs as:[113]

> … costs that will be incurred in the future in providing the service. This involves estimating costs on the basis of current and future prices of inputs and given the availability of modern technologies and assets. The aim is to estimate the cost of providing the services in the future rather than the past.

[113] Commerce Commission "Application of a TSLRIC Pricing Methodology - Discussion Paper" 2 July 2002, paragraph [32].

108. In the December 2013 UCLL process and issues paper, we defined the concept of forward-looking costs as follows:[114]

> Forward-looking costs reflect the costs that a network operator would incur if it built a new network today using assets collectively referred to as the modern equivalent asset, which we discuss further below. The costs of these assets are the costs of currently available equipment as opposed to the costs of older equipment that may actually still be in use.

109. In our July 2015 further draft determination we used what we considered to be an ordinary economic understanding of the forward-looking costs concept. That is, we considered that forward-looking costs reflected "the current and ongoing future costs of providing the service".[115]

110. Spark submitted a different interpretation of the term "forward-looking". Spark submitted that forward-looking costs will be "the incremental investment required by the access provider to extend the lifetime of existing assets in order to support continued use".[116] Spark seems to be suggesting that forward-looking costs relate to Chorus investing in its existing assets.

111. Spark also submitted that the distinction between forward-looking and historical costs does not address the treatment of costs that can be avoided through prudent asset management.[117] In our view, such costs that are avoided through prudent asset management are inefficiently incurred costs. Assessing costs on a forward-looking basis, and TSLRIC more generally, is consistent with the exclusion of inefficient costs.

112. In contrast to Spark's submission, we consider that the term "forward-looking costs" does not pre-suppose that the costs are those associated with investment by Chorus. As the Court of Appeal noted, forward-looking costs can be read as reflecting the notional cost to an operator if it built a new network, not the costs of any particular entity or the costs of the incumbent:[118]

> The TSLRIC model provides an estimate of the costs of an efficient access provider over a sufficient period of time (long run), on a "forward-looking" basis (reflecting the notional costs to an operator if it built a new network) rather than of Chorus's actual costs.

113. We also note that the definition of TSLRIC refers to the costs of the "service provider" and not the "access provider". The term "access provider" is used in the Act's descriptions of the regulated services, where for many services Chorus is identified as the "access provider". The use of "service provider" and not "access

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114 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [68].

115 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [101]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [100]. "

116 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [41].

117 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [46].

provider" in the definition of TSLRIC reinforces the view that we are not required to model Chorus' costs.

114. Overall we remain of the view that forward-looking costs reflect the current and ongoing future costs of providing the regulated service. Historic costs that have already been incurred, and the accounting costs that are recorded in a business' financial accounts, are not necessarily the same as forward-looking costs (although they may be informative in some circumstances). Businesses and households make decisions (eg, regarding pricing, output, entry, investment, and consumption) based on present and future costs and benefits.

115. We also remain of the view that this definition of forward-looking costs is an ordinary economic understanding of the concept. We do not consider that the concept of forward-looking costs determines the sort of entity we should be modelling. In particular, we do not agree with Spark's submission that forward-looking costs must relate to Chorus investing in its existing assets.

Over the long run

116. In previous papers we defined the "long run" to mean a timeframe over which all factors of production including capital equipment are variable in response to changing demand.[119,120] This is also our final view.

117. This definition of "long run" takes account of its "context and purpose" and is "to give effect to real-world outcomes that achieve real-world efficiencies", to use Spark's words.[121] Also, as we explain below, our definition is consistent with how the long run is defined in economic theory and in regards to the conventional understanding of the TSLRIC concept. Later in this Chapter we consider the efficiencies and outcomes that the conventional approach is typically said to promote (ie, TSLRIC objectives/outcomes). It follows that the definition of "long run" in the conventional TSLRIC concept is consistent with achieving these real-world outcomes and efficiencies.

118. Our definition of "long run" is also consistent with how the concept of the long run is considered in microeconomic theory.[122] Microeconomists define the long run as the

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119 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [79]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [79].

120 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [103]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [102].

121 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [56].

122 We note that Spark referred to a *New Palgrave Dictionary of Economics* article which found that the concept of the long run does not have a uniform meaning (Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015 at [54], citing Carlo Panico and Fabio Petri "Long run and short run" *The New Palgrave Dictionary of Economics,* Second edition, Steven N. Durlauf and Lawrence E. Blume (eds.), 2008). The article in question relates to the use of the term "long run" in analysing equilibrium concepts in macroeconomics, and we do not consider it is relevant to a discussion of the term "long run" as a TSLRIC concept.

period of time sufficiently long enough such that all costs are considered variable in response to changes in demand.[123] This is also how the definition of the long run is considered in regards to the TSLRIC concept, as shown by the following examples.

118.1 The Australian Competition and Consumer Commission (ACCC) defined the long run in the context of TSLRIC as "a period long enough such that all of a firm's costs (*including sunk costs)* become variable or avoidable",[124] which contrasts with Spark's submission that the long run concept does not focus on sunk costs.[125]

118.2 Spark refers to the meaning of "long run" used by the US Federal Communications Commission (FCC) in 1996 in regards to a variant of the TSLRIC concept, total element long run incremental cost (TELRIC),[126] as a period long enough that all of the firm's costs become variable.[127]

118.3 Spark's submission also refers to William Baumol's definition of the long run (referred to above, and which is consistent with taking a period of time in which all costs are variable) as being "arguably more consistent with the definition of TSLRIC".[128]

119. Spark submitted that "it seems that there is a risk that the Commission's approach to the long run has tended to result in costs being included that should not be – particularly sunk and reusable assets. Assets which in the long run would not, on a forward-looking basis be replaced, do not warrant a value".[129]

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123 See, for example, Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [38]; and William Baumol, *Economic Theory and Operations Analysis*, Fourth edition, Prentice Hall, New Jersey, 1977, p.290. Baumol refers to "the very long run" as "a period so long that all of the firm's present contracts will have run out, its present plant and equipment will have been worn out or rendered obsolete and will therefore need replacement, etc".

124 ACCC "Access Pricing Principles – Telecommunications: a guide" July 1997, p.37, emphasis added.

125 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [55].

126 TELRIC is a variant of the TSLRIC concept that was applied in the United States by the Federal Communications Commission. The TELRIC and TSLRIC concepts do not differ in how they treat the hypothetical network build; rather the difference relates only to the extent of the increment considered. Doane, Sibley and Williams (1999) have noted that "[t]he concept behind TELRIC is the same as that of TSLRIC but is specific to a particular network element." (Michael J. Doane, David S. Sibley and Michael A. Williams (1999) "Having Your Cake – How to Preserve Universal-Service Cross Subsidies While Facilitating Competitive Entry" *Yale Journal on Regulation*, 16, 311-326, footnote 12 at 313).

127 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [55]; FCC "In the matter of implementation of the Local Competition Provisions in the Telecommunications Act 1996" CC Docket No. 96-98, August 1996, paragraph [677].

128 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [50].

129 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph[51].

120. We disagree with Spark. As Analysys Mason explains, "'the length of time in which all factors of production are variable' is exactly the interpretation required".[130] We also agree with Sapere. As Sapere submitted, Spark's approach "does not fall under the auspices of TSLRIC", and is "confusing TSLRIC with other costing concepts".[131]

121. Further, in contrast to Spark's point that certain assets "do not warrant a value", we agree also with the point made by CEG, that "[i]f an asset is still being used it has a forward looking economic value".[132]

122. As with the forward-looking concept discussed above, the term "long run" does not pre-suppose a particular entity making an investment (while Spark assumes it is Chorus).

123. Professor Vogelsang has also highlighted inconsistencies in Spark's interpretation of the "long run". He states that Spark mixes the conventional approach (which "assumes that all these assets are replaced now by MEAs and run efficiently") with an actual cost approach, and chooses "the properties of each to come up with the lowest possible cost".[133]

124. Therefore, we remain of the view and our final decision is that it is appropriate to consider the "long run" as a time period over which all costs, including sunk costs, are variable.

Total service, incremental costs

125. The Act refers to costs that are "directly attributable to, or reasonably identifiable as incremental to, the service". We refer to these costs collectively as "incremental costs". In this context, incremental costs are the costs that are extra or variable to an additional service that a business provides. That is, if a business were to add an additional service to the existing set of services that it provides, then the costs it incurs in doing so would be considered the costs that are incremental to that service.

126. In regards to the relevant service over which costs are considered incremental, the definition of TSLRIC refers to the "total quantity of the facilities and functions". We consider that the "total quantity of the facilities and functions" refers to the total inputs required to supply all the quantity of the network operator's services. This means that TSLRIC is different from the incremental cost the network operator

130 Analysys Mason "Report for Chorus UCLL and UBA FPP draft determination cross-submission" 22 September 2015 at p. 10.

131 Sapere "Report for Chorus Limited - Cross-submission on UCLL and UBA Price Determination Issues" 22 September 2015, paragraphs [75] and [82].

132 Competition Economists Group "Non-replicable assets and forward-looking cost" August 2014, paragraph [35].

133 Ingo Vogelsang, "Review of some Submissions on the Commerce Commission's July 2, 2015 draft determination on UCLL/UBA pricing" 26 November 2015, paragraphs [75] and [78].

incurs in supplying the last unit of the service, or the incremental cost of providing the service to one particular access seeker.[134]

127. The definition of TSLRIC also requires that "the service provider's provision of other telecommunications services" should be considered when determining what costs are directly attributable to, or reasonably identifiable as incremental to, the service we model. This leads us to assume that the service provider that we use for cost modelling will provide other telecommunications services, in addition to the UBA service for which we are modelling TSLRIC. This affects how we identify incremental costs, and how we allocate shared costs and common costs (discussed under the next heading below).

128. As discussed in more detail below, we have used the concept of a hypothetical efficient operator as a guiding principle in modelling TSLRIC. We looked at the mix of services that Chorus provides as the best evidence of services required by New Zealanders that would likely be offered by a hypothetical efficient operator.

129. Accordingly, we assume that a hypothetical efficient operator would use its network infrastructure assets (eg, trenches and ducts) to provide other telecommunications services, including leased line services with dedicated capacity for commercial end-users, High Speed Network Service (HSNS) and mobile site backhaul.

130. In addition to costs that are directly attributable to the service, the definition of TSLRIC refers to an allocation of forward-looking common costs (as discussed next).

131. Together, paragraphs (a) and (b) of the definition of TSLRIC capture all relevant forward-looking costs.

Reasonable allocation of forward-looking common costs

132. The definition of TSLRIC covers both:

132.1 costs that are "directly attributable to, or reasonably identifiable as incremental to, the service" (as described in paragraph (a) of the definition and as described above); and

132.2 a reasonable allocation of forward-looking common costs (paragraph (b) of the definition).

133. The Act also provides a definition of forward-looking common costs:

> **forward-looking common costs—**
>
> (a) means those costs efficiently incurred by the service provider in providing the service that are not directly attributable to providing an additional unit to that service; but
>
> (b) does not include any costs incurred by the service provider in relation to a TSO instrument

[134] Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [65].

134. In this section we explain the requirements to be met in allocating forward-looking common costs. The details of the approach we have taken to allocating forward-looking common costs are discussed later in this determination (in Attachment N – Cost allocation).

135. We use the following terminology when talking about forward-looking common costs.[135]

135.1 We generally use the term "common costs" to refer to costs not directly attributable to any individual service or subgroup of services; they are attributed to all services. These may be "non-network" common costs, that are not directly incurred in providing services associated with the telecommunications network itself (an example is corporate overheads), or "network" common costs, which are directly incurred in providing all services associated with the network.

135.2 We generally use the term "shared costs" to refer to costs not directly attributable to any individual service, but that can be attributed to a subgroup of services (rather than to all services).[136] These are also typically "network shared costs", as they are directly incurred in providing a subgroup of services associated with the network.

136. For clarity, we note that both "common costs" and "shared costs" are included in the definition of "forward-looking common costs".

137. Accordingly, under paragraph (a) of that definition we must include a reasonable allocation of costs:

137.1 efficiently incurred in providing the service; but

137.2 not directly attributable to providing an additional unit to that service.

138. First, we are only required to allocate forward-looking common costs efficiently incurred by the service provider. Second, we must include only those costs that are not directly attributable to providing an additional unit to the service. We will allocate the likely forward-looking common costs associated with the hypothetical network that a hypothetical efficient operator would build. As noted above, this includes the operator providing a mix of other telecommunications services using its infrastructure. These forward-looking common costs include the cost of network infrastructure assets used for multiple services.

139. It is open to us to look to Chorus' actual network and actual costs to guide us in assessing the likely forward-looking common costs efficiently incurred by the hypothetical efficient operator, and in a number of instances we do. However, we are not required to set a price based on Chorus' actual costs (though we discuss clause 4B of schedule 1 of the Act in more detail later in this Chapter).

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135 For further detail see Attachment N – Cost allocation.

136 Another term for these costs is "joint costs".

140. Limb (b) of the Act's definition of "forward-looking common costs" provides that they do not include "any costs incurred by the service provider in relation to a TSO instrument". The TSO instruments are relevant to the UCLL service (including both the UCLL STD service and the sub-loop UCLL service described in the SLU STD), but not the UBA service. We discuss the relevance of the TSO instruments in Chapter 2 of our UCLL final determination.

Role of section 18 in TSLRIC

Our overall consideration was what promotes competition in telecommunications markets for the long-term benefit of end-users, and in doing so we considered section 18(2) and (2A)

141. Section 19 requires us to consider "the purpose set out in section 18" and make the determination that, in our view, best gives or is likely to give effect to that purpose. That purpose is found in section 18(1), which is:

> … to promote competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand by regulating, and providing for the regulation of, the supply of certain telecommunications services between service providers.

142. Section 18(2) and (2A) identify particular matters that we are required to consider when determining what promotes competition in telecommunications markets for the long-term benefit of end-users:

> (2) In determining whether or not, or the extent to which, any act or omission will result, or will be likely to result, in competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand, the efficiencies that will result, or will be likely to result, from that act or omission must be considered.
>
> (2A) To avoid doubt, in determining whether or not, or the extent to which, competition in telecommunications markets for the long-term benefit of end-users of telecommunications services within New Zealand is promoted, consideration must be given to the incentives to innovate that exist for, and the risks faced by, investors in new telecommunications services that involve significant capital investment and that offer capabilities not available from established services.

Section 18(1) is the "dominant" provision in section 18

143. As the High Court has observed, section 18(1) is the "dominant" provision in section 18, and subsections (2) and (2A) "are specified for the purpose of assisting analysis under section 18(1)".[137] In this sense, subsections (2) and (2A) are not isolated considerations on their own. Rather, they help us consider whether competition is promoted to the long-term benefit of end-users. In other words, all analysis around the relevant considerations that feed into section 18(1) should then be considered in the round and we will make a decision that we consider best promotes competition in telecommunications markets for the long-term benefit of end-users.

137 *Chorus v Commerce Commission* [2014] NZHC 690 at [34].

Efficiencies, incentives to innovate, and the appropriate welfare standard

144. We have treated "efficiencies" in section 18(2) as referring to static and dynamic efficiencies. This is consistent with the High Court's comments regarding our IPP determination, where Kós J stated that it was "common ground that 'efficiencies' refer to both static and dynamic efficiencies".[138]

145. Static efficiencies are allocative and productive efficiencies: they reflect efficient use of resources and efficiency in internal firm production respectively. By contrast, dynamic efficiencies are concerned with new and innovative products and services, or supplying existing ones at better quality, which lead to greater consumer choices and benefits over the long-term.

146. Section 18(2A) requires us to consider the "incentives to innovate that exist for, and the risks faced by, investors in new telecommunications services that involve significant capital investment and that offer capabilities not available from established services." A determination that undermines incentives to invest would deter future investment and so would be likely to undermine competition over the long-term.

147. Consideration of efficiencies is also related to the appropriate welfare standard implied by section 18. We note that Sapere argued that a total welfare standard is required by the legislative history, case law and economics of section 18.[139] We do not agree that there is an absolute rule as to how wealth transfers should be treated. Rather, the appropriate approach to consumer welfare, total welfare, wealth transfers and efficiencies will depend on the circumstances. We explain in Chapter 5 of our UCLL final determination that, in this context, our chief concern is to reach a decision that promotes competition for the long-term benefit of end-users.

148. Static and dynamic efficiencies are also relevant to the TSLRIC objectives/outcomes, which are explained in the next section.[140] For example, the objectives of efficient use of infrastructure and providing incentives to minimise costs relate to allocative and productive efficiencies, while incentives for efficient investment relate to dynamic efficiencies.

The relationship between TSLRIC and section 18

149. As we explain below, we see TSLRIC and section 18 working in tandem. That is, our immediate task is to apply TSLRIC, but in doing so we must make the determination that best gives effect to section 18. Accordingly, our application of TSLRIC is informed by section 18 considerations.

150. In this pricing review determination we must apply the FPP as set out in Schedule 1 of the Act. The FPP for the UBA service is the price for the UCLL service plus TSLRIC of

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138 *Chorus v Commerce Commission* [2014] NZHC 690 at [34].

139 Sapere "Report for Chorus Limited – Economic Comment on UCLL and UBA Pricing Issues" 11 August 2015, paragraphs [33]-[64].

140 TSLRIC objectives/outcomes are a number of outcomes that are typically considered to be outcomes that arise from an appropriate application of the TSLRIC concept.

the additional costs incurred in providing the UBA service. Section 19 requires us to consider "the purpose set out in section 18" and make the determination that, in our view, best gives or is likely to give effect to that purpose. However, section 19 does not cause section 18 to override the statutory task (ie, apply TSLRIC).

151. The Court of Appeal has confirmed that we should read the specific requirements of the Act as being consistent with the section 18 purpose statement. It stated:[141]

> …it is reasonable to assume that Parliament will have settled on that particular definition because it is consistent with and implements the requirements of the statutory purpose.

152. In the context of the IPP determination, it also stated (footnotes omitted):[142]

> [44] It is also reasonable to assume, on the basis of the principle of statutory interpretation that the provisions of a statute are likely to be internally consistent, that the statutory definition of the UBA price reflects the requirements of s 18, including in particular subs (2A) which was enacted at the same time. In other words, the mandatory requirement for the Commission to carry out the "benchmarking" exercise for the IPP by reference to appropriate "comparable countries" is itself designed to implement the statutory purpose, not to contradict or undermine it.

153. We agree with Russell McVeagh's, Spark's, and Vodafone's submissions on the relationship between TSLRIC and section 18.

154. As Russell McVeagh submitted, "Parliament has chosen TSLRIC as the methodology that will best give effect to section 18" (in the context of the FPP).[143]

155. As Spark submitted, "a properly applied TSLRIC methodology is entirely compatible with section 18".[144] Spark further submitted that "s18 does not override the obligation to first focus on the technical task of determining and modelling the best estimate of efficient forward-looking costs when applying a TSLRIC methodology."[145] Similarly, Vodafone has submitted that "s 18 considerations cannot displace a proper analytical approach to determining TSLRIC." [146]

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141 *Chorus v Commerce Commission* [2014] NZCA 440 at [153].

142 *Chorus v Commerce Commission* [2014] NZCA 440.

143 Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews" , paragraph[28(a)].

144 See, for example, Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [136]; Vodafone "Submission to the New Zealand Commerce Commission on Process Paper and Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Comments on Analysys-Mason TSLRIC Models" 20 February 2015, paragraph [B2.1].

145 Telecom "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Submission Commerce Commission" 6 August 2014, paragraphs [36] and [43].

146 Vodafone "Comments on process and issues paper for the unbundled copper local loop (UCLL) final pricing principle" 14 February 2014, paragraphs [C2.12]-[C2.13]. Vodafone "Submission to the New Zealand Commerce Commission - Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, paragraph [D1.7]. Vodafone "Submission to the New Zealand Commerce Commission - Cross submission on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 20 August 2014, paragraph [B1.6].

156. Our final view is that TSLRIC and section 18 operate in tandem, and, as explained below, section 18 may provide guidance at a number of decision points.

We applied section 18 to cost modelling decisions throughout the process

157. Section 19(c) requires that, when making a determination, we consider what best gives, or is likely to best give, effect to the section 18 purpose statement. To ensure that the determination as a whole best meets the section 18 purpose statement, we considered section 18 throughout the process and in respect of each individual modelling decision.

158. Submitters generally agreed that we should consider section 18 in regards to individual modelling choices.

159. Spark stated that "…where choices are required when implementing TSLRIC, [the Commission is required to] make choices that enable it to give best effect to the purpose set out in section 18".[147] At the conference, Chorus stated that section 18 is a mandatory requirement in respect of "all discretions that the Commission is exercising",[148] while Vodafone noted that section 18 applies "to a range of functions that [we] perform", including in determining TSLRIC.[149]

160. In contrast with these views, Wigley and Company submitted that we can apply section 18 to our modelling decisions only to resolve an "impasse" where no modelling choices lead to "true TSLRIC".[150] Wigley and Company further stated that many modelling decisions can be determined "without regard to section 18".[151]

161. We disagree with Wigley and Company. Our view is that section 18 does not have a limited role of only resolving an "impasse" in assessing efficient costs. In our view it should guide our entire approach to the exercise. That is, we should consider section 18 in regards to individual modelling choices, regardless of whether or not there is an "impasse" for those modelling choices.

162. Having said that, the section 18 purpose statement may not necessarily be helpful in respect of each and every modelling decision (for example, regarding technical details or where certain approaches are prescribed by the Act).[152] We agree with the submissions of Spark and Vodafone that section 18 may not necessarily have a

147 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [124].

148 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.34.

149 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.39.

150 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [5.13].

151 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.34.

152 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [160]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [159].

"separate discernible", or "separate observable", effect at every decision point during the modelling process.[153,154]

163. As will be further explained in this determination, we have found that the section 18 purpose statement was a particularly important factor in relation to the following decisions: to model a hypothetical efficient operator, on asset valuation, not to make a TSLRIC or WACC uplift, and whether or not to backdate.

The predominant effect of individual modelling choices was generally reduced to an impact on the resulting modelled price

164. As we explained in our draft decisions, there did not appear to be any strong and unequivocal ways that many of our individual modelling choices (particularly in relation to technical issues such as the size of cables used in our TSLRIC model) could, taken in isolation, influence competition for the long-term benefit of end-users. Rather, the main effect of such choices is to contribute to the overall level of the price determined using TSLRIC.[155]

165. Chorus and Vodafone agreed with us. Chorus stated that in some modelling decisions section 18 may not "bite directly", and Vodafone stated that section 18 may not have a role where judgements can be made on the best available evidence.[156, 157]

166. Although Spark submitted that section 18 would not always have a "separate observable" effect at every stage, it submitted that "prices being set to allow the recovery of efficient costs [should be] the over-riding common objective".[158]

167. We disagree with Spark. The purpose of the present exercise is to determine a price in accordance with the FPP, and it is that determination which must give effect to the section 18 purpose statement.

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153 Telecom "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Submission Commerce Commission " 6 August 2014, paragraph [46].

154 Vodafone "Comments on process and issues paper for the unbundled copper local loop (UCLL) final pricing principle" 14 February 2014, paragraphs [C2.12]-[C2.13]. Vodafone "Submission to the New Zealand Commerce Commission - Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, paragraph [D1.7]. Vodafone "Submission to the New Zealand Commerce Commission - Cross submission on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 20 August 2014, paragraph [B1.6].

155 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [161]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [162].

156 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.35.

157 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.41.

158 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [24a].

168. Spark also submitted that "there is a very clear efficiency focus in both section 18, and TSLRIC, which is also supported by the relevant definitions in the Act" and "this efficiency objective should be the key determinant of the Commission's individual modelling choices".[159] Russell McVeagh stated that "the Commission must promote competition (under section 18) by setting a price based on efficient forward looking costs of providing the regulated service".[160]

169. Section 18 and/or efficiency considerations should not lead us away from the statutory task of determining a price in accordance with TSLRIC. Spark's approach appeared to mix some aspects of TSLRIC with aspects of an approach based on actual costs and Chorus' legacy assets. Professor Vogelsang made a similar observation regarding Spark's approach:[161]

> … my sense is that it mixes the TSLRIC approach with a path dependence approach, choosing the properties of each to come up with the lowest possible costs.

170. Overall, we believe that we should consider section 18 throughout in respect of our individual modelling decisions within our regulatory framework.

171. Regardless of whether section 18 is directly instructive in respect of particular modelling choices, the price that results from those decisions will be important to the promotion of competition for the long-term benefit of end-users. Here it is the aggregate price, rather than the price effect from individual modelling choices, that is important. Accordingly, we consider that the relationship between the price level and section 18 and the analysis of the risks of under- or over-estimating TSLRIC can be addressed in light of the cumulative effect of all our modelling choices. It is therefore desirable to undertake this analysis after all modelling decisions have been made and we have determined our central estimate of TSLRIC.

How we considered section 18 purpose statement before making our overall price decision

172. Our modelling choices taken together determine our central estimate of TSLRIC, which represents our best estimate of the efficient forward-looking costs of supplying the UBA increment.

173. However, because of the uncertainty in this estimate, and because it could conceptually lie within a plausible range of modelled estimates of TSLRIC, we can consider the costs of an error in our central TSLRIC estimate. To the extent these costs are asymmetric, we can consider whether we can better meet the section 18 purpose statement by considering an increase or decrease from the central estimate of TSLRIC.[162]

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160 Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews" paragraph [29].

161 Professor Vogelsang "Review of some Submissions on the Commerce Commission's July 2, 2015, draft determination on UCLL/UBA pricing", 26 November 2015, paragraph [78].

162 Also, as discussed in more detail in Chapter 5, if the evidence demonstrates that incentivising migration to fibre (by way of moving to a different point within a plausible range) would promote competition in telecommunications markets for the long-term benefits of end-users of telecommunications services, then it is within our discretion to make this adjustment.

174. Such an approach is based on the costs of erring from the best estimate of the forward-looking efficient costs of supplying the UBA increment. As a result, it is desirable to undertake this analysis once all our modelling decisions have been made, rather than in respect of each individual modelling decision.

175. How we consider section 18 and exercise our judgement in making our overall price decision is further discussed in Chapter 5, in respect of a possible adjustment from the overall central estimates of TSLRIC and the WACC, and in respect of the relativity considerations of the Act. In addition, we have also considered our overall price decision with respect to how it compares to international TSLRIC model estimates; the opposing views of submitters on the direction and causes of any possible bias in individual decisions; and the costs of currently building a modern replacement UBA network (as discussed in Chapter 3).

Predictability

176. Our view regarding the role of predictability evolved during our consultation process.

177. At an early stage of our process, we suggested that respecting reasonable investor expectations would give effect to the section 18 purpose statement (as doing so would help build predictability into regulation).[163] In our December 2014 draft determinations we noted criticisms of that suggestion and revised our view.[164] In the July 2015 further draft determinations we reconsidered the role of an objective of predictability in our decision-making framework, and explained our view that we should be careful not to give predictability disproportionate weight.

178. We remain of the view that regulatory predictability is consistent with the section 18 purpose statement, and it is a relevant consideration that should be considered as part of best regulatory practice. Where regulatory uncertainty exists, this may undermine firms' incentives to invest and innovate. Investment and innovation is generally beneficial to end-users, and therefore a predictable regulatory environment that supports firms' incentives to invest is important to promote competition in telecommunications markets for the long-term benefit of end-users.

179. Spark and Vodafone have submitted that this is an improper application of section 18, and that the Act does not provide for a predictability test.[165] In this regard, we note that we are not seeking to re-interpret section 18 or apply it in a different way. Rather, we believe that regulatory predictability is a relevant consideration (among others) in the broad sense of best regulatory practice.

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163 Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [86].

164 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraphs [176]-[187].

165 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [157]; and Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [B2.14]

180. We agree with submitters that regulatory predictability is best considered at a higher level, in terms of best regulatory practice.[166] Predictability is not necessarily relevant across each individual modelling decision. While we do not accept Vodafone's argument that the concept of predictability is "meaningless" in this context, we agree that there are limits to the extent we can provide for predictability with such a large number of modelling decisions.[167]

181. Some submitters criticised our decision-making process on the basis that we had changed our mind about relevant objectives without changing our "key modelling decisions".[168] Our thinking has evolved over the course of a lengthy consultation and determination process. This has included reconsideration of some of the objectives that we consider to be relevant to our determination. We have kept an open mind about satisfying ourselves that our modelling decisions are appropriate in light of our final understanding of the relevant objectives and considerations.

TSLRIC objectives/outcomes

182. As discussed earlier in this Chapter, the definition of TSLRIC provides some guidance on the various modelling choices, but it is not prescriptive about the approach we should take on all of our modelling decisions. Therefore, our exercise involved a certain amount of estimation and judgement. Since many of the terms contained in the definition of TSLRIC are terms of economic theory, we have drawn on economic theory to help us to interpret TSLRIC.

183. Economic theory provides us with a number of outcomes that are typically considered to be outcomes that arise from an appropriate application of the TSLRIC concept. We refer to these as TSLRIC objectives/outcomes. We had regard to these objectives/outcomes when applying the definition of TSLRIC and considering individual modelling decisions.

Potential TSLRIC objectives/outcomes

184. In the July 2015 UCLL and UBA further draft determinations we reconsidered the objectives/outcomes of TSLRIC to which we give weight, and the role that these objectives/outcomes play in our TSLRIC modelling.[169]

185. We set out in Table 2.1 the potential objectives or outcomes that a TSLRIC-based price is typically said to promote.

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166 See, for example, Spark "UBA and UCLL FPP pricing review draft decision" 20 March 2015, paragraph [61].

167 Vodafone "Cross submission to the New Zealand Commerce Commission on submissions to the Process Paper and Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access services (excluding TSO Boundary considerations)" 20 March 2015, paragraph [C5.5].

168 See, for example, Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [10]; Wigley and Company "Submission on further draft pricing review UCLL and UBA determinations" 13 August 2015, paragraph [1.13].

169 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [130]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [130].

Table 2.2: Potential objectives/outcomes that a TSLRIC-based price may promote

Potential TSLRIC objective/outcome	Description
Efficient investment (both by the service provider and by access seekers)	A TSLRIC-based price can support incentives for the service provider to efficiently invest in maintenance and expansion of its network. It can also provide efficient "build/buy" incentives for access seekers, in terms of buying the wholesale service from the service provider, or building an alternative bypass network.
Preventing monopoly pricing	A TSLRIC-based price caps the price below the monopoly level.
Incentives to minimise costs	A TSLRIC-based price can provide incentives for the service provider to reduce its costs and improve its productivity.
Efficient entry in downstream (retail) markets	A TSLRIC-based price can provide incentives for entry such that only efficient access seekers can enter and compete with the service provider in downstream (retail) markets.
Efficient use of infrastructure	A TSLRIC-based price can support incentives for access seekers and end-users to use wholesale and retail services efficiently.
Efficient cost recovery	A TSLRIC-based price can allow the service provider to recover only costs efficiently incurred, including through providing a normal return on efficient investment.
Non-discrimination between the service provider and access seekers	A TSLRIC-based price can mitigate the potential for discriminatory pricing as between access seekers and the service provider.

186. The link between the TSLRIC objectives/outcomes (which are efficiency-based) and the objectives of section 18 is close. Setting a TSLRIC-based price that meets the TSLRIC objectives/outcomes will generally promote competition for the long-term benefit of end-users.

187. A number of sources support these potential objectives/outcomes.

187.1 The objectives/outcomes identified in Table 2.1 are consistent with those identified by regulatory authorities in Europe – see TERA's review of the objectives used by regulators across Europe in applying LRIC methodologies.[170]

187.2 The ACCC also helped us to understand the possible objectives/outcomes of a TSLRIC-based price. These include promoting efficient entry and exit; supporting incentives for efficient investment in, and use of, infrastructure; providing incentives for cost minimisation; allowing for efficient cost recovery; and mitigating non-discrimination.[171,172]

187.3 Professor Vogelsang has identified many of the TSLRIC objectives/outcomes drawn from his review of the academic literature, which include:

187.3.1 providing prices that are compatible with competitive markets, thereby preventing monopoly pricing;

187.3.2 providing for efficient entry;

187.3.3 providing for allocative (efficient use of infrastructure) and productive (cost minimisation) efficiency; and

187.3.4 providing for dynamic efficiency with respect to efficient investment by the access provider, access seekers and alternative competitors.[173]

187.4 In its 2013 submission on behalf of Vodafone to the MBIE regarding the review of the Telecommunications Act, Network Strategies also identified some of these TSLRIC objectives/outcomes including: providing incentives for efficient entry and exit; efficient investment; allocative efficiency; and cost minimisation.[174]

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170 TERA Consultants "TSLRIC literature review on UBA and UCLL Costing approaches" June 2014, p. 7.

171 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [58].

172 ACCC "Access Pricing Principles – Telecommunications, a guide" 1997, p. 29-30.

173 Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [45]. See also Ingo Vogelsang "What effect would different price point choices have on achieving the objectives mentioned in s18, the promotion of competition for the long-term benefit of end-users, the efficiencies in the sector, and incentives to innovate that exist for, and the risks faced by investors in new telecommunications services that involve significant capital investment and that offer capabilities not available from established services" 5 July 2013, paragraph [24].

174 Network Strategies "Review of the Telecommunications Act 2001: Key Issues" 13 September 2013, p. 24.

187.5 Spark supported some of these objectives/outcomes, including preventing monopoly pricing, cost minimisation, and recovering efficient costs.[175]

The role of TSLRIC objectives/outcomes in our modelling decisions

188. The role of the TSLRIC objectives/outcomes has evolved during our consultation process.[176,177] Our final decision is detailed below.

188.1 As a starting point, we were open to considering any of the potential TSLRIC objectives/outcomes identified above in our modelling decisions (as identified in Table 2.1 above).

188.2 However, we have found in practice that some of the objectives/outcomes noted in Table 2.1 above are of limited relevance given the current New Zealand circumstances.

188.3 For example, an objective/outcome of non-discrimination is relevant when there is a vertically integrated service provider, as a service provider might otherwise favour its own downstream retail operations over those of its retail competitors. In the present circumstances, however, where Chorus is legally prohibited from operating in the downstream (retail) segment in which access seekers compete, non-discrimination is not such a relevant consideration.[178] We note also that section 69XB of the Act sets out the requirements for undertakings by Chorus relating to supply of certain wholesale telecommunications services, which includes non-discrimination provisions. These factors limit the role played by a TSLRIC objective/outcome of non-discrimination in our modelling decisions in the current context. Even so, we remain open to considering the role of a TSLRIC objective/outcome of non-discrimination, as it may have some relevance in respect of unbundling.

188.4 Further, TSLRIC objectives/outcomes are typically considered to be outcomes that arise from appropriately applying the TSLRIC concept. Accordingly, we have kept the objectives/outcomes in mind (to the extent they were

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175 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [22].

176 In our December 2014 UCLL and UBA draft determination papers we expressed our preference to emphasise predictability and efficient investment as objectives of a TSLRIC-based price (Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [126]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [96]).

177 In the July 2015 UCLL and UBA further draft determinations we reconsidered the objectives/outcomes of TSLRIC to which we gave weight, and the role that these objectives/outcomes played in our TSLRIC modelling.[177] As explained in our further draft determination, while we kept our minds open to all potential TSLRIC objectives/outcomes, we found in practice that their greatest role was as a cross-check, by ensuring that any of our modelling decisions did not undermine these objectives/outcomes (Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [130]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [130]).

178 We note that there is a slight distinction here in respect of unbundling, where Chorus competes (through the provision of the UBA service) at a similar functional level to unbundlers.

consistent with our statutory task) to ensure that we are applying TSLRIC in an appropriate manner, rather than focusing on the objectives/outcomes by themselves.

189. In summary, we have kept our minds open to the potential TSLRIC objectives/outcomes that a TSLRIC-based price may promote (as identified in Table 2.1 above). We have found these TSLRIC objectives/outcomes to be helpful in guiding the overall development of our model.

190. We have also considered these TSLRIC objectives/outcomes when making individual modelling decisions, for example, by asking whether there is anything in our individual or collective modelling decisions that undermines or is inconsistent with the achievement of these outcomes. In stepping back, we have considered whether the collection of modelling decisions has produced a model that is likely to achieve those objectives/outcomes.

Modelling a hypothetical efficient operator to assist in determining the TSLRIC price

191. In the following sections we explain our conceptual approach to implementing TSLRIC; the hypothetical efficient operator, its characteristics and role; the context in which the hypothetical efficient operator builds and operates the hypothetical network; and the concept of a MEA.

192. As we explained earlier in this Chapter, we are only pricing the "additional costs" component of providing the UBA service (which is the "UBA increment"). Therefore, the following discussion regarding the TSLRIC for UBA only applies to the "UBA increment".

The hypothetical efficient operator

193. The TSLRIC concept is a methodology that bases wholesale prices on the economic costs that would be incurred in providing the service. Economic costs are generally considered to be the forward-looking costs that are incremental to the service in question and efficiently incurred over the long run.[179] In New Zealand, the determination of costs on a forward-looking long run basis is codified in the Act.

194. As we set out in our draft decisions, the conventional approach to implementing the concept of TSLRIC is to estimate forward-looking, long run, efficiently incurred, incremental costs by hypothesising an efficient operator building and operating a new network using a MEA to provide the relevant regulated services.[180,181]

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179 Baumol, Ordover and Willig (1996, p.3) state that "economic costs are long-run costs that reflect forward-looking efficient investment, including a return on capital consistent with competitive capital markets". Affidavit of William J. Baumol, Janusz A. Ordover, and Robert D. Willig (1996), Attachment to Comments filed by AT&T on May 14, 1996 in FCC Docket 96-98.

180 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [149]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [119].

195. The hypothetical network is built from scratch, as if the hypothetical efficient operator is building on a blank/clean slate. The hypothetical network is unconstrained by legacy choices made regarding, for example, the design of the network, the nature of assets or the mix of technology employed. This involves the assumption that all assets within the existing network no longer exist, and modern and efficient technology is used to build and operate the hypothetical network. In the case of UBA, the hypothetical network relates to the UBA increment and, as discussed below, we must make a separate decision about the underlying access network.

196. When discussing these concepts, we note that the economic costs as measured under TSLRIC are only those that are efficiently incurred. Costs that are efficiently incurred reflect those of least cost technologies and processes, subject to meeting customer preferences, including maintaining scope and quality for the relevant services. As Professor Vogelsang noted, this implies that "outdated technologies and inefficiently incurred costs like redundant manpower are not reflected".[182]

197. We consider that there is a close linkage between the statutory definition of TSLRIC (in particular, "forward-looking" and "long run") and the concept of a hypothetical efficient operator constructing a new network with modern and efficient technology.

198. By assuming a hypothetical efficient operator that replaces the entirety of the network as if building from scratch, the conventional approach takes into account the concept of "long run" costs. Mayo (2003) makes this point in respect of TELRIC where he states that "…as a long run model, TELRIC-based cost calculations appropriately consider all plant and equipment to be malleable, and are therefore constructed from the ground up".[183]

199. Similarly, Professor Vogelsang has stated that "[t]he conventional approach to TSLRIC measurement has been to interpret "long-term" to mean that all costs are variable so that the costs measured are those of a hypothetical firm that starts from scratch".[184]

200. The conceptual paradigm of a hypothetical efficient operator building a new network on a clean slate using modern efficient technology therefore captures the efficient incremental costs that will be incurred over the long run in providing the regulated service. And to the extent that these costs are assessed based on present and

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181 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [171]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [169].

183 John W. Mayo (2003) "Efficient Forward-Looking Telecommunications Networks as a Foundation for TELRIC" in *Pricing Based on Economic Cost: The Role and Mechanics of TELRIC*, a collection of essays published on the FCC website, available at http://apps.fcc.gov/ecfs/document/view;jsessionid=bxchRlNG6hyvDBpyF7cN20J5jv2C5G65Wvs6vV4YgTpvWGQrptYQ!-1694890999!-477673473?id=6515382451, p.1.13.

184 Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [86].

ongoing future costs, then it will also account for the "forward-looking" concept of TSLRIC.

201. The economics literature also supports the proposition that the conventional implementation of the TSLRIC concept is based on the assumption of a hypothetical network being built from scratch using modern efficient technology, as shown by the following examples.[185]

201.1 Noam states that "TSLRIC is defined as the total forward-looking cost of a hypothetical, efficient system built from scratch, using the most efficient modern technology".[186]

201.2 Kahn, in discussing TELRIC, describes it as "the costs of a hypothetical, most efficient new entrant, constructing an entire set of facilities as though writing on a blank slate".[187]

201.3 Ergas refers to the "thought experiment" underlying TSLRIC as "the hypothetical builder of a new, wholesale only, network".[188]

201.4 Bauer refers to TELRIC as "a forward-looking methodology to generate a benchmark based on the assumption that an efficient, modern network (rather than the legacy network) is in place".[189]

202. Regulators have taken a similar view in respect of the hypothetical efficient operator paradigm underlying the TSLRIC concept. For example:

202.1 The ACCC applied a TSLRIC concept to determine wholesale prices for unbundled local loop services up until 2011 when it was replaced with a building blocks methodology. In respect of the TSLRIC concept applied, the ACCC has stated:[190]

> …each time an access price is determined, the existing sunk investment (in this case the [copper access network]) is revalued on the basis of a hypothetical situation **where a brand new network is instantaneously constructed**, and replicates the existing network's service potential, **but uses best-in-use technology** based on forecast demand. The 'cost' of building this hypothetical replacement network is therefore the 'asset base' from which access prices are determined.

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185 The references to the economics literature below are intended to illustrate what the authors consider to be the conceptual framework underlying the TSLRIC/TELRIC concepts. The citations should not be taken to indicate that we either agree or disagree with the remaining arguments raised in the papers cited.

186 Eli M. Noam (2001), *Interconnecting the Network of Networks*, Massachusetts Institute of Technology, Massachusetts, p.95.

187 Alfred E. Kahn (2001), *Whom the Gods Would Destroy or How Not to Deregulate*, AEI-Brookings Joint Center for Regulatory Studies, Washington D.C., p.4.

188 Henry Ergas (2009) "Time Consistency in Regulatory Price Setting: An Australian Case Study" *Review of Network Economics*, 8(2), 153-163, p.160.

189 Johannes M. Bauer (2005) "Unbundling Policy in the United States: Players, Outcomes and Effects" *Communications & Strategies*, 57, 59-82, p.65.

190 ACCC (2009) "Assessment of Telstra's Unconditioned Local Loop Service Band 2 monthly charge undertaking" Final decision, August, p. 54, emphasis added.

202.2 The Irish Commission for Communications Regulations (ComReg) previously set wholesale prices for unbundled local loop services using a conventional application of a bottom-up long run average incremental cost (BU-LRAIC) model (ComReg has recently moved to an approach based on recommendations by the European Commission, which we discuss further below). Such a model follows the same general principles used for TSLRIC/TELRIC modelling. ComReg has stated in regards to the conventional approach that it used that "[a] principal characteristic of a model of this nature is that it allows for the cost of a newly designed modern efficient network" and that "ComReg believes that the BU-LRAIC methodology should reflect assets of a new network". [191,192]

203. Similarly, in a 2013 submission on behalf of Vodafone to MBIE, Network Strategies summarised standard practice in respect of TSLRIC modelling:[193]

> Regulators typically develop a bottom-up economic/engineering cost model to estimate TSLRIC prices. This involves estimating the cost of replicating the functionality of the network if it had to be built from scratch today. Current market or replacement cost is applied, the network is dimensioned to meet current (and forecast) demand and the number and type of modern equivalent assets (MEA) that need to be costed are estimated.

204. Chorus agreed that "a conventional approach to TSLRIC is consistent with the statutory purpose and the conclusion of the Court of Appeal in its recent consideration of the UBA initial pricing principle".[194] Chorus also agreed that conventional TSLRIC requires consideration of a new network built from scratch.[195]

205. Spark criticised the dates of the above citations, and stated that they do not reflect "modern TSLRIC thinking".[196]

206. However, we note that the same view is expressed in the more recent citations referred to above, such as that of Network Strategies (Spark's consultants in the current FPP process) in 2013, and Professor Vogelsang in 2014. In addition, Tardiff (2015) has referred to the TELRIC methodology as basing "wholesale prices on a

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191 ComReg (2010) "Response to Consultation Documents No. 09/39 and 09/62" Decision No. 01/10, 9 February, paragraph [1.11].

192 *Ibid*, paragraph [4.177].

193 Network Strategies (2013) "Final report for Vodafone New Zealand: Review of the Telecommunications Act 2001" 13 September, p. 24.

194 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, paragraph [7].

195 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, paragraph [8].

196 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [86].

hypothetical incumbent that served the entirety of its volumes with completely new equipment".[197]

207. There also seems to be overall agreement on the core elements of this approach. As Wigley and Company submitted, "the one element of common ground between Chorus and our RSP and consumer representative clients is that[198] 'the historic costs of network deployment … are irrelevant in calculating a forward-looking long run incremental total cost of the service … forward-looking costs reflect the costs that a network operator would incur if it built a new network today using assets collectively referred to as the modern equivalent asset'".[199]

208. Submitters have also generally supported, in broad terms, the use of the hypothetical efficient operator as a tool to implement our statutory task. For example:

208.1 Chorus submitted that the hypothetical efficient operator concept is a tool used to determine the TSLRIC price of providing the regulated service;[200]

208.2 Spark supported the hypothetical efficient operator approach as pointing to a solid foundation for the TSLRIC model;[201]

208.3 Vodafone submitted that "there is general agreement that TSLRIC must reflect the price of a hypothetically efficient operator (HEO) deploying a network using modern equivalent assets (MEA)";[202] and

208.4 Wigley and Company submitted that "the whole idea is not to model the incumbent's network".[203]

209. In summary, we have adopted the conventional approach to TSLRIC of modelling a hypothetical efficient operator constructing a new network with modern and efficient technology as a tool in implementing TSLRIC. We consider that this approach gives effect to the statutory language, is consistent with the TSLRIC objectives/outcomes and assists in developing an overall coherent model that will

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197 Timothy Tardiff (2015), "Prices based on current cost or historical cost: How different are they?", *Journal of Regulatory Economics*, 47, 201-217, p.202.

198 Quoting Chorus (Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 13 August 2015 at [62]).

199 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015 at [6.11].

200 Chorus "Submission for Chorus in response to Draft Ricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" 20 February 2015, paragraphs [101-102].

201 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [36].

202 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, at executive summary "ii)".

203 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [5.18e] and [2.31].

promote the section 18 purpose statement. We have, however, also remained open to revising or departing from this approach in light of submissions on particular issues as discussed throughout this determination.

The hypothetical efficient operator and "efficiency"

210. An important component of the hypothetical efficient operator, and indeed the TSLRIC concept, is "efficiency". However, there are different efficiency considerations that we have regard to.

211. For example, the hypothetical efficient operator achieves productive efficiency by minimising its costs in the production of goods and services, subject to factors such as scope, quality and technological performance. That is, subject to meeting customer preferences, the hypothetical efficient operator is assumed to adopt least cost technologies and processes, and to optimise its network deployment to efficiently meet expected demand.

212. In addition to productive efficiency, we are also required by section 18(2) to consider other efficiencies that may result from our decisions. As identified earlier, this includes dynamic efficiency as well as static efficiency. Dynamic efficiency permits an inter-temporal aspect to assessing efficiency, so that we should consider aspects such as lifetimes and forward-looking performance.

213. In assessing whether particular modelling decisions are likely to promote outcomes that are dynamically efficient, we have been conscious of the role played by the price we are setting. It is a nationwide price, and it affects investment and consumption decisions not just by Chorus, but also by access seekers and consumers of telecommunications services. In particular, the UBA increment determines the difference between the total price for the UBA service and the price for the UCLL service, and thus is a significant factor in access seekers' decisions whether to unbundle.

214. We also consider efficiency in terms of the outcomes that TSLRIC can achieve, as provided by the various TSLRIC objectives/outcomes identified earlier (such as the incentive for efficient investment).

215. In terms of our application of these concepts, Spark submitted that the "most efficient" means the "cheapest" technology.[204] Spark also submitted that we have "allowed economic concepts to exclude the application of the clear statutory purpose".[205] In particular, Spark submitted that a clear "efficiency objective" is established in the definition of TSLRIC and section 18, and that we have failed to recognise this in our decision-making process. [206,207]

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204 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [42(b)].

205 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [64(b)].

206 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015 paragraph [12] of Executive Summary.

216. Russell McVeagh stated that "section 18(2) guides the Commission to ensure that only efficient costs are included in its cost model".[208] To the same effect, Wigley and Company submitted that we must first determine the "efficient cost", which it equates with "least cost", before considering any section 18 efficiencies.[209]

217. On the other hand, Chorus and other submitters argued that we applied the concept of efficiency in an "unrealistic" manner.

217.1 "The Commission is proposing to use unrealistic hypothetical costs which are significantly below what any operator could achieve building a nationwide network in New Zealand today".[210]

217.2 "The much lower prices proposed by the Commission are based on hypothetical choices that are disconnected from the reality in New Zealand, compounded by unrealistic efficiency discounts".[211]

217.3 "The Commission's draft determination has used an impossibly high efficiency standard not anchored on real world data".[212]

218. We address the issue of whether particular modelling decisions are unrealistic or otherwise depart from the standard of productive efficiency as they arise in the following Chapters and Attachments.

219. The point we address here is the submissions by Spark, Russell McVeagh and Wigley and Company that we have failed to give effect to the efficiency objective in section 18(2) and that any modelling decision that does not produce the lowest cost possible is inefficient by definition.

220. These submitters appear to have misinterpreted our framework and taken a one-dimensional approach to efficiency.

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207 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [68].

208 Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews", 24 September 2015, paragraph [28(c)] (emphasis added).

209 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [5.18].] and Wigley and Company "Submission on Further Draft Pricing Review UCLL and UBA Determinations" 13 August 2015, paragraph [4.10].

210 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, p.3 (emphasis added).

211 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, p.4 (emphasis added).

212 L1 Capital, Cross-submission dated 24 September 2015, p.4 (emphasis added).

221. Specifically, we note the following points.

221.1 Our immediate task is to apply TSLRIC. The statutory task is informed by section 18 considerations. Section 18 considerations cannot override the obligation to first focus on the application of TSLRIC.

221.2 The concept of efficiency (including both dynamic and static efficiency) is a core element of our regulatory framework. In particular, we have given effect to section 18(2) which requires us to consider the efficiencies that will result, or will be likely to result, from our decision-making process.

221.3 Most of the TSLRIC objectives/outcomes that we consider when exercising our judgement contain efficiency elements (eg, efficient investment, efficient entry in downstream (retail) markets, efficient use of infrastructure and efficient cost recovery).

221.4 Our modelling decisions are consistent with these objectives/outcomes, as shown by the following examples.

221.4.1 The network deployment decision is consistent with the efficient cost recovery and incentives for cost minimisation objectives/outcomes.

221.4.2 The asset valuation decision is consistent with efficient cost recovery (expectation of recovering efficient forward-looking costs), and consistent with promoting efficient build-buy decisions by access seekers.

221.4.3 The decision on the allowance for certain asymmetric risks that the hypothetical efficient operator is likely to face is consistent with efficient cost recovery and incentives for minimising cost.

221.5 We do not agree that promoting efficient outcomes always means the same as “least cost” or lowest possible cost. Section 18(2) relates to efficiencies that “will result” or are outcomes of our decision-making. That is, we need to consider whether our individual and collective modelling decisions will yield efficient outcomes. This can be distinguished from determining whether an individual modelling choice represents an efficient cost or an efficient firm’s decision. While matters such as network deployment and optimisation may principally involve productive efficiency, decisions that affect incentives to invest (such as the asset valuation methodology) relate to dynamic efficiency. We are not aware of any international precedent that ignores dynamic efficiency considerations in TSLRIC modelling. Further, we do not consider that such an approach would be consistent with the section 18 purpose or the TSLRIC objectives/outcomes.

221.6 Nor do we agree that the Act contemplates a separate exercise of determining the “efficient cost” of the network before considering whether section 18 requires an adjustment to that price so as to promote static or dynamic efficiencies. The task of modelling the network of a hypothetical

efficient operator must be guided by the purpose of the Act (including the need to take into account dynamic and static efficiencies). That purpose will not necessarily require that the lowest cost approach be adopted at each and every step.

222. In summary, we have postulated a hypothetical efficient operator that is efficient in the sense that it adopts least cost technologies and processes, taking into account performance, capacity and other considerations. However, in making other modelling choices (such as asset valuation or considering whether to make an adjustment from the central TSLRIC estimate) we are dealing with efficiency concepts that cannot be reduced to a "least cost" requirement.

The hypothetical efficient operator compared to an efficient Chorus

223. Submitters have generally supported the hypothetical efficient operator approach, but they differed in their views in how the hypothetical efficient operator concept is characterised for the purpose of the TSLRIC modelling. For example, Chorus characterised the hypothetical efficient operator as a replacement for Chorus without access to Chorus' assets.[213] In contrast, Network Strategies characterised the hypothetical efficient operator as an operator that would seek to re-use assets that were available.[214]

224. We note that alternatives to modelling a hypothetical efficient operator were open to us. These included modelling an "efficient Chorus", that is an entity that had access to Chorus' assets but which is assumed to make efficient investment and operational decisions. The difference between these approaches is more marked with respect to the UCLL service, which requires a full network to be modelled rather than just the components required to supply the UBA increment, but the conceptual choice is still relevant to UBA.

225. While we have kept an open mind on the characteristics of the hypothetical efficient operator, we continue to believe that adopting the conventional approach of hypothesising an efficient operator building and operating an entirely new network using modern assets is more appropriate for this FPP.

226. The concept of the hypothetical efficient operator helps us to model a network that is not constrained by the legacy decisions of the incumbent.

    226.1 We believe that our hypothetical efficient operator concept is the most appropriate approach to implementing TSLRIC. In particular, we consider that this approach is the best fit with the statutory requirement to model "forward-looking" and "long run" costs (which are relevant elements of our statutory task), and consistent with the conventional approach for

213 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.66.

214 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.69.

implementing TSLRIC (which is the best way of implementing our statutory task).

226.2 An "efficient Chorus" approach (ie, hypothesising an entity that has access to Chorus' assets) might lead to irrational results. If the "efficient Chorus" had the existing network used to provide the UBA increment at its disposal, then this would tend towards a cost model based on the use of that network. That is, the logic of having assets available for re-use may result in a cost model that tended toward the short-run marginal cost of operating the existing UBA network. We do not think that such a result would be recognisable as a TSLRIC model since it would omit fixed costs, not involve optimisation and not send appropriate build/buy signals. No party has suggested that this is the correct outcome of the FPP.

226.3 A relevant TSLRIC objective/outcome for this exercise is "efficient investment (both by the service provider and by access seekers)". As we explain further below, the approach we have adopted for determining TSLRIC can provide neutral incentives for efficient "build/buy" decisions by access seekers, in terms of buying the wholesale service from the access provider (ie, Chorus), or building an alternative bypass network, where it is efficient to do so.

226.4 The conventional approach to TSLRIC is typically seen by regulators and economists as being consistent with the competitive market standard.[215] This is consistent with the section 18 purpose statement of promoting competition for the long-term benefit of end-users. In this regard, we agree with the following statement by the Australian Competition Tribunal in the *Telstra* case on why the competitive market standard is consistent with efficiency and promoting competition:[216]

> A long-established body of economic analysis supports the view that a competitive price sends the right signals for promoting competition in markets for services provided by access seekers by means of their use of the [unbundled local loop service]…; and for the economically efficient use of, and investment in, the infrastructure…

226.5 As mentioned above, the Court of Appeal recently commented, in Chorus' challenge of our IPP determination for the UBA service, that "the TSLRIC model provides an estimate of the costs of an efficient access provider over a sufficient period of time (long run), on a "forward-looking" basis (reflecting

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215 Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [46], referring to the objectives of "classical" (which we refer to here as conventional) TSLRIC. See also the FCC's description of its TELRIC methodology, which is consistent with the conventional approach to TSLRIC, and is referred to as replicating "to the extent possible, the conditions of a competitive market" (FCC "In the matter of implementation of the Local Competition Provisions in the Telecommunications Act 1996" CC Docket No. 96-98, August 1996, paragraph [679]).

216 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [191].

the notional costs to an operator if it built a new network) *rather than of Chorus's actual costs*" (emphasis added).[217]

227. We also consider that modelling a hypothetical efficient operator will promote the section 18 purpose statement. In particular, we consider build/buy incentives to be important in the New Zealand context and that the hypothetical efficient operator concept is the best tool for ensuring that appropriate incentives are set.

228. In terms of the importance of build/buy incentives we note the points below.

228.1 All parties in the present process appear to accept that the copper network will remain relevant in significant areas of the country for some time. The UBA network is therefore also likely to be relevant where households purchase broadband services. Therefore, in New Zealand, build versus buy incentives remain relevant.

228.2 There has been competitive bypass of Chorus' UBA network by access seekers that have unbundled Chorus' cabinets and exchanges. Such unbundling has continued since the introduction of cost-based prices for the UBA increment, with new exchanges being unbundled during 2015.

229. Our conventional approach sets appropriate incentives for access seekers to buy the regulated service from Chorus, or build an alternative bypass network, where it is efficient to do so. It is not clear that an "efficient Chorus" approach provides these same incentives. In particular, by reflecting components of Chorus' existing network, the efficient Chorus approach would only provide build/buy incentives where those same parts of Chorus' network could be re-used, regardless of whether or not it is efficient to do so or whether an entity would be able to obtain access to those parts of Chorus' network.

230. For all of these reasons, we have concluded that modelling a hypothetical efficient operator building and operating an entirely new network using modern assets is the appropriate approach for this FPP.

The role of the hypothetical efficient operator concept

231. Spark argued that our "interpretation of a 'conventional' TSLRIC framework pre-determines some of the key individual modelling choices it [we] must make".[218] Related to this, Spark suggests that our adoption of a conventional approach is a "key determinant" of our modelling choices.[219]

232. We disagree that our interpretation of TSLRIC has "pre-determined" any of our modelling decisions.

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217 *Chorus v Commerce Commission* [2014] NZCA 440 at [30].

218 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [12].

219 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [11] of Executive Summary.

233. As we explained in the July 2015 UCLL and UBA further draft determination papers, while the concept of a hypothetical efficient operator building and operating a new network from scratch is important to a number of our modelling decisions, we have also remained open to revising this approach.[220]

234. We also consider that the hypothetical efficient operator concept fits well with our statutory task, the TSLRIC objectives/outcomes and the section 18 purpose statement.

235. We also endeavoured to develop a model that is internally consistent.[221] This consistency was assisted by the use of the hypothetical efficient operator concept as an organising principle. However, in making individual modelling decisions and in making our determination overall, we have:

    235.1 considered each decision on its merits;

    235.2 remained open to taking an approach even if it did not fit with the hypothetical efficient operator, if this was justified in the circumstances; and

    235.3 remained open to adopting a different organising principle.

236. We have also not used the conventional approach to TSLRIC as a "key determinant" of our modelling choices, as suggested by Spark. Rather, our modelling choices are informed by several elements, as explained in this Chapter.

237. Spark also appeared to suggest that we considered "conventionality" as a principle in its own right.[222] This is not correct – we use "conventionality" as a means of describing a particular way of implementing TSLRIC, and (as we explain in this Chapter) we have considered whether that implementation approach is appropriate relative to alternative approaches.[223]

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220 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [184]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [183].

221 As explained in the relevant Attachments, we recognise that there are degrees of consistency and that a departure from a guiding principle (or revisiting a guiding principle) might be justified in particular circumstances.

222 See, for example, Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [20], suggesting that our approach gives weight to "conventionality".

223 The conventional approach is also referred to by others as the "classical" approach (see Ingo Vogelsang, "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, section 3; and Sapere "Report for Chorus Limited - Cross-submission on UCLL and UBA Price Determination Issues" 22 September 2015, paragraph [67]) and the "traditional" approach (see Spark "Analytical framework for considering an uplift to FPP prices" 11 May 2015, paragraph [86]).

238. Chorus submitted a "HEO's business case" that purports to show that a financial analysis based on our TSLRIC modelling "doesn't stack up".[224] We reject the intent of Chorus' analysis.

239. In our December 2014 UCLL and UBA draft determinations and in the July 2015 UCLL and UBA further draft determinations we noted that the conventional approach to TSLRIC "is not intended to be a business plan for building and operating a high-speed nationwide network replacement accounting for resource pressures".[225,226]

240. The purpose of our TSLRIC exercise is to set robust and representative wholesale prices for the regulated services in accordance with the section 18 purpose statement. As supported by submitters, we have abstracted from reality, eg, the hypothetical efficient operator has sufficient access to resources and instantaneously commissions a national network that replaces existing fixed telecommunications networks. We remain of the view that our modelling does not need to provide a business plan for a nationwide replacement real telecommunications network.

The context in which the hypothetical efficient operator builds and operates the hypothetical network

241. We consider that we do not need to specify in too much detail the exact circumstances in which our hypothetical efficient operator will build a replacement network (to reflect the "additional costs" component of providing the UBA service), when the intent of this paradigm is simply to help us identify forward-looking long run incremental costs. Even so, some elements of the hypothetical efficient operator thought experiment do need considering, as they help us understand the nature of the costs that are to be incurred. We set out these considerations in this section.

Real-world information may be a relevant consideration for our modelling decisions

242. Real-world constraints exist in the hypothetical world in which the network is replaced. These constraints are based on what, in our view, are the constraints that would be faced by a hypothetical efficient operator building a new network in New Zealand.

243. Yet we note that not all aspects of the real world are typically reflected in a modelling environment. For example, in the present circumstances we make a simplifying assumption that the hypothetical efficient operator has sufficient access to land, labour, capital and other resources to construct and operate its network, without inducing higher prices for these resources.

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224 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, p. 2.

225 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [156]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [126].

226 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [184]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [183].

244. The hypothetical efficient operator is not constrained by the legacy decisions of the incumbent. This applies, for example to network technology, network design, the nature of the assets and cost structures. The characteristics and costs of the incumbent are therefore not a necessary consideration in regards to the new network that is built and operated for the purposes of determining forward-looking efficient costs.

245. Baumol, Ordover and Willig state that "proper TSLRIC estimates do not simply accept the architecture, sizing, technology, or operating decisions of the ILECs [incumbent] as bases for calculating TSLRIC".[227] The logic is that the network built by the incumbent, and the costs that it incurs, are not necessarily efficient, and that to take these as given would be inconsistent with the TSLRIC approach of reflecting efficient forward-looking costs.

246. Having said that, real-world information may be used to inform our assessment of constraints a hypothetical efficient operator would likely face and decisions it would likely take. For example, in some circumstances, decisions made by Chorus and others in the real world, to the extent that these are considered efficient, may indicate the hypothetical efficient operator's likely response to the same issues.

247. Indeed, many of our decisions involve matters that are, to some extent, objectively measurable. In these cases we believe it is appropriate to use data and evidence, which may include data from Chorus and others, to determine our best estimate of what an objective value is, rather than relying on subjective assertions or speculation. This does not detract from the approach of the hypothetical efficient operator concept; rather, it uses real-world information to inform our assessment of this concept. We discuss the use of real-world data in more detail later in this Chapter in respect of evidential matters.

248. Spark agreed that the hypothetical efficient operator "must not lock-in historic asset classes or network design choices that would be regarded as economically inefficient in a deployment today".[228] Spark also submitted "investments and decisions made in the past, do not necessarily reflect those of the future".[229]

249. Vodafone submitted that "real world information can inform the Commission's assessment of the constraints on an HEO and its likely decisions", and submitted that

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227 "Affidavit of William J. Baumol, Janusz A. Ordover, and Robert D. Willig (1996), Attachment to Comments filed by AT&T on May 14, 1996 in FCC Docket 96-98, at p.9. See also, for example, Gregory L. Rosston and Roger G. Noll (2002) "The Economics of the Supreme Court's Decision on Forward Looking Costs" *Review of Economics*, 1(2), 1-13, at p.3, who state that "According to the TELRIC method, the price of a[n] [unbundled network element] should be based on the cost of building an efficient network using the best available technology, rather than the actual cost of the incumbent's network (or any other network that was built in the past)".

228 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [42(c)].

229 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015 paragraph [30].

"it is also necessary to extrapolate from real world information to identify the choices that an efficient HEO would make".[230]

250. We agree with Spark and Vodafone. We agree that we can take into account real-world information (including Chorus') when we have reasons to believe that it is efficient.

251. For instance, as further explained in this determination, we considered Chorus' information when determining: the hypothetical efficient operator's network deployment (we also used LFCs' data); asset lives; price trends (Chorus data has been considered where appropriate only); opex; and NRC (where we have also used Chorus data and adjusted for efficiencies).

The hypothetical efficient operator environment

252. The economics literature on TSLRIC/TELRIC referred to above considers that only the telecommunications fixed network is being built from scratch.

253. In determining long run incremental costs for the fixed telecommunications network that is built from scratch, it is assumed that Chorus' copper network, LFCs' infrastructure and Chorus' UFB infrastructure do not exist. As a consequence, Chorus' and LFCs' demands are served by the hypothetical efficient operator, and the hypothetical efficient operator does not re-use or share their assets. Attachments A and E contain further explanation on this point.

254. Our task is to determine a robust representative price for a nationwide copper network. We consider that to assume that the existing LFCs' infrastructure and Chorus' UFB infrastructure existed in the hypothetical environment would not assist in achieving these objectives. In particular, it does not seem plausible in this exercise to assume that the hypothetical efficient operator's network and the LFC/Chorus UFB networks would co-exist, given the nature of the UFB infrastructure as a government sponsored overbuild of the existing access network implementing modern technology. We also consider that such an assumption may interfere with setting efficient build/buy signals, which would not promote the section 18 purpose statement.

255. However, nothing in the literature suggests that infrastructure of other networks (eg, mobile networks, HFC networks, electricity networks) is also being built; rather, it appears that such infrastructure remains in place.

256. Accordingly, Attachment D considers whether the hypothetical efficient operator could share certain assets (eg, underground infrastructure) with other networks that already exist.

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230 Vodafone "Submission to the New Zealand Commerce Commission Further Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop Service and Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access Service" 13 August 2015, paragraph [A4.5].

257. We consider also that, to the extent that it is relevant to our modelling choices, the current regulatory and legislative environment facing the hypothetical efficient operator should generally reflect real-world circumstances.

258. We consider that the Resource Management Act (RMA) 1991, as amended, is a relevant consideration for this determination in terms of costs incurred by the hypothetical efficient operator.[231] We have identified the areas where we consider such costs would arise, including trenching. As explained further in the relevant Attachments, based on the assumptions that RMA consent would be sought where relevant and granted, we have made our best estimate of the costs associated with obtaining the relevant consents.

259. Similarly, the New Zealand Health and Safety regulations are a relevant consideration in this determination, particularly the Health and Safety in Employment Act 1992 (as amended), and the Health and Safety at Work Act 2015.

260. We consider that the hypothetical efficient operator should conduct its operations in accordance with the relevant New Zealand industry codes of practice and standards. We discuss this in more detail in Attachment J with respect to trenching.

261. As explained in Chapter 1, we have not taken into account proposed changes to the Telecommunications Act because we are required to apply the legislation as it currently stands.

262. Separately, some submitters suggested that we should take into account reforms to other aspects of the regulatory environment (beyond the Telecommunications Act), such as amendments to the National Environmental Standards for Telecommunications Facilities, in determining the hypothetical efficient operator's environment. While we are not required to assume that the existing regulatory environment will remain static and are open to considering potential developments, in our view it would be too speculative to rely on those changes at this stage.[232]

263. As Chorus submitted in relation to amendments to the National Environmental Standards for Telecommunication Facilities, "the proposed amendments to the NESTF are not in place and there is no guarantee they will be implemented as currently being discussed".[233]

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231 The RMA requires local Councils to ensure that environmental impacts are managed sustainably. To comply with this obligation, each local Council has a set of rules. These rules typically differ to some degree as the rules relate specifically to the relevant local areas and the costs associated with obtaining consents or planning permission also vary.

232 On 24 September 2015, the Communications Minister and the Minister for the Environment announced proposed changes to the National Environmental Standards following consultation earlier in the year (see http://www.beehive.govt.nz/release/new-rma-standard-streamline-telecommunications-upgrades). However, without firm information about the form and timing of any proposed changes, we consider that the proposed changes remain too speculative to take into account in the present process.

233 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)", paragraph [47]

The concept of a modern equivalent asset

264. An important aspect of our approach for implementing TSLRIC is the concept of the MEA. The MEA identifies assets that an efficient operator would deploy today to provide the service in question. In regards to the UBA service, the MEA relates to the "additional costs" component of providing the UBA service.

265. Using a MEA allows prices to reflect the costs of modern and efficient technology. This is consistent with the definition of TSLRIC, particularly the requirement to estimate costs on a forward-looking basis. Identifying modern and efficient technology that is used to provide the regulated service provides us with an appropriate basis for reflecting the current and ongoing future costs of providing that service.

266. The use of a MEA is also consistent with a number of the TSLRIC objectives/outcomes we have identified earlier in this Chapter. Allowing prices to reflect the costs of modern and efficient technology provides incentives for investment to occur in similar technologies where it is efficient. In a similar manner, a MEA is consistent with providing incentives for Chorus to minimise its costs in line with those that would be associated with modern and efficient technology, and allowing for the recovery of costs that are efficiently incurred.

267. The concept of a MEA is also a key component of the conventional approach to implementing the concept of TSLRIC, which as discussed earlier in this Chapter estimates forward-looking, long run, efficiently incurred, incremental costs by hypothesising an efficient operator building and operating a new network using modern and efficient assets.

268. An alternative to the MEA concept is to assume that the assets providing the regulated service are the existing assets of the incumbent operator. This is the approach implicit in the cost model submitted by Chorus as part of our consultation process, which uses Chorus' actual existing network assets to determine TSLRIC-based prices (see Attachment Q – Chorus' cost model for a discussion of this model).

269. We consider that such an approach would not be consistent with the requirement to estimate efficient costs on a forward-looking basis, as legacy assets are unlikely to be the most efficient technology, and their costs may not be efficiently incurred. This is contrary to the efficiency-based TSLRIC objectives/outcomes, the requirement to consider efficiencies in section 18(2) and the conventional approach to implementing the concept of TSLRIC.

270. Submitters generally agree that it is appropriate to undertake a thought experiment using hypothetical tools such as the concept of MEA (Spark,[234] Chorus,[235] Vodafone,[236] Wigley and Company,[237] and WIK).[238] Some submitters also specifically identified the concept of a MEA as being a key requirement of the TSLRIC concept. For example, Network Strategies submitted:[239,240]

> One of the key requirements of a TSLRIC model is that it represents an efficient network utilising modern efficient assets (MEA) as deployed by a hypothetical operator.

271. Accordingly, we consider it is appropriate to adopt the concept of a MEA as a tool in implementing TSLRIC.

272. We discuss our considerations in selecting a MEA for the UBA increment later in this determination (Attachment B). As we explain in that Attachment, before we could determine the hypothetical efficient operator's network for the UBA increment, we had to consider the underlying network it would be additional to. We decided that the appropriate underlying access network is primarily copper-based – reflecting a fibre-to-the-cabinet deployment similar to Chorus' existing copper network. We then modelled the efficient costs that would be incurred in supplying the UBA increment using the MEA.

The European Commission is moving away from the conventional approach to TSLRIC

273. We have noted that the implementation of TSLRIC using a hypothetical efficient operator building an entirely new network with modern assets is the *conventional*

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234 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015, paragraph [36]; and Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph[25].

235 Chorus "Submission for Chorus in response to Draft Ricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" 20 February 2015, paragraphs [101-102].

236 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, at executive summary "ii)"; and Vodafone "Submission to the New Zealand Commerce Commission Further Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop Service and Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access Service" 13 August 2001, paragraph [A4.1],

237 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [5.18e] and [2.31].

238 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents, paragraph [172].

239 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 75. Note that Network Strategies used the term MEA to refer to a "modern efficient asset", whereas we refer to it as a "modern equivalent asset". This does not alter the intent of the point Network Strategies was making.

240 See also WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [460].

approach. We noted in the July 2015 UBA and UCLL further draft determinations that more recently, however, some regulators have been moving away from that approach.[241] In particular, the European Commission (EC) has recommended a costing methodology to be applied by European regulators that "should not assume the construction of an entirely new civil infrastructure network for deploying an NGA [next generation access] network".[242] Rather, the EC approach assumes that the hypothetical efficient operator can re-use certain legacy civil engineering assets when building a replacement network.

274. The EC's rationale for moving away from the conventional approach to TSLRIC appears to be twofold:

274.1 its recommended approach is regarded as sending the appropriate pricing signals for efficient market entry, reflecting a competitive process in the European context in which new entrants would be unlikely to replicate civil engineering infrastructure;[243] and

274.2 the approach is regarded by the EC as avoiding the risk of over-recovery by the incumbent of costs of re-useable legacy civil infrastructure, consistent with the EC recommendation that regulated access to such assets be provided, as discussed below.[244]

275. As a preliminary point, we note that neither the TSLRIC concept nor the valuation approach regarding civil engineering infrastructure are prescribed by European law.[245] While the Access Directive requires national regulatory authorities to consider imposing price control where effective competition is lacking, it does not mandate a particular pricing methodology.[246] In making its recommendation, the EC had discretion in designing an appropriate methodology.

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241 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [193]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [192].

242 European Commission "Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment" 11 September 2013, paragraph [32].

243 European Commission "Commission staff working document – Impact assessment accompanying the document Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment" 11 September 2013, p. 43 and 82.

244 European Commission "Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment" 11 September 2013, recommendation [35].

245 We also note that the New Zealand Parliament did not direct us to follow the EC approach.

246 Directive 2002/19/EC of the European Parliament and of the Council on access to, and interconnection of, electronic communications networks and associated facilities.

276. By contrast, we are required to apply TSLRIC.[247] This is not to suggest that we are bound by conventional economic underpinnings of TSLRIC. Indeed, we have remained open to both the EC approach and the conventional approach to TSLRIC. However, the EC may have more flexibility than we do to move away from what is considered to be a TSLRIC approach. As we note below, Professor Vogelsang has suggested that it is debatable whether the EC approach is within the limits of the TSLRIC concept. As well as being bound to apply TSLRIC, we are bound to follow the statutory requirement to determine the "forward-looking costs over the long run" of the regulated service.

277. In this context the EC's first rationale for moving away from the conventional approach to TSLRIC appears to be based in part on the desire to promote private investment in high speed broadband via next generation networks. The EC's approach is based on its view that such investment is expected to occur through the roll-out of a next generation network (eg, fibre) with re-use of the incumbent's civil engineering assets. In the European Union (EU), this process is yet to (materially) occur.

278. We consider, however, that we should take into account the circumstances in New Zealand, and the EC situation (in respect of the hypothetical efficient operator concept and re-use of civil engineering assets) is distinguishable to New Zealand in two important ways.

    278.1 The current situation in New Zealand in regards to next generation networks is characterised by fibre deployment through the subsidised UFB roll-out, which has already commenced and is ongoing.[248] In some areas, Chorus' copper network also remains subject to competitive UFB roll-outs by LFCs. Accordingly, we consider that the process regarding next generation network investment in New Zealand is different from that used to justify a movement away from the conventional TSLRIC concept by the EC.

    278.2 The EU has a more extensive regulatory regime for regulated access to certain civil engineering assets (eg, ducts, trenches and poles) than New Zealand. Directive 2014/61/EU of the European Parliament and Council of the European Union directs member states to ensure network operators can offer undertakings to provide access to physical infrastructure for deploying high speed electronic communication networks.[249] In addition, the EC has stated that "[a]ccess to civil engineering infrastructure is crucial for the deployment of parallel fibre networks" and recommended that "[w]here duct

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247 Spark agreed that New Zealand's TSLRIC definition places certain strictures on the implementation of TSLRIC modelling, but considers that these strictures are reflected in the EC's approach (Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [91]).

248 In broad terms, the Government has offered subsidies (in the form of interest free loans) to network operators willing to invest in next generation networks. The contracts have been awarded by competitive tender with Chorus being successful in some areas and LFCs in others. The process is ongoing. See http://www.crownfibre.govt.nz/crown-partners/agreements-with-ufb-partners/.

249 See Article 3 of "Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high speed electronic communication networks".

capacity is available, NRAs should mandate access to civil engineering infrastructure".[250] This points towards a greater likelihood of competition occurring through the re-use of existing civil engineering assets in the EU than it would in New Zealand.

279. Where entities constructing a new network are provided regulated access to assets, the pricing of services based on re-use of such assets can be compatible with efficient build/buy decisions, in contrast to the New Zealand situation where there is no such regulated access.

280. Overall, the EC's modified approach to TSLRIC can be seen as implementation of a specific policy framework. Such an approach imposes a tight constraint on legacy network prices and uses relaxed regulation of next generation network prices as an incentive for such investment.[251,252] One possible motivation for this approach is to provide incentives for investment by incumbents in next generation networks.[253]

281. Spark suggested that our consideration of the EC's first rationale amounts to preferring a particular form of competition, and has submitted that it is highly debatable whether it is open to us to do so.[254]

282. We disagree with Spark. We have remained open to the forms of competition that can occur, and consider that our approach to implementing TSLRIC allows competition to occur as and where it is efficient. It is the EC that has focused on attempting to encourage investment in a particular way. As the circumstances in New Zealand are different, we do not consider it appropriate to try to encourage investment in that same way by adopting the EC approach. This would require us to take a view on the place of re-useable assets in future competition, rather than allowing that competition to occur as and where it is efficient. As noted earlier and accepted by Spark, the conventional approach to TSLRIC is consistent with the competitive market standard.[255] This provides a neutral approach to the form of competition that arises.

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250 European Commission "Commission recommendation of 20 September 2010 on regulated access to Next Generation Access Networks (NGA)" 20 September 2010, paragraph [12] and recommendation [13].

251 The EC anticipates that access prices for the full unbundled copper local loop will be in the range of €8-10 in 2012 prices (recommendation [41] of European Commission "Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment" 11 September 2013).

252 See recommendations [1]-[3] of European Commission "Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment" 11 September 2013.

253 Regarding the tight constraint on legacy network prices, WIK has previously stated that "[h]igh levels of copper access charges generate negative incentives for incumbents to invest into fibre because of profit cannibalization" – WIK, "Wholesale pricing, NGA take-up and competition" 7 April 2011, p.9.

254 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [92].

255 Spark said that "the TSLRIC methodology seeks to establish efficient prices that would be the outcome of a competitive market – providing efficient signals for access provider, RSP and end user consumption".

283. In respect of the EC's second rationale, regarding the risk of over-recovery of costs, in our view TSLRIC is based on forward-looking costs, and is not directly concerned with the regulated firm's recovery of past expenditure.[256] To the extent that the regulated firm over- or under-recovers against the costs it has already incurred, then this does not alter the efficiency-enhancing properties of TSLRIC, including the incentivising of efficient build/buy decisions. In other words, one outcome of TSLRIC is to limit the regulated entity's ability to set prices at a monopoly level. However, this is achieved by setting an objectively efficient price rather than by modelling a reasonable return on the incumbent's historic investment. As we discuss in more detail in in Attachment E in respect of asset valuation, TSLRIC in this regard differs from the approach taken under Part 4 of the Commerce Act. We again note the EC's flexibility as to its choice of pricing principles.

284. Spark submitted that it "seems incontrovertible to us that the creation of windfall gains for a monopoly provider of regulated services must be inefficient. Excess returns above a normal return do not advance end-users' interests in any identifiable way".[257]

285. A substantial body of academic literature and regulatory decision-making (referred to earlier in this Chapter) highlights the efficiency properties of TSLRIC. These efficiency properties arise even though TSLRIC is not directly concerned with the regulated firm's recovery of past expenditure. In contrast, Spark provided no evidence to support its "incontrovertible" proposition. We explain further in Attachment E why the TSLRIC exercise that we are required to undertake is not directly concerned with "windfall gains" and "windfall losses".

286. Spark also appeared to have misinterpreted our analysis here. In contrast to Spark's suggestions, the EC's concern regarding any over- or under-recovery of costs already incurred by the regulated firm does not relate to excess returns above a normal return. Rather, the concern appears to relate to the lifetimes for many assets being much longer than modelled, which could lead to returns in excess of what they would have been had longer modelled lifetimes been used.[258]

287. In terms of the practical risk of over-recovery we also note the following.

    287.1 It is difficult to determine with any certainty whether prices set using TSLRIC would result in over-recovery for Chorus relative to its past prices. Professor Vogelsang noted that over-recovery in regards to TSLRIC in the EU has been driven by the modelled lifetimes for many assets being set much shorter than

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(Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015 at [5]).

256 As noted earlier, the Court of Appeal has taken a similar view – see *Chorus v Commerce Commission* [2014] NZCA 440 at [30].

257 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [95].

258 See Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [93] and [107].

turned out to be the case in reality. This resulted in higher prices than were needed to recover the costs of those assets.[259] In contrast, New Zealand has had no previous bottom-up cost modelling approach to determine Chorus' regulated access prices.[260]

287.2 We are setting TSLRIC in the factual context of the UFB fibre network being built, facilitated by government subsidy.[261] This will result in end-users migrating from the copper network to the fibre network.

287.3 In our view, it is by no means self-evident that Chorus will over-recover its costs on the copper network over the lifetime of its copper assets, when a certain proportion of its customers will migrate away to fibre before Chorus can recover those costs.[262] We have not received any submissions during this consultation process to convince us that any over-recovery exists.

288. Windfall gains or losses are possible when a price based on the TSLRIC concept is reset at a future regulatory determination, if the revaluation of assets based on current replacement costs differs from what was expected (and has been reflected in the price trends) at the current determination. However, as we discuss in more detail in Attachment E in regards to asset valuation, future resets should not result in systematic gains or losses provided the tilted annuity parameters are set in an unbiased manner.

289. More generally regarding the EC approach, we also note Professor Vogelsang's view, that it is open to debate whether the EC's approach is within the limits of the TSLRIC concept.[263] Professor Vogelsang noted that while the EC sees its approach as consistent with the conventional TSLRIC concept, in his view the approach is in fact a break from this concept.[264] Similarly, Sapere submitted that Spark's approach to

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259 Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [93] and [107].

260 Further, we have accounted for the risk of asset stranding through the use of our asset lives (see Attachment F – asymmetric risk). Whether this risk eventuates or not, the modelled asset lifetimes will not necessarily match what happens in reality. Even so, the risk of asset stranding remains.

261 We note also that the UFB roll-out was subject to a competitive tender. Such competition would provide an element of tension that would be expected to compete away, to some extent, any monopoly rents.

262 To the extent that over-recovery did occur, this could be mitigated to some extent by competition between Chorus' copper network and the fibre networks of LFCs. That is, in non-Chorus UFB areas, Chorus may lower the price below the TSLRIC-based price cap to compete with LFCs, reducing any possible over-recovery that might otherwise occur.

263 Ingo Vogelsang "Reply to Comments on my November 25, 2014 paper "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand"" 23 June 2015, paragraph [98].

264 Ingo Vogelsang "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand" 25 November 2014, paragraph [103].

TSLRIC (which is based on the EC approach regarding asset re-use) "does not fall under the auspices of TSLRIC".[265]

290. In conclusion, we remain of the view that there are important differences between New Zealand and the EC approach regarding the hypothetical efficient operator concept and re-use of civil engineering assets. On balance, we do not think there is a sufficiently strong case to follow the EC and move away from the conventional approach to implementing TSLRIC.[266]

291. Therefore, our decision is that TSLRIC is best implemented using the conventional approach, that is, by assuming a hypothetical efficient operator building and operating an entirely new network from scratch, using MEA technology, to provide the relevant regulated services. We also consider that the conventional approach best fits with the statutory task of determining "forward-looking costs" over the "long run".

292. While the concept of a hypothetical efficient operator building and operating an entirely new network from scratch is important to a number of our modelling decisions, we have also remained open to revising this approach. But we have found no reasons to justify us doing so.

293. In particular, after working through all the detailed decisions, we have remained of the view that the concept of a hypothetical efficient operator building a new network from scratch will best promote the section 18 purpose statement, by providing a framework for setting a price that is consistent with the competitive market standard. In doing so, this approach also provides for economic efficiency, consistent with section 18(2) and the TSLRIC objectives/outcomes, including by providing neutral incentives for build/buy decisions to occur where efficient.

Evidential matters

294. In the case of a number of our modelling decisions we have been assisted by looking at real-world evidence. An example is the economic lifetime of assets in our model.

295. In these instances we consider our best estimate of what an objective value would be to implement our statutory task. The evidence we considered included: data we gathered from Chorus, Vodafone, Spark, and LFCs; the views of experts including Beca, NZIER, and TERA's; and international benchmarking or approaches used by other regulators.

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265 Sapere "Report for Chorus Limited - Cross-submission on UCLL and UBA Price Determination Issues" 22 September 2015, paragraphs [75].

266 We also note that the ACCC recently reviewed and amended the pricing principle for fixed line access in Australia. In contrast to the EC varying the implementation of TSLRIC, the ACCC rejected TSLRIC and replaced it with a building blocks approach (ACCC "Review of the 1997 telecommunications access pricing principles for fixed line services Draft Report" September 2010).

296. At the conference, Chorus stated that there are certain modelling questions we need to answer by reference to the best available evidence.[267] Similarly Vodafone submitted that an assessment of the evidence can be used to answer some modelling questions.[268]

297. We have attempted to make best use of the available evidence. We have weighed up the available data points, considered the views of submitters, and exercised our judgement as to what provided the best objectively measurable data.

Other relevant considerations

298. In addition to the various elements set out above, there are also other considerations relevant to our modelling decisions.

Capital contributions

299. In our model of the hypothetical efficient operator, if the evidence suggests that certain costs are unlikely to fall on the hypothetical efficient operator, but rather are borne by other parties for parts of the network build, then we consider that these costs should not be included in TSLRIC. This might occur where the hypothetical efficient operator would seek a capital contribution from an end-user or require the end-user to provide part of the infrastructure to be connected.

300. We consider that this view is consistent with the principle against double recovery contained in clause 4B (discussed below), and it would be inconsistent with the promotion of competition for the long-term benefit of end-users to allow double recovery where it can be clearly identified.

301. In TSLRIC terms, we consider that these costs should not be included in TSLRIC since the hypothetical efficient operator (as the service provider) would not bear such costs. We discuss this issue further in Attachment K – Capital contributions.

Practical considerations

302. We note that because we are preparing a model (rather than building and deploying a new network in reality), modelling practicalities may often be an important consideration. These include the need to avoid unnecessarily complex approaches to modelling or the need to provide for modelling transparency. Examples of this are our modelling choice regarding the use of either the Shapley-Shubik approach or capacity-based approach in respect of cost allocation (as discussed in Attachment N – Cost Allocation), and our modelling choice for cable routes to follow the road network (as discussed in Attachment C – Network Optimisation).

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267 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.35.

268 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.40-41.

Additional legal requirements

303. The Act sets out a number of additional legal requirements that apply when determining FPP prices for the UBA services, which we now discuss.

We must ensure no double recovery of costs recovered in prices of designated or specified services (clause 4B)

304. Clause 4B of schedule 1 of the Act provides:

> In applying [the FPP], the Commission must ensure that an access provider of a designated service does not recover costs that the access provider is recovering in the price of a designated or specified service provided under a determination prepared under section 27 or 30M or a designated or specified service provided on commercial terms.

305. The UBA price we set must not allow Chorus to recover costs that it recovers in the prices of other "designated services" and "specified services" Chorus provides.[269,270]

306. We also allocate the costs we are currently modelling for the UBA service and UCLL service to avoid double recovery of those costs in the prices we set for those services. We are well placed to do that given that we are pricing the two services at the same time.

307. Clause 4B applies to designated or specified services provided under a STD where a regulated price applies, and designated or specified services provided on commercial terms where an unregulated price applies. Accordingly, if and how Chorus provides designated or specified services on commercial terms will affect the costs allocated to the regulated prices that we set.

308. We note that including a reasonable allocation of the forward-looking common costs of the service provider in TSLRIC (as we discussed above) is additional to this requirement in clause 4B to avoid double recovery of particular costs recovered by Chorus. If we were to conclude that a reasonable allocation of the forward-looking common costs of the service provider would lead to Chorus double-recovering costs in terms of clause 4B, then we must not make that allocation of the forward-looking common costs in the TSLRIC modelling.

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269 A "designated service" means:
• a "designated access service", which means a service described in subpart 1 of Part 2 of Schedule 1 of the Telecommunications Act 2001; or
• a "designated multinetwork service", which means a service described in subpart 2 of Part 2 of Schedule 1 of the Telecommunications Act 2001. These are: Local telephone number portability service; Cellular telephone number portability service; National toll-free telephone number portability service; and Telecom's fixed PSTN to mobile carrier pre-selection service.

270 A "specified service" means a service described in Part 3 of Schedule 1 of the Telecommunications Act 2001. These are: National roaming; Co-location on cellular mobile transmission sites; and Co-location of equipment for fixed telecommunications services at sites used by Broadcast Communications Limited.

We "must determine" geographically averaged price (clause 4A)

309. Clause 4A of Schedule 1 of the Act provides that, in applying the FPP for the UCLL and UBA services, we "must determine" a geographically averaged price, which is defined in clause 1 of Schedule 1 as:

> **geographically averaged price** means a price that is calculated as an average of all geographically non-averaged prices for a designated service throughout the geographical extent of New Zealand.

310. Turning to the definition of geographically averaged price, we consider that we would only need to calculate the average of geographically non-averaged prices if we had geographically non-averaged prices to begin with. That is, we are not required to first set geographically non-averaged prices, though we may do so if we choose to.

311. In our view, Parliament's reference to calculating an average of geographically non-averaged prices simply reflected the fact that, when clause 4A was introduced, we had been setting non-averaged prices and so averaging them was the easiest and an efficient way to produce the necessary single price.

312. In this determination, the prices that we determine based on TSLRIC are single national prices that apply throughout the geographical extent of New Zealand.

We must set an expiry date

313. Section 52(f) of the Act requires us to set an expiry date. [271] The expiry date relates to the price we are setting in this pricing review determination process. There is no expiry date for the UBA STD. [272,273]

314. On 13 January 2014 we published a supplementary paper to the December 2013 UCLL process and issues paper with our preliminary views on the effect of the expiry date under the Act.[274] We have re-stated those views in our draft and further draft decisions.[275]

315. It is not clear from the Act what prices will apply for the UBA STD at the expiry of the price set in this UBA pricing review determination (ie, the determination we are currently making).

316. We would expect to amend the STD to update the UBA price before the pricing review determination expires. This would avoid the STD prices reverting to the IPP

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271 See also section 62 of the Act.

272 That is, there is an expiry date for the determination setting the price resulting from the review but the STD – apart from the price embedded in it – does not have an expiry date.

273 See section 30Q of the Act.

274 Commerce Commission "Process and issues for determining a TSLRIC price for Chorus' unbundled copper local loop service - supplementary paper on expiry date" (13 January 2014).

275 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [236]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [235].

price, which otherwise appears to be the effect of having to include an expiry date in the pricing review determination.

317. The price would be recalculated in accordance with the FPP through sections 30R and 30P(1)(a)(ii) of the Act (that is, we would not revert to the IPP).

318. We also consider that we have the ability to update the FPP price to take effect before the pricing review determination expires, either under sections 30R and 30P(1)(a)(ii) of the Act (discussed below) or if we incorporated an updating process into the pricing review determination.

319. Chorus' submission on the December 2013 UCLL process and issues paper set out its understanding of that proposed approach to the expiry date.[276] We confirmed in our 14 March 2014 further consultation paper that Chorus' submission broadly corresponded with our proposed process on expiry of the pricing review determinations. But we noted that one possible extra step not set out in Chorus' summary was that it is possible that the UBA model itself might need to be updated as part of amending the STDs to update the UBA price before the expiry of the pricing review determination.[277]

320. The expiry date determines the regulatory period, which has two important roles in a TSLRIC model:[278]

    320.1 it is an important input used to estimating the WACC; and

    320.2 it sets the timeframe over which the price that we determine will be in force. This means the regulatory period sets both the start and end dates of the model.

321. The length of the regulatory period does not affect, for example, our view of "forward-looking" in the definition of TSLRIC, or our approach to asset lives or asset depreciation.

We are setting an expiry date of five years from the start date of the regulatory period

322. We sought views on the length of the regulatory period in our December 2013 UCLL process and issues paper. Most submissions supported a five-year regulatory period. However, Chorus argued that ten years would be the appropriate length for the

276 Chorus "Submission in response to the Commerce Commission's Process and issues paper for determining a TSLRIC price for Chorus' unbundled bitstream access service in accordance with the Final Pricing Principle" 14 February 2014, paragraph [152].

277 Commerce Commission "Further consultation paper on issues relating to determining a price for Chorus' UCLL and UBA services under the final pricing principle" (14 March 2014), paragraph [6].

278 In our December 2014 UBA draft determination paper we stated there were three roles. This third, separately identified, yet relevant role is the period over which a levelised price was applied. As we discuss further in Chapter 4 of this determination, we are no longer setting a levelised price over the regulatory period.

regulatory period. This was primarily because, in its view, that length of time would provide more certainty for business planning and investment.[279]

323. In our December 2014 UCLL and UBA draft determinations, we noted that our consultations up to that date regarding the regulatory period had not included any reference to the possibility of backdating of the determination.[280] Our comments to that point had been based on the assumption that what we referred to as the regulatory period would begin on the date of the final determination. Accordingly, we noted that we interpreted the submissions on the regulatory period as addressing the issue of the expiry date of the determination. We noted that submissions favouring a five-year regulatory period advocate an expiry date five years after the date of the final determination. We noted also that backdating, if we decided that it was warranted, could be implemented by way of some form of adjustment to the regulatory period.

324. In the discussion below we continue to use the term "regulatory period" for convenience, but the term should be interpreted as referring, in the view of Commissioners Gale and Welson, to the period starting five years from 16 December 2015. Commissioner Duignan considers backdating to 1 December 2014 should apply. Chapter 7 explains our approach to backdating.

325. In our July 2014 regulatory framework and modelling approach paper, we outlined our preliminary view that:

    325.1 a five-year regulatory period is the most appropriate for our TSLRIC modelling; and

    325.2 we should have the same regulatory period for both the UCLL and UBA services. This is supported by the Act's requirement that we consider the relativity between the UCLL service and the UBA service.[281]

326. We outline below the reasons we gave in that paper, with some modifications we proposed in our December 2014 UCLL and UBA draft determination papers and our July 2015 UCLL and UBA further draft determination papers based on further consideration of the issue and submissions.

    326.1 We consider five years is supported by the broader legislative context. The Act does not define how often we should review a STD (or in this case the part of a STD that relates to price). However, it does provide some guidance that suggests a five-year regulatory period is appropriate.

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279 Chorus "Submission in response to the Commerce Commission's Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 14 February 2014, paragraph [23].

280 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [236]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [207].

281 Telecommunications Act 2001, s 19(b) and Schedule 1, Part 2, Subpart 1.

326.1.1 Five years is the period within which we must consider whether to review whether a service should remain regulated. Schedule 3 provides that we must consider:[282]

> … at intervals of not more than 5 years after the date on which a designated service or specified service came into force, whether there are reasonable grounds for commencing an investigation into whether the service should be omitted from Schedule 1 under s 66(b).

326.1.2 Given that the Act requires us to review whether to deregulate a service within five years, it seems appropriate that we should endeavour to review prices in STDs at no longer than five-year intervals.

326.2 Some international regulators have adopted a shorter regulatory period (eg, Sweden, France, Denmark, Ireland and Germany all support a regulatory period of three years or less).[283]

326.3 It is likely that in 2019 the roll-out of fibre to deliver UFB will be significantly further advanced and we will have a better idea of the effects of UFB migration on the markets for UCLL and UBA.[284] By then the Government's review of the Act should be complete and any changes should have taken effect.[285]

326.4 In combination, the above matters also seem to us to suggest that a seven-year period would be too long.

327. We note that section 53M of the Commerce Act 1986 requires every price-quality path to have no longer than a five-year regulatory period. This is more prescriptive than the Act, but it is widely agreed that the telecommunications market is a faster changing market, which supports our view that we should be reviewing STD prices at intervals of no longer than five years.

328. In response to our July 2014 regulatory framework and modelling approach paper, Vodafone and Spark supported our preliminary view of a five-year regulatory period for both the UCLL and UBA services.[286,287] Chorus stated that it would prefer to have

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282 Telecommunications Act 2001, Schedule 3, clause 1(3).

283 Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [321].

284 We consider that UFB migration is a relevant real-world consideration in respect of determining the length of the regulatory period. In contrast, in regards to the TSLRIC concept, as noted above not all aspects of the real world are relevant in a modelling environment. In this regard, as previously discussed we have assumed that existing UFB (LFC and Chorus UFB) infrastructure does not exist in the hypothetical environment.

285 Telecommunications Act 2001, s 157AA.

286 Vodafone NZ "Submission to the New Zealand Commerce Commission - Comments on Consultation paper outlining Commission's proposed view on regulatory framework and modelling approach for UBA and UCLL services" 6 August 2014, section D2.

a reasonable period of price stability to focus on the UFB roll-out and migration of customers.[288] Chorus reiterated that it would like a longer regulatory period, and suggested a compromise of seven years, to balance regulatory and pricing stability.[289]

329. In our December 2014 UCLL and UBA draft determination papers we explained the reasons why we continued to hold the view that we should set the expiry date five years from the date of our final determination.[290] This is our final decision.

330. Chorus was the only party to submit further on the issue of the regulatory period. Chorus maintained its position that a ten-year regulatory period, or as a compromise a seven-year period, is appropriate.[291] Chorus submitted that a longer period would provide a period of price stability over which it could focus on the UFB roll-out and migration of customers to UFB, and would provide certainty for Chorus and its customers while the Government's review of the legislative process takes place.[292]

331. We acknowledge that a ten- or seven-year regulatory period could be appropriate in certain circumstances. However, on balance, we remain of the view that we should set a five-year regulatory period.

332. We consider that a five-year regulatory period provides the appropriate balance between providing for a reasonable period of price stability, while allowing for our cost model and modelling decisions to remain up-to-date in a fast-changing telecommunications market.

333. Before the end of the expiry date of the pricing review determination, we would expect to conduct a review under section 30R of the Act, regarding the price payable for the service for the next five-year period (the FPP price reset).

334. As well as considering and determining a price for the service for the next five-year regulatory period, we would expect to update the inputs in our cost model and review whether any other change in circumstances since our previous pricing review

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287 Telecom "UCLL and UBA FPP: consultation on regulatory framework and modelling approach – Submission Commerce Commission " 6 August 2014, paragraphs [154]-[155].

288 Chorus "Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraph [176].

289 Chorus "Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraph [179].

290 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [243]; and Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [214].

291 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" 20 February 2015, paragraph [355].

292 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" 20 February 2015, paragraph [356].

determination causes us to reconsider any of our fundamental modelling decisions. The Act defines a "change in circumstances" as follows:[293]

> change in circumstances, in relation to the price payable for a service, means any change in relevant circumstances since the last date on which that price was calculated (for example, any change to the terms of the service).

335. Without limiting our discretion, we consider that we would be unlikely to revisit all of the choices we made at this determination in a review under section 30R of the Act conducted during the regulatory period of this pricing review determination process.

Section 19(b) and relativity

336. Section 19(b) requires us to consider any additional matters specified in Schedule 1 regarding the application of section 18. For the UCLL/UBA services, that additional matter is the relativity between the UCLL service and the UBA service. We discuss this in more detail in Chapter 5, including considering submissions in respect of relativity. We note briefly here that the relativity of the price of UCLL service to the price of UBA service will affect incentives to unbundle, and that considering relativity involves considering the weight we give to unbundling incentives. We note also that the price of the UBA increment is the primary driver of incentives to unbundle.

337. By way of summary of our discussion of the relativity consideration in Chapter 5, we find that relativity guides us less towards attempting to promote unbundling, and more towards the efficiency aspects of the section 18 purpose statement. We consider that we should be neutral in promoting unbundling, and allow for unbundling to occur to the extent that it is efficient.

Our views in relation to the *Vodafone TSO* and *Telstra* cases

338. Some submitters had the view that *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* (the *Vodafone TSO* case) and *Application by Telstra Corporation Ltd* (the *Telstra* case) are relevant considerations for this process.[294,295]

339. As explained below, the context and circumstances of these cases were different from those in this FPP process.

340. Having said this, we consider that our approach to determining the TSLRIC of the UBA increment is consistent with the principles to be derived from the Supreme Court's judgment in the *Vodafone TSO* case.

The Vodafone TSO case

341. The *Vodafone TSO* case concerned the provision of residential telephone connections to commercially non-viable customers (CNVCs). Under the TSO regime in effect at the time, Telecom provided a residential telephone connection to CNVCs and obtained recompense from other telecommunications service providers who

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293 Telecommunications Act 2001, s 30B.

294 *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138, [2012] 3 NZLR 153.

295 *Application by Telstra Corporation Ltd* [2010] ACompT 1.

connected to its network.[296] The regime was designed to spread the cost of providing this service across the industry in a manner that was transparent and competitively neutral.

342. Under the old Part 3 of the Telecommunications Act, Telecom was entitled to compensation for the "net cost" of meeting the TSO obligations as calculated by us. This was not to be based on Telecom's actual costs, but rather Telecom was entitled to recover the "unavoidable net incremental costs to an efficient service provider" of providing the TSO service.[297] That calculation was also required to take into account "the range of direct and indirect revenues and associated benefits" of providing the service to CNVCs, less the costs of doing so, and "the provision of a reasonable return on the incremental capital employed in providing the services to those customers."[298]

343. In other words, the purpose of the net cost formula was to allow Telecom to recover "the cost to it of efficiently servicing its commercially non-viable customers."[299]

344. The issue before the Courts was whether we had erred in law by choosing a model based on Telecom's existing core copper network with limited optimisation, and valuing that network at its replacement cost. The Supreme Court found that our approach was inappropriate for two reasons:

    344.1 we had failed to adjust our model to allow for the introduction of mobile technology "where it is most efficient" to be used by an efficient service provider;[300] and

    344.2 we had used a replacement cost methodology to value old assets that were partially or wholly depreciated and would not in reality be replaced by Telecom in the future.[301]

345. As a result, we were required to reconsider various TSO net cost determinations.

346. The Court was concerned to ensure that the objective standard of an efficient service provider provided an effective cap on Telecom's recoverable costs.[302] This meant that the assessment of net cost had to be based on the capital actually employed by Telecom (subject to efficiency considerations), otherwise the "cap" might be higher

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296 At [1] per Elias CJ; and at [19]-[23] per Blanchard, McGrath and Gault JJ.

297 Section 5.

298 Section 84(1).

299 At [82] per Tipping J.

300 At [8], [9] and [17] per Elias CJ; and at [74]-[76] per Blanchard, McGrath and Gault JJ.

301 At [70]-[72] per Blanchard, McGrath and Gault JJ and [81] per Tipping J. Elias CJ declined to express a view on the asset valuation methodology ([15]).

302 At [9] per Elias CJ. See also *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* HC Wellington CIV-2008-485-2194, 1 April 2010, at [64]-[65] per Winkelmann J.

than the costs actually incurred.[303] If the net cost amount exceeded Telecom's actual costs, then Telecom could receive windfall profits and its competitors would be placed at a competitive disadvantage against the then vertically integrated Telecom.[304] Accordingly, using a replacement cost methodology to value old assets that were not going to be replaced was seen as inconsistent with the statutory purpose behind the TSO regime then in place.

347. Chorus submitted that the *Vodafone TSO* case is distinguishable (as both the statutory text of the relevant pricing principle and purpose are different), and also points to the Court's comments about the low precedent value of the case.[305,306]

348. Vodafone has indicated that the *Vodafone TSO* case does not have much to say in the context of our TSLRIC exercise, other than in relation to the question of asset stranding.[307,308]

349. On the other hand, Spark and Wigley and Company argued that the case is indistinguishable.[309,310]

Our circumstances are different

350. We have been guided by the *Vodafone TSO* case in relation to questions of network optimisation. In particular, our hypothetical efficient operator concept models the construction of a new network with modern and efficient technology.

351. However, in our view the Court's concerns about the adoption of a replacement cost methodology arose out of the specific context of calculating the "net cost" to an

303 At [70]-[71] per Blanchard, McGrath and Gault JJ; and at [81]-[83] per Tipping J. See also *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* HC Wellington CIV-2008-485-2194, 1 April 2010, at [67] and [72]-[74] per Winkelmann J.

304 *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* HC Wellington CIV-2008-485-2194, 1 April 2010, at [74] per Winkelmann J.

305 Chorus "Cross submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations 20 March 2015, paragraph [285].

306 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services, (2 July 2015)" 24 September 2015, paragraphs [137] and [138].

307 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.221.

308 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [D8.1(e)] .

309 Spark "UBA and UCLL FPP pricing review draft decision", 20 March 2015, paragraph [123]; Spark "Submission on UBA and UCLL FPP pricing review determination" 20 February 2015, paragraph [333]; and Spark "Submission on UBA and UCLL FPP pricing review determination" 20 February 2015, paragraph [333] and Russell McVeagh "Memorandum to Telecom on UCLL and UBA Final Pricing Reviews" 30 April 2014, paragraphs [9(b)] and [12].

310 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [13.12]; Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [13.10].

efficient service provider of meeting the TSO obligations and do not apply to economic regulation generally or to TSLRIC-based prices in particular.

352. As noted above, the *Vodafone TSO* case concerned the situation where Telecom was required to provide a universal service to all residential customers which necessarily involved a service to CNVCs.[311] Under the TSO regime that applied at the time, Telecom was entitled to a contribution towards the cost of uneconomic customers from other telecommunications companies (which could be described as a "top up" payment).

353. However, this "cost" was subject to a cap in that Telecom could only seek recompense for the costs it incurred acting efficiently. In these circumstances, the Court found it was an error to conduct a hypothetical exercise that valued depreciated assets at optimised replacement cost where Telecom was unlikely to replace such assets. The Court found that this approach would "artificially inflate" the value of the existing assets.[312] The Court stressed that in the context of the definition of "net cost", the efficient service provider was intended "to be a proxy for a firm which will continue to employ old assets",[313] and its costs "must be construed as meaning '… cost to Telecom acting efficiently'." [314]

354. In other words, the efficiency cap had to be tied closely to Telecom's actual costs (subject to optimisation) and could not be based upon those of a hypothetical network operator building a network from scratch.

355. We note that in that case we were not required to apply TSLRIC and the Court was not concerned with the proper approach to TSLRIC generally. Rather, the Court's views were based on the statutory purpose of the "net cost" calculation as being a cap on the extent to which Telecom's actual costs could be recovered from its competitors – a statutory requirement that does not apply here.[315]

356. Both Blanchard J and Elias CJ noted that the decision would have limited precedential value because of the "unique nature of the Part 3 regime" and subsequent legislative changes.[316] As noted by the High Court in the Input Methodologies judgment, the *Vodafone TSO* case dealt with the meaning of the specific statutory definition of "net cost" rather than the use of a more broadly expressed decision-making power.[317]

357. In this pricing review determination, we are required to apply a TSLRIC approach (with its focus on forward-looking costs incurred over the long run) and we have

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311 At [23] per Blanchard, McGrath and Gault JJ.

312 At [70] per Blanchard, McGrath and Gault JJ.

313 At [70] per Blanchard, McGrath and Gault JJ.

314 At [82] per Tipping J.

315 At [57] per Blanchard, McGrath and Gault JJ it was noted that the calculation of an amount of net cost was not "a broadly expressed power designed to achieve economic objectives". TSLRIC can be fairly described as such a broadly expressed power.

316 *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138 at [7], [64].

317 *Wellington International Airport Ltd v Commerce Commission* [2013] NZHC 3289 at [999].

carried this out in the conventional way of modelling the costs of a hypothetical efficient operator constructing a new network (ie, not a "top up payment" nor a cap on the recovery of actual costs, but modelling a full service cost over the long run). The sort of considerations that are relevant to such an access price (as discussed above in relation to the TSLRIC objectives/outcomes) are quite different from those that arose in relation to the calculation of "net cost" in the *Vodafone TSO* case.

358. We have explained earlier in this Chapter why we considered that it was appropriate in the current context to adopt the hypothetical efficient operator concept as the basis of our model of the UBA increment. As Chorus submitted, the hypothetical efficient operator concept "is accepted not to be a proxy for Chorus but rather replaces it, and the Commission has selected a MEA which differs from the technology actually used by Chorus to provide the service".[318] In these circumstances we do not consider that the Court's concerns about using a replacement cost methodology arise.

359. We explain how our modelling decisions have applied the *Vodafone TSO* case in the relevant Attachments.

The Australian Telstra case

360. Spark and Wigley and Company submitted that the *Telstra* case is a relevant "overseas precedent on TSLRIC" that we should follow in this determination.[319]

361. In the *Telstra* case, the issue for the Australian Competition Tribunal (and before it the ACCC) was whether the access undertaking lodged by Telstra in respect of the unconditioned local loop service (ULLS) – the equivalent of our UCLL service – for Band 2 areas (the "undertaking") was reasonable in terms of the various criteria set out in section 152AH of the Trade Practices Act 1974.

362. The Tribunal rejected the undertaking for three main reasons.

363. First, the Tribunal found that Telstra's TSLRIC model was not capable of estimating the efficient costs of supplying the ULLS because it was too closely tied to Telstra's historic choice in relation to cable routes. In particular, the model assumed the use of existing locations of pillars, manholes and pits and thereby severely limited the optimisation of cable routes.[320]

364. Second, the Tribunal considered that under the statutory reasonableness criteria referred to above, the focus should have been on Telstra's actual costs taking into account the assets it has in place, and on providing a commercial return on its

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318 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 24 September 2015, paragraph [140.2].

319 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 24 September 2015, paragraph [124]. See also Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [7.8].

320 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [230]-[237].

prudent past investment, rather than on the costs of a hypothetical new operator.[321] In reaching its decision, the Tribunal commented that in light of the evolving nature of the telecommunications industry in Australia and the lack of deployment of competing end-to-end infrastructure, a "regulated asset base" approach might be simpler and more appropriate.[322]

365. We note that following the decision, the ACCC reviewed the pricing principles for fixed-line access and moved away from TSLRIC in favour of a "building blocks" approach.[323]

366. Third, the Tribunal stated that no "material before [it] that independently addresses the reasonableness criteria as they might apply to the $30 figure proposed by Telstra in its undertaking. Consequently, the Tribunal is unable to satisfy itself that $30 would be a reasonable price".[324]

367. We note that in this FPP process submitters and their experts had very different views on how much the regulated services would cost.

    367.1 Spark[325] and WIK[326] referred to a UCLL price and the price of the additional costs of providing the UBA service of $16.64 and $7.83 (UBA total price of $24.47) respectively each month.[327]

    367.2 Chorus and Analysys Mason referred to a UCLL and the price of the additional costs of providing the UBA service of $74.10[328] and $16.57[329] (UBA total price of $90.67) respectively each month.

368. We have found the reasoning in the *Telstra* case to be helpful in relation to our decisions around optimisation. As further explained in Attachment C, we have taken an approach to network optimisation that is efficient and appropriate to the current circumstances. In particular, our model was only informed by the existing locations of active assets (ie, DSLAM and FDS). We have optimised the cable routes linking DSLAM and FDS locations.

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321 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [239]-[249].

322 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [198]-[199].

323 This is further discussed in the Attachment E.

324 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [248].

325 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015 at [18].

326 WIK "Submission In response to the Commerce Commission's "Draft pricing review determination for Chorus' unbundled bitstream access service" and "Draft pricing review determination for Chorus' unbundled copper local loop service" including the cost model and its reference documents", paragraph [452].

327 We note that in September 2013, Telecom (now Spark) submitted to MBIE that "A total copper price range of $35-$40 may better approximate expected forward-looking costs" (Telecom "Review of the Telecommunications Act 2001: Discussion Document" 13 September 2013 at [26(c)]).

328 Analysys Mason "Report for Chorus to provide to the Commerce Commission - Model user guide for UCLL hybrid bottom-up model" 28 November 2014, paragraph [2.1].

329 Analysys Mason "Report for Chorus to provide to the Commerce Commission - Model user guide for UBA model" 28 November 2014, paragraph [2.1].

369. We do not, however, consider that the Tribunal's focus on the incumbent's actual costs and preference for a "regulated asset base" type of approach is required or appropriate in our circumstances for the following reasons.

369.1 In the *Telstra case* "the main question in issue between the parties was the reasonableness of the proposed access charge of $30 per month" for the ULLS service which was to be judged against a variety of criteria.[330] The "main question" posed to us is different. Parliament gave us the specific task of setting the price for the UBA increment using TSLRIC.

369.2 That is, unlike Australia, we are required by law to apply TSLRIC. Further, the definition of TSLRIC includes the reference to "forward-looking costs" over the "long run". Therefore, in contrast to the *Telstra case*, it is not open to us to decline to apply TSLRIC.

369.3 Rather than applying statutory "reasonableness criteria" and selecting an "appropriate means of providing an outcome which may inform the reasonableness of the proposed monthly charge"[331], we must apply TSLRIC and give effect to the section 18 purpose statement, in the process of which we are guided by the TSLRIC objectives/outcomes.

369.4 As explained earlier in this Chapter, we consider that the appropriate approach to TSLRIC in our circumstances is to take the conventional approach – ie, look at the costs of a hypothetical efficient operator building and operating a new network rather that to estimate the incumbent's ongoing costs.[332] As the Court of Appeal recently commented:[333]

> The TSLRIC model provides an estimate of the costs of an efficient access provider over a sufficient period of time (long run), on a "forward-looking" basis (reflecting the notional costs to an operator if it built a new network) rather than of Chorus's actual costs (emphasis added).

369.5 As discussed earlier in this Chapter, we consider that the hypothetical efficient operator approach sets build/buy signals that continue to be important in promoting competition in our environment. In that respect, we take a different view to the Tribunal. In contrast, the *Telstra* decision was made in the context of the recently contracted National Broadband Network project which involved the national deployment of fibre and the copper network ultimately being "cut off".

330 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [30].

331 *Application by Telstra Corporation Ltd* [2010] ACompT 1 at [33].

332 *Application by Telstra Corporation Ltd* [2010] ACompT 1 [231].

333 *Chorus v Commerce Commission* [2014] NZCA 440 at [30].

370. In summary, we have considered the reasoning in the *Telstra* case and concluded that our approach to network optimisation is materially different from the model rejected by the Tribunal. We have also concluded that the different legal and factual context in New Zealand means that the focus on the incumbent's actual costs is not required or appropriate for our FPP process.

Conclusion

371. The context and circumstances of the *Vodafone TSO* case and the *Telstra* case were different from the current case. We are required to determine TSLRIC for the UBA increment. For the reasons given in this determination, we are satisfied that we have constructed an appropriate model for determining the cost of the UBA increment that is fit for purpose.

Conclusion

372. In this Chapter 2 we have explained that our regulatory framework under which we are setting prices using TSLRIC for the UBA increment is informed by several elements – in particular:

372.1 the definition of TSLRIC;

372.2 section 18 considerations;

372.3 TSLRIC objectives/outcomes that we considered when exercising our judgement;

372.4 our approach to implementing the TSLRIC concept, including:

372.4.1 the characteristics of the hypothetical efficient operator; and

372.4.2 the hypothetical efficient operator environment;

372.5 the concept of MEA;

372.6 evidential matters;

372.7 other relevant considerations;

372.8 additional legal requirements; and

372.9 *Vodafone TSO* case principles.

373. In submissions on our July 2015 UCLL and UBA further draft determinations, one of the more controversial aspects of our framework was how the hypothetical efficient operator concept is characterised for the purpose of the TSLRIC modelling.

374. With this in mind, we have remained open to revising our framework while making modelling decisions. We have not received any submissions, nor found any reason that has persuaded us to change the application of the conventional approach, the hypothetical efficient operator or its characteristics.

375. After working through all the modelling decisions, we have remained of the view that the concept of a hypothetical efficient operator will best promote both the TSLRIC objectives/outcomes and the section 18 purpose statement. Our modelling decisions are based on identifying forward-looking efficient costs over the long run. As we have previously explained in this Chapter, a price based on these costs promotes the TSLRIC objectives/outcomes and the section 18 purpose statement.

376. In the other Chapters and Attachments of this determination we explain further how the modelling decisions are consistent with and/or do not undermine the relevant elements of our framework.

Chapter 3: How we have calculated the TSLRIC for the UBA service

377. Having established the nature of the TSLRIC exercise to be undertaken in Chapter 2, in this Chapter we summarise the implementation decisions we have made for determining the TSLRIC of the UBA service. Detailed reasons are included in Attachments to this determination.

378. As explained in Chapter 2:

378.1 in this pricing review determination we are pricing the "additional costs" component of providing the UBA service (which is the "UBA increment"); and

378.2 to calculate the price of these "additional costs" we determine the TSLRIC of providing the UBA service.

379. We have taken the following steps to determine the TSLRIC for the UBA service.

379.1 First, we determined:

379.1.1 the network footprint to be modelled for the UBA service, which means determining the size of the network over which the UBA service will be modelled; and

379.1.2 the demand for the UBA service over the regulatory period (which is used to determine per unit costs).

379.2 Secondly, we identified the most efficient way for modelling the UBA core network using modern technology. This involved determining the MEA, network optimisation and the method of deployment of the modelled network.

379.3 Thirdly, we determined the various costs of the modelled network. This involved establishing the following:

379.3.1 the method for asset valuation;

379.3.2 the WACC;

379.3.3 the appropriate treatment of asymmetric risk;

379.3.4 the method of asset depreciation;

379.3.5 the setting of asset lives;

379.3.6 the applicable price trends;

379.3.7 the calculation of trenching costs;

379.3.8 the treatment of capital contributions;

379.3.9 the modelling basis for taxation; and

379.3.10 the calculation of operating expenditure.

379.4 Fourthly, we allocated costs across services provided by the hypothetical efficient operator. This step involves allocating the forward-looking common costs across services provided by the hypothetical efficient operator, and then calculating the cost of the UBA services, which is discussed in Chapter 4.

379.5 Finally, we performed a cross-check on the TSLRIC price determined by our modelling. The purpose of the cross-check was to consider whether the decisions we had made in determining the TSLRIC price resulted in any upward or downward bias.

380. As discussed in Chapter 2, the conventional approach to calculating a TSLRIC is to hypothesise an efficient operator building and operating an entirely new network. The hypothetical efficient operator is not constrained by legacy decisions made regarding the technology or deployment of the current network. This has been a helpful guiding principle to inform our modelling decisions and determine the forward-looking long run costs of the UCLL service. In order to construct the model we have also relied on expert advice and data from Chorus and other operators (internationally and nationally), and applied adjustments where appropriate.

381. In making our modelling decisions, we have also tried to ensure that the individual decisions create a coherent model as a whole. Although the decision-making process is described above as a liner sequence, we have also considered the inter-relationship between modelling decisions (for example, between asset valuation, network footprint, demand and capital contributions). This helps us ensure coherence. We have also considered whether the order of the decisions is important. We are comfortable that the sequence set out above is a logical approach and has not hindered our consideration of all the individual decisions (including their relationship to each other), particular given our iterative approach to consultation.

382. In order to carry out the TSLRIC modelling exercise, we engaged TERA Consultants (TERA) to build the cost model for the UBA (and UCLL) service and to provide expert advice on TSLRIC modelling.

383. Alongside this paper we have published a number of reports compiled by TERA that provide further detail on how it has built the cost model for the UBA service. We have reviewed these reports and agree with the advice and with the approach TERA has and taken in building the detailed cost model for the UBA service.

384. The cost model consists of five parts:[334]

384.1 geospatial data processing – determines all cable paths from the end-user dwellings to the network nodes;[335]

384.2 access network dimensioning – dimensions the access network based on the geospatial data analysis (for example, cables and civil engineering);

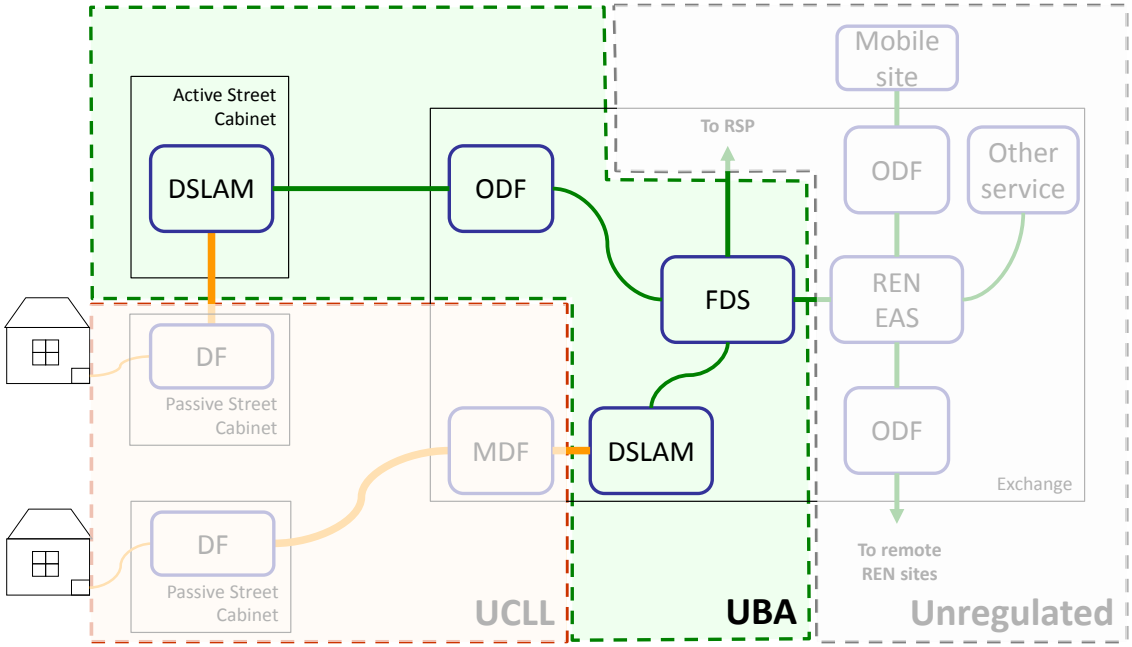
384.3 access network model – once the access network is dimensioned, costs are derived by multiplying the network inventory by the unit costs;[336]

384.4 opex model – derives the opex and non-network costs are derived for each service; and

384.5 core network model – dimensions and derives the costs of the core network and derives the price for each service.

385. As mentioned above, the scope of this further draft determination is limited to determining the cost of the "UBA increment". The cost of the "UBA increment" is determined in the UBA core network model which covers the provision of the UBA service from the MDF to the FDS (as highlighted in green in Figure 3.1 below).[337]

Figure 3.1: Core network model scope



334 For a full description detailing the specification of the cost model see TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Specification" December 2015.

335 The geospatial processes we have undertaken are summarised in TERA's Model Specification paper.

336 Parts of the UBA increment are determined in the access network, for example, the local aggregation paths between the exchange and first data switch.

337 The TSLRIC modelling of the UBA service follows a similar approach to Figure 1 of the UCLL further draft determination.

386. Having consulted extensively and considered submissions and cross submissions, we set out below our key decisions on our approach to modelling the cost of the UBA service. Detailed discussion and reasons for our decisions are included in Attachments to this determination.

387. Matters of a more technical nature are addressed in TERA's review of submissions document, which we have published alongside this determination.[338] We have discussed these "technical" submissions with TERA. Responses to these points are set out in TERA's review of submissions. We have reviewed this document and we agree with TERA's responses to the submissions made.

Determining network footprint for the UBA service

Network footprint and demand for the UBA service

388. The network footprint determines the number of connections that comprise the bitstream network, informs where the modelled network will be deployed, and is a key determinant of the network's cost.

389. The network demand determines the number of paying customers over which total modelled costs will be spread to produce a cost per user.[339]

    389.1 Setting constant network demand leaves the relationship between network footprint and demand fixed throughout the regulatory period, and the cost per user remains fixed. Alternatively, modelling demand migration allows the demand to move, which flows through to the cost per user calculations.

    389.2 The time the modelled network takes to attract demand and reach full load is reflected in the level of demand assumed to be served from Day 1. This could mean a higher cost per user in the early years as demand builds.

390. Our final decisions are that:

    390.1 the hypothetical efficient operator's network connects every address with an active UBA connection;

    390.2 the hypothetical efficient operator has demand equal to the number of end-users paying for a UBA service;

    390.3 there is constant demand on the hypothetical efficient operator's network; and

    390.4 the end-users comprising the network demand all take services from the hypothetical efficient operator from Day 1.

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338 See TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Analysis of the responses to the second consultation following the further draft determination" December 2015.

339 Throughput requirement, which is the average minimum bandwidth each UBA end user demands during peak times, is an independent modelling parameter addressed in Attachment B.

391. Our key reasoning for these decisions is based on:

391.1 the need for us to select an appropriate network scale to determine a representative price for the regulated service, which we consider is best achieved by selecting a network footprint aligned to Chorus' UBA service availability;[340]

391.2 the need for us to consider incentives to unbundle;[341] and

391.3 relevant real-world information, which has informs our geospatial and demand considerations.[342]

392. Attachment A provides a detailed discussion of how we have reached our final decisions on the network footprint and demand.

Determining the modelled network

393. Once we determined the network footprint for the UBA service, we then determined the efficient costs of serving that network footprint. To do so we have first considered what a hypothetical efficient operator would likely build today to provide the UBA service (the modelled network). We have then considered how the hypothetical efficient operator would likely deploy that network, including network optimisation.

Selecting the modern equivalent asset for the UBA service

394. In order to identify the assets that a hypothetical efficient operator would deploy today to provide the UCLL service we have used the concept of a modern equivalent asset (MEA). Using a MEA allows prices to reflect the costs of modern and efficient technology. This is consistent with the definition of TSLRIC in the Act, particularly the requirement to estimate costs on a forward-looking basis.

395. The UBA price has two components: the price for Chorus' UCLL network; and the TSLRIC of the "additional costs" of the UBA service. The first component is set by the UCLL pricing review determination. Accordingly, the MEA for the UBA service is relevant only for determining the TSLRIC of the "additional costs" of the UBA service.

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340 As set out in our Framework, the purpose of our TSLRIC exercise is to set robust and representative wholesale prices for the regulated services in accordance with the section 18 purpose statement.

341 As set out in our Framework, we find that relativity guides us less towards attempting to promote unbundling, and more towards the efficiency aspects of the section 18 purpose statement. We consider that we should be neutral in promoting unbundling, and allow for unbundling to occur to the extent that it is efficient.

342 As set out in our Framework, many of our decisions involve matters that are, to some extent, objectively measurable. In these cases we believe it is appropriate to use data and evidence, which may include data from Chorus and others, to determine our best estimate of what an objective value is, rather than relying on subjective assertions or speculation. This does not detract from the approach of the hypothetical efficient operator concept; rather, it uses real-world information to inform our assessment of this concept.

396. The first issue we have addressed is the appropriate underlying access network that we use as the baseline for determining the UBA increment. Some submitters suggested that the Act dictates a particular answer, but have disagreed whether this is Chorus' copper network or the FTTN/FWA network modelled for UCLL. We consider that we have discretion as to the appropriate underlying access network.

397. Our decision is that starting with a copper network as the underlying access network will likely best allow for competition through unbundling where it is efficient. This is because access seeker decisions regarding unbundling are made in respect of the existing copper access network. That is, a potential unbundler compares the cost of installing its own equipment on the existing copper access network against the TSLRIC of the additional costs of the UBA service. Therefore, in our view a MEA for the UBA service that is built over a copper access network will better promote efficient build/buy decisions by access seekers, compared with the modelled UBA network being built over a hypothetical fibre access network.

398. Accordingly, on balance, our view is that section 18, and the requirement to consider relativity between the UCLL and UBA services (as explained in Chapter 2 and Chapter 5), lead us to prefer a MEA for the UBA increment that is built over a copper-based access network.

399. Having determined that a copper network is the appropriate underlying access network, we then determined the MEA for the UBA increment. In our view the MEA for the UBA increment would utilise an Ethernet-based layer 2 aggregation network to transport the data traffic to the handover point. In our view it is the most efficient and best performing layer 2 technology available to provide the UBA service.

400. We have also considered bitstream throughput requirements. Our modelled network includes the cost of additional network elements that are required to meet the growing bitstream throughput at a 50% per annum growth rate in traffic.

401. Attachment B provides a detailed discussion of how we have reached our final decisions on the MEA for the UBA service.

Network optimisation

402. At a high level, optimisation within TSLRIC modelling is concerned with two aspects:

    402.1 how much of the existing network should be reflected in the modelling (all, none, or somewhere in between); and

    402.2 what will be the basis for deriving the costs – built-up from granular cost components (bottom-up), or adopting something closer to the network provider's aggregated accounts (top-down).

403. Consistent with our use of the hypothetical efficient operator concept to model the TSLRIC costs, we have taken a scorched earth approach as our starting point. However, for the reasons set out below, we consider that a modified scorched node approach is appropriate and provides an appropriate and reasonable approximation of the forward-looking efficient costs that would be incurred in supplying the UBA service.

404. Our approach to optimisation retains the existing locations of active assets (ie, DSLAM and FDS) in Chorus' copper network. All other aspects of the core network have been scorched and optimised – notably the cable routes linking DSLAM and FDS locations. We consider that this provides an appropriate and reasonable estimate of a scorched earth approach.

405. In terms of the details of our approach:

405.1 our optimisation of cable routes has required us to implement minor modifications to take into account the location of notional nodes and network connectivity;

405.2 the active assets in the model have been optimised based on the relevant demand. TERA has calculated the necessary number of assets required at each location to meet demand;

405.3 we have optimised the size of Chorus' exchange buildings based on a bottom-up calculation of the space required to house the active assets;

405.4 where available, we have used data provided by Chorus to inform the bottom-up calculation to model the most efficient deployment; and

405.5 for practicality, and where applicable, we have constrained the modelled network to the road network. Cable routes follow the New Zealand road network, which we have determined includes motorways, private roads, and access ways.

406. Attachment C provides a detailed discussion of how we have reached our final decisions on network optimisation.

Infrastructure sharing in the core network

407. Underground infrastructure sharing refers to the sharing of trenches (and sometimes ducts) between parties that both deploy cables underground for the purpose of distributing their network to end-users.

408. Sharing underground infrastructure can reduce the cost of deploying underground infrastructure as the cost is split between two parties. Therefore, it is important that we try to set a realistic level of infrastructure sharing in the TSLRIC model to avoid setting a TSLRIC price that is too high or too low.

409. Our final decisions are to:

409.1 include 5% of underground infrastructure sharing with EDBs; and

409.2 maintain the savings generated from infrastructure sharing at 50%, but not to include any savings for the cost of installing ducts.

410. We recognise that the hypothetical efficient operator would look to share infrastructure wherever possible.

411. However, it would not be practical to re-open existing underground infrastructure to install the hypothetical efficient operator's infrastructure. Therefore, this will only take place when electricity distribution businesses (EBDs) are looking to deploy their network underground.

412. We based the extent of underground infrastructure sharing and the cost of infrastructure sharing on the best local current practice data that we have available. This is because we believe this is most representative of the conditions the hypothetical efficient operator will face.

413. Attachment D provides a detailed discussion of how we have reached our final decisions on underground infrastructure sharing.

Determining the cost of the hypothetical network

414. Having decided how we will build the UBA core network, we then determined the cost of the network.

Asset valuation

415. Asset valuation is an important step in costing the network elements that are involved in supplying the regulated UBA service.

416. We have had to determine an appropriate methodology to use for valuing assets, in particular civil engineering assets that are potentially reusable and difficult to replace. A common example of such an asset is a duct. A number of regulators overseas have in recent years been moving towards valuing such assets on the basis of their historic cost.

417. For the purposes of this final determination, we have used optimised replacement cost (ORC) to value all assets used in our TSLRIC model for the UBA service. While we have explored a range of alternative asset valuation methodologies, we consider that ORC is consistent with our regulatory framework for carrying out the UBA pricing review determination. In particular, ORC is consistent with the concept of the hypothetical efficient operator who builds a new network from scratch.

418. We also consider that ORC is consistent with the forward-looking and long run features of TSLRIC, and with our TSLRIC objectives/outcomes, in particular encouraging efficient build/buy decisions, allowing for efficient cost recovery and incentivising the regulated entity to minimise its costs.

419. We have therefore applied ORC to all assets.

420. Attachment E provides a detailed discussion of how we have reached our final decisions on asset valuation.

Weighted average cost of capital

421. We are required to set forward-looking cost-based access prices for the UBA service using a TSLRIC methodology. The WACC is one of the key inputs to the TSLRIC model for UBA, and represents the expected return investors require.

422. We have determined a forward-looking post-tax WACC estimate of 5.56% for our UBA final determination.

423. The parameters used to generate our mid-point post-tax WACC estimate of 5.56% for UBA are summarised in Table 3.1 below.

Table 3.1: UCLL and UBA WACC estimates

Parameter	Estimate for December 2014 draft	Estimate for July 2015 further draft	Estimate for December 2015 final
Risk-free rate	4.19%	3.26%	2.74%
Debt premium	1.85%	1.75%	1.85%
Leverage	43%	37%	38%
Asset beta	0.40	0.45	0.43
Debt beta	0.00	0.00	0.00
TAMRP	7.0%	7.0%	7.0%
Corporate tax rate	28.0%	28.0%	28.0%
Investor tax rate	28.0%	28.0%	28.0%
Debt issuance costs	0.25%	0.25%	0.25%
Cost of executing interest rate swaps	0.04%	0.08%	0.08%
Equity beta	0.70	0.71	0.69
Cost of equity	7.92%	7.32%	6.80%
Cost of debt	6.33%	5.34%	4.92%
Post-tax WACC (mid-point)	**6.47%**	**6.03%**	**5.56%**

424. The WACC is estimated as at 1 September 2015, which is approximately three months prior to the date of the final determination for UBA. This was necessary to enable us to complete modelling and other work prior to finalising our final determination.

425. Compared to the July 2015 UBA further draft determination:

425.1 the risk-free rate has reduced from 3.26% to 2.74%, and the debt premium has increased from 1.75% to 1.85%, to reflect current interest rates on government and corporate bonds as at 1 September 2015;

425.2 we have decreased the asset beta from 0.45 to 0.43, reflecting further analysis of asset beta estimates for Oxera's refined comparator sample, including updated data to 1 September 2015; and

425.3 we have updated our leverage estimate to reflect data over the most recent 10 year period, to be consistent with the approach to estimating asset beta. This has resulted in an increase in leverage from 37% to 38%.

426. A detailed discussion of how we estimated the WACC is set out in the Cost of Capital for the UBA and UCLL pricing reviews paper, published alongside our final determination paper.

Asymmetric risk

427. We are required to set a TSLRIC price for the UBA service. There are a range of factors in the future which may affect costs, the settings of which are uncertain. We do not adjust the price for all of the uncertain factors (risks) because sometimes these factors are equally likely to decrease costs as to increase them. However, some factors will only have the potential to increase the price. These factors, collectively known as asymmetric risk, will change the expected cost to the hypothetical efficient operator.

428. We must consider how to adjust the single price (or otherwise incorporate this risk into the modelled cost). If we fail to take into account the fact that even a hypothetically efficient operator would face these risks, this would cause us to undercompensate this operator. This would be a barrier to the development of a robust telecommunications network.

429. Our final decisions in respect of asymmetric risks are:

429.1 to provide for an *ex ante* allowance for the asymmetric risk of catastrophic events. This allowance is based on Chorus' costs of catastrophic risk (eg, insurance) but appropriate efficiency adjustments are applied (as discussed in Attachment M, regarding the efficiency adjustments we apply to opex);

429.2 to provide for an *ex ante* allowance for the asymmetric risk of asset stranding due to technological change by adopting asset lives that recognise the risk of asset stranding; and

429.3 to not provide any *ex ante* allowance for the asymmetric risks of asset stranding due to competitive developments or future regulatory decisions.

430. Attachment F provides a detailed discussion of how we have reached our final decisions on asymmetric risk.

Depreciation

431. Depreciation determines the amount of its asset base that the hypothetical efficient operator can recover each year through the regulated access prices. As telecommunications networks, and in particular the UCLL and UBA services, are capital intensive, depreciation is a significant component of these services' forward-looking cost-based prices. Therefore, decisions about the choice of depreciation methodology and the inputs into the depreciation formula in the TSLRIC model can directly affect these prices. In particular, these decisions can affect whether the

hypothetical efficient operator's costs are recovered from current or future users of the hypothetical efficient operator's network.

432. Due to a combination of physical deterioration, technical obsolescence, and contract terms, most of the hypothetical efficient operator's network and related assets have finite commercially-useful lives. As these assets age, their future productive capacity and market value declines.[343] This loss of value is a cost that needs to be recovered over the life of these assets as part of the forward-looking cost-based prices charged for the service(s).

433. Our final decision is to maintain the view that the tilted annuity method is the appropriate methodology for regulatory depreciation.[344] This approach combines an allowance for depreciation with the return on capital.

434. Tilted annuities are consistent with the principles of financial capital maintenance and provide efficient incentives for build-buy decisions over time.

435. A tilted annuity calculates an annuity charge that changes between years at the same rate as the expected change of the asset value. Because of this feature, the tilted annuity approach is an approximation of economic depreciation as annual charges are brought in line with the expected value of the asset at each time of its economic life. As with a standard annuity, the tilted annuity should still result in charges that, after discounting, recover the asset's purchase price and financing costs.

436. Attachment G provides a detailed discussion of how we have reached our final decisions on depreciation.

Asset lives

437. Asset lives are the economic lives of the hypothetical efficient operator's assets. We use these asset lives to depreciate the hypothetical efficient operator's assets which determines how much of the cost of these assets is recognised each year. In effect, the life of an asset is the amount of time an asset can be used until it is replaced.

438. In order to set a TSLRIC price that promotes efficient investment, it is important that we set asset lives that are our best estimate of the economic lifetime of assets. If asset lives understate the economic lives of assets, the TSLRIC price will be set too high. This would mean that consumers would pay more than they need to. Similarly, if asset lives overstate the economic lives of assets, the TSLRIC price would be too low. This would mean that there would not be sufficient incentives for the hypothetical efficient operator to invest.

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343 Charles R. Hulten and Frank C. Wykoff (1996) "Issues in the measurement of economic depreciation: introductory remarks", *Economic Inquiry* 34, p. 10–23.

344 For calculating the hypothetical efficient operator's notional taxation, we have used diminishing value taxation.

439. Our final decision is to set the hypothetical efficient operator's assets lives equal to Chorus' except where:

439.1 Chorus' asset lives are out of line with international benchmarks; or

439.2 no Chorus data is available. In these cases we used international benchmarks to adjust/set asset lives.

440. The main reasons for our final decision are:

440.1 we consider that the accounting asset lives supplied by Chorus provide a reasonable estimate of the economic lives of the hypothetical efficient operator's assets; [345] and

440.2 we believe that international benchmarks provide the most appropriate check for Chorus' asset lives.

441. Attachment H provides a detailed discussion of how we have reached our final decisions on setting asset lives.

Price trends

442. Price trends are estimates of expected price changes for components of the TSLRIC model during and beyond the regulatory period. The price trends are used in the TSLRIC model to forecast costs, and are applied as part of the tilted annuity depreciation formula to spread capital costs over the lifetime of the asset.

443. The price trends we have chosen would apply to a hypothetical efficient operator in New Zealand. They are the most accurate estimate of long-term price trend over the lifetime of the modelled assets and for expenses. These have been chosen to reflect international costs where we think they will apply and New Zealand specific costs where relevant.

444. Our final decisions are to use the following price indices and approaches to determine the long-term price trend for the following cost drivers.

345 Chorus provided a list of asset categories and its estimation of the corresponding lives, as required by our section 98 Notice. TERA has allocated all of the assets in the model into one of these categories.

Table 3.2: Price indices and approaches to determine long-term price trends

Cost driver	Appropriate price index	Basis of price trend	Price Trend (annual percentage change)
NRC	Labour Cost Index (LCI) - all industries	Due to the predominant use of a wide variety of labour used in non-recurring activities	Annual change in index[346]
Trenching costs	A Statistics New Zealand Producers' Price Index for the Heavy and Engineering Civil Construction sector	Relationship to construction sector labour costs and general all sector producer input price inflation	3.3%
Wages/labour	Labour Cost Index (LCI) - all industries	Relationship to general inflation	2.0%
Non-labour opex	Consumer Price Index (CPI)	The expectation that the gains and losses across all activities in this category will lead to a stable price trend of 0%	0.0%
CPI	Consumer Price Index (CPI)	Current requirements of the RBNZ's policy target agreement with the Minister of Finance	2.0%
Building costs	Capital Goods Price Index (CGPI) for non-residential buildings	Relationship to general inflation	1.9%
Fabricated steel	Producer Price Index for Outputs of the metal fabrication industry (PPI-O)	Relationship to international steel prices, aluminium prices and domestic labour costs	2.9%
Copper	London Metals Exchange (LME) prices for Copper	Average of historical growth and forecast based on LME futures plus Consensus Economics consensus forecasts	5.0%
Fibre optic cabling	A US Bureau of Labour Statistics Producer Price Index (US PPI) for wholesale prices of fibre optic cable	Historical trend including currency effects	-1.3%

[346] The percentage change observed in the LCI (all industries) during the preceding calendar year will be applied to non-recurring charges in November each year.

445. We consider these price trends the best available price trends and methodologies taking into account our own analysis, expert advice and evidence provided in submissions and cross submissions.

446. We have introduced a price trend for core NRC.[347] Core NRC prices will now be adjusted each calendar year in November on the basis of the change in the Labour Cost Index (LCI, all industries) in the year to November for that given year.

447. The price adjustment for sundry NRC[348] will now also be based on LCI (all industries) rather than LCI (communication services), the way it will be applied is consistent with the new price adjustment mechanism for core NRC.

448. Attachment I provides a detailed discussion of how we have reached our final decisions on price trends.

Trenching costs

449. Trenching involves the techniques used to deploy telecommunications infrastructure underground; specifically, the ducts and cables which are deployed along roadways and into homes and workplaces to deliver telecommunications services, such as the UBA service.

450. Trenching is a critical input when establishing the TSLRIC of the UBA service. Trenches and ducts are required to house the cables between the active equipment used to deliver the UBA service.

451. As part of our TSLRIC exercise, for trenching, we carried out three phases of work:

451.1 soil type analysis;

451.2 trenching methodologies; and

451.3 representative trenching costs.

452. Under each phase we have made a series of decisions to determine the representative costs for trenching.

453. Our final decisions and reasons are set out as follows:

453.1 Based on advice from Beca we have identified:

453.1.1 five rural soil types and a single soil type for urban areas; and

453.1.2 several accepted trenching methodologies that are used in New Zealand for consideration in our model .

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347 Core NRC are charges associated with the main features of the service.

348 Sundry charges are additional charges that may arise in the course of provisioning the services ancillary to the main features of the service.

453.2 We have decided to deploy a fully ducted network as this approach is consistent with New Zealand and international best practice.

453.3 In our view the hypothetical efficient operator would not deploy ducts larger than necessary, therefore the size of ducts being deployed would be 50 mm for the FTTH network and 110 mm for the FTTN network.

453.4 In our view the hypothetical efficient operator would not use sub-ducts in its network. As set out in Attachment A, we have assumed constant demand, therefore the benefits of sub-ducting will not be realised for our hypothetical efficient operator. As such, the hypothetical efficient operator would not incur the additional expense of sub-ducting its network.

453.5 Based on current New Zealand practice and advice from TERA, we have provided for network resilience of critical trenches (5000 or more lines) by double trenching rather than trench reinforcement.

453.6 We have relied on Beca for the setting of trenching costs. We consider that the Beca costs are based on objective and independent data that used:

453.6.1 historical data held by Beca from previous tenders;

453.6.2 limited supplier pricing;

453.6.3 indicative “cover-all” rates; and

453.6.4 pricing methodologies received from contractors from throughout New Zealand.

453.7 We asked Beca to review trenching costs supplied by Chorus and the LFCs. Beca noted there were challenges on comparing its data with the Chrous data as the Chorus data was not as granular as the Beca data and was therefore difficult to rely on for the purpose of modelling trenching costs.

453.8 However, Beca has used the data received from Chorus’ UFB roll-out and data from LFCs, as a cross-check of its trenching cost data.

453.9 Beca concluded that its costs were not dissimilar to the Chorus’ UFB data and the LFCs data with its trenching costs. We are therefore satisfied that Beca has provided us with an independent, robust, and representative estimate of trenching costs the hypothetical efficient operator would incur.

453.10 We have used a weighted set of trenching methodologies, provided by Beca. We consider that this ensures the trenching methodologies used in our approach are representative of what the hypothetical efficient operator would likely encounter.

453.11 We are not applying any discount over and above Beca’s cost estimates. We do not consider the hypothetical efficient operator would be able to achieve any discount further to the trenching costs set by Beca.

454. Attachment J provides a detailed discussion of how we have reached our final decisions on trenching costs.

The treatment of capital contributions

455. Capital contributions arise because network providers can require end-users or third parties to provide elements of their network (such as lead-in trenches) or to pay a cash contribution towards the cost of an asset. Where this occurs, we need to determine how to treat capital contributions as part of this pricing review determination.

456. In considering how to treat capital contributions in this pricing review determination, we have been guided by several factors: real-world practice; the Act's general intention that Chorus should not over-recover its costs; and our view that it would not promote competition for the long-term benefit of end-users to permit Chorus to recover a cost that would be borne by end-users or third parties.

457. We have accounted for the cost of providing bitstream in Rural Broadband Initiative (RBI) areas by removing the modelled TSLRIC costs relating to the number of DSLAMs and active cabinets deployed by Chorus under the RBI initiative.

458. Attachment K provides a detailed discussion of how we have reached our final decision on capital contributions.

Modelling basis for taxation

459. The modelling basis for taxation describes how we treat corporate income tax in our TSLRIC model. As the hypothetical efficient operator would be subject to corporate income tax on its earnings, how we estimate and treat its tax obligations in our TSLRIC model will impact the TSLRIC price. It is important that we adopt a realistic approach to taxation to avoid setting a TSLRIC price which is too high or too low.

460. As the hypothetical efficient operator's network is capital intense, it will be able to significantly reduce its tax obligations by deducting depreciation expenses (depreciation tax shield). Hence we have considered how our TSLRIC model should account for the tax benefits of depreciation deductions.

461. Our final decision is that the TSLRIC-based price we derive will be a pre-tax amount. Given that the price we derive will be a pre-tax amount, our final decision is to adjust the tilted annuity capital charges for each type of asset by taking into account an appropriate tax depreciation rate. This will ensure that the TSLRIC-based price does not over-estimate the tax position of the hypothetical efficient operator, which would occur if the tax model adopted a simple pre-tax calculation that assumed the corporate tax rate.

462. Attachment L provides a detailed discussion of how we have reached our final decisions on taxation.

Operating expenditure

463. Operating expenditure (opex) relates to costs that are incurred in the ongoing operation of a business.

464. Our TSLRIC model seeks to reflect all of the forward-looking long run incremental costs of the telecommunications network that we model. This includes the ongoing costs of operating the telecommunications network on a day-to-day basis, and the costs of operating the telecommunications company itself. Accordingly, determining the appropriate level of this opex is an important input in to the TSLRIC model.

465. Our final decision in respect of opex for the UBA service is that our starting point is to use Chorus' financial accounts to determine opex in our TSLRIC model.

466. For a detailed discussion of our reasons and our analysis of the issues in respect of the use of Chorus' opex as a starting point please refer to Attachment M – Opex of our December 2015 UCLL final determination. As we are applying a similar conceptual economic framework to determine a TSLRIC price for the UBA service as we have used for the UCLL service, we consider that the principles regarding opex discussed in Attachment M of the December 2015 UCLL final determination are also relevant for the UBA service, subject to the following paragraphs.

467. In Attachment M of our December 2015 UCLL final determination we discuss a 40% adjustment to opex for a fibre access network. This opex adjustment has not been applied in respect of the opex related to the UBA network, as our modelled opex for UBA is not affected by whether the access technology is copper or fibre.

468. We note that in Attachment M of our December 2015 UCLL final determination we also discuss an adjustment based on line fault indexes as a proxy for the likely higher fault rates of our hypothetical efficient operator's UCLL network. This has a larger proportion of aerial deployment relative to Chorus' copper network. This adjustment has not been applied in respect of the opex related to the UBA network, as aerial deployment is not a relevant consideration in respect of the UBA assets.

469. Attachment M provides a detailed discussion of how we have reached our final decisions on opex.

Cost allocation

470. The Act's definition of TSLRIC includes reference to "a reasonable allocation of forward-looking common costs". The Act defines "forward-looking common costs" as "those costs efficiently incurred by the service provider in providing the service that are not directly attributable to providing an additional unit to that service".

471. Cost allocation is concerned with the nature and quantum of these forward-looking common costs, and an appropriate methodology to provide for a reasonable allocation of these costs to be included in our TSLRIC model.

472. Our final decisions and reasons in regards to how we allocate forward-looking common costs in our TSLRIC model for the UBA service are:

472.1 For forward-looking common costs that are incurred in providing services associated with the telecommunications network itself (network costs), we use a capacity-based allocation approach. We consider that this provides a reasonable allocation of network costs because of the use of this approach by regulators elsewhere, its greater objectivity and transparency (relative to alternative approaches), and the support for this approach by submitters. This approach is implemented:

472.1.1 for active assets, by using specific allocation keys identified for different categories of network costs;

472.1.2 for the cost of the fibre link between the cabinet and the exchange, by allocating 100% of the cost to the bitstream services, so as to avoid double counting where costs have already been allocated to fibre leased lines;

472.1.3 for the cost of the fibre link between the exchange and the FDS, by using the method of equi-proportional mark-up (EPMU) that is modified to be based on revenue-shares (which we refer to in this final determination as "modified EPMU"), as we do not have appropriate data to undertake a capacity-based allocation approach; and

472.2 For forward-looking common costs that are required to operate a telecommunications company but are not associated with the telecommunications network (non-network costs), we use the method of EPMU. We consider that this provides a reasonable allocation of non-network costs because of the use of this approach by regulators elsewhere, its greater simplicity (relative to alternative approaches), and the support for this approach by submitters.

472.2.1 For the allocation of non-network costs between UCLL and UBA (in aggregate) and other services (for example, co-location and NRC), we use modified EPMU based on each service's share of revenue, as we do not have appropriate data to undertake a standard EPMU approach.

472.2.2 For the allocation of non-network costs between the regulated services (UCLL and UBA), we do have the appropriate data so we use the standard EPMU approach based on each service's share of total attributable costs.

473. Attachment N provides a detailed discussion of how we have reached our final decisions on cost allocation.

Cross-checking the total TSLRIC-based price

474. Setting the TSLRIC price for UCLL and UBA has been complex and contentious. In light of the strong views expressed by submitters that the price we were setting would not accurately reflect a neutral TSLRIC estimate (and noting submitters disagreed on whether we were setting a price that was too high or too low), we have carried out a final cross-check at the end of the pricing exercise.

475. Overall, our goal has been to make unbiased decisions for each of the TSLRIC inputs, which we then combined to form our best estimate of the TSLRIC price. By unbiased, we mean a best or neutral estimate that does not tend to understate or overstate the true or most reasonable value of the relevant parameter.

476. As a check on the individual decisions we made, and bearing in mind the section 18 purpose, we then considered whether there were any indicators of bias in the overall price, ie, that the modelled price was not in fact the best estimate of TSLRIC. This check was not a decision in itself, but rather we have looked at the aggregate modelled price (UCLL and UBA) for signs of bias that would give us cause to relook at the individual decisions. In our view there are no indicators of bias.

477. There is no one specific indicator that provides a directly comparable, objective cross-check on the aggregate modelled price. However, in forming our view that the overall price did not show signs of bias, we took into account:

477.1 Our review of wholesale service charges in comparable countries, as set out in Attachment P. Contrary to suggestions from some submitters prior to the further draft determination in July, these comparator prices did not provide evidence that the Commission's modelled price was biased upwards. Rather a proper analysis highlighted some contextual differences, and once these were taken into account, the comparators did not suggest that our TSLRIC price was unreasonable.

477.2 The opposing views of submitters on the direction and causes of any possible bias in individual decisions that could then bias the TSLRIC price up or down. We have looked back at some of the more material and more difficult decisions in this process. While in each case we made our best estimate, we wanted to ask whether there was any consistent pattern of favouring one side of the argument. We do not think that any such pattern exists. Submitter views on these modelling decisions included:

477.2.1 Possible downward bias:

(a) The "spot" risk-free rates we have used in calculating the WACC in the model are low compared to historic averages.

(b) We have based modelled demand on a fully-loaded network with instantaneous demand take-up.

(c) Our approach to setting NRC uses the lowest of a number of possible comparator rates from other countries, rather than the median or mean.

477.2.2 Possible upward bias:

(a) Our UCLL network deployment is constrained by having to at least meet the existing line speed on each current copper line. This has led to a mostly fibre deployment, with little FWA in the model.

(b) We have determined the MEA by taking a modified scorched node approach to network layout, consistent with how other regulators have approached similar price tasks, rather than trying to directly determine a scorched earth MEA.

(c) We have not allowed for any re-use of existing Chorus or LFC infrastructure assets, such as ducts.

477.3 Many key inputs into our TSLRIC model take account of actual Chorus UFB or LFC cost data ie, the costs of currently building a modern replacement fibre network.

478. So based on our conception of our task under the Act – to price a modern replacement network – we found, and were presented with, no compelling evidence that our aggregate TSLRIC price was biased up or down. It is the best estimate.

479. We further considered whether the section 18 purpose in the Act should cause us to make an upward or downward adjustment from the best estimate to promote particular benefits to end-users, such as the benefits of migration from copper to fibre. Our analysis and reasons for not making such an adjustment are set out in Chapter 5.

480. Finally, while we have not used UFB pricing as a cross-check, we have discussed the comparison between the aggregate TSLRIC price to the entry level UFB price in the Executive Summary.

Chapter 4: Calculating the TSLRIC-based price for the UBA increment

Purpose

481. In the previous Chapter of this final determination, we explained how we determined the total annual TSLRIC for the UBA increment. In this Chapter we set out how we have converted that total annual cost to a monthly unit price of the UBA increment.

482. We also describe how we convert the monthly unit price of the UBA increment into prices for the four different variants of the UBA service specified in the UBA STD.

483. We also set out in this Chapter our final decision regarding the price profile over the regulatory period.

Our final decisions

484. Our final decisions in regards to calculating a TSLRIC-based price for the UBA increment are:

484.1 We converted total annualised TSLRIC for the UBA increment to monthly unit TSLRIC for each of the five years of the regulatory period, by dividing the annualised TSLRIC by the number of months in a year, ie, 12, and then by demand.

484.2 We determined price differentials between the four different variants of the UBA service specified in the UBA STD using a gradient approach. This approach uses price differentials that were determined in the UBA IPP determination, which we applied as percentage mark-ups to the monthly unit TSLRIC for the UBA increment (and also taking account of the distribution of customers across each of the UBA variants).

484.3 We used a price profile over the regulatory period with varying prices for each of the UBA variants for each year over the regulatory period.

485. Our final decision for the UBA increment for the four different variants of the UBA service is summarised in Table 4.1 below, along with the UCLL price.[349]

[349] The UCLL price has been determined in the UCLL final pricing review determination published alongside this paper.

Table 4.1: Nominal monthly unit prices for UBA increment for each UBA variant and UCLL (NZ$)

	Year 1	Year 2	Year 3	Year 4	Year 5
BUBA	$11.44	$11.22	$11.01	$10.83	$10.67
EUBA 40	$13.87	$13.61	$13.36	$13.14	$12.94
EUBA 90	$14.47	$14.20	$13.94	$13.71	$13.50
EUBA 180	$15.55	$15.26	$14.98	$14.73	$14.51
UCLL	$29.75	$30.22	$30.70	$31.19	$31.68

Source: Commission's TSLRIC model for final determination

Converting total annualised TSLRIC for the UBA increment to monthly unit TSLRIC

486. In this section we explain how we have converted the total annualised TSLRIC for the UBA increment to monthly unit TSLRIC for each of the five years during the regulatory period.

487. Our TSLRIC model provided the total annualised TSLRIC for the UBA increment for each of the five years during the regulatory period, which are shown in Table 4.2 below. These figures are after we have allocated common costs and shared costs between other services, as discussed in Attachment N – Cost allocation.

Table 4.2: Total annualised TSLRIC for the UBA increment based on our TSLRIC model, (NZ$, millions, nominal)

	Year 1	Year 2	Year 3	Year 4	Year 5
Total annualised TSLRIC for UBA increment	$156.01	$153.04	$150.27	$147.74	$145.55

Source: Commission's TSLRIC model for final determination

488. To calculate the monthly TSLRIC for each of the five years, we divided the annualised TSLRIC by the number of months in a year, ie, 12. To determine a "per unit" monthly TSLRIC for the UBA increment we then divided these monthly costs by UBA demand. A description of the demand profile is set out in Attachment A – Network footprint and demand.

489. Having derived this monthly unit TSLRIC for each year in the regulatory period, we then spread this cost across the four different variants of the UBA service, as described in the next section.

Determining prices for variants of the UBA service

490. The UBA STD specifies four different variants to the UBA service: a best efforts Basic UBA (BUBA) service (also referred to as EUBA0) and three Enhanced UBA (EUBA) variants, offering a real time Class of Service, (EUBA40, EUBA90, and EUBA180). We refer to the four different variants to the UBA service collectively as the UBA variants.

491. The UBA variants were included within the UBA STD to enable access seekers greater flexibility in terms of the services they can support at the retail level. The intention was that alternative services would provide further opportunities for service differentiation and, therefore, would likely promote competition for the long-term benefit of end-users in telecommunications markets.[350]

492. In the following sections we consider:

    492.1 whether it would be appropriate to set the same price for each variant; and

    492.2 if it is not appropriate to set the same price, how we can determine different prices for the variants, including considering whether our TSLRIC cost model can provide an appropriate price differential.

Should we set the same price for the different variants?

493. Our final decision is that it is not appropriate to set the same price for each of the UBA variants.

494. We reach this view because we consider that, with no price differential, there would be a tendency for access seekers to switch to the highest-end variant at the same cost.[351] Such behaviour would be inconsistent with our TSLRIC objective/outcome of providing for efficient use of infrastructure, because it results in all access seekers using a single UBA variant, regardless of whether or not it is efficient to do so.

495. The TSLRIC objective/outcome of providing for efficient cost recovery is also relevant in this regard. We consider that the most efficient recovery of fixed costs is unlikely to be achieved through a single averaged price applying for each of the variants. Rather, differential prices can enhance efficiency by allowing for fixed costs to be recovered while also ensuring that marginal consumers (eg, those whose willingness to pay is relatively low) are served.

496. Chorus agreed with this view, and submitted that we should continue to provide differential pricing between the UBA variants.[352] Other submitters submitted on the appropriate method for setting differential prices (we discuss these submissions

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350 Commerce Commission "Standard Terms Determination for the designated service Telecom's unbundled bitstream access" 12 December 2007, Decision 611, paragraph [109].

351 The highest-end variant refers to EUBA 180. This variant provides access to the greatest share of dedicated bandwidth.

352 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [230].

further below), and it appears implicit in these submissions that they accept that it is appropriate to set differential prices.

497. Accordingly, our final decision is that we should set differential prices for the UBA variants.

How we determine differential prices for the UBA variants

498. We have considered whether our TSLRIC model provides any cost differential between the UBA variants that can be used to determine the different prices.

499. WIK submitted that if our cost model had been determined appropriately, particularly in regards to traffic dimensioning, then the model should provide a cost differential between the UBA variants according to bandwidth.[353] Similarly, Wigley and Company submitted that, if our TSLRIC model is not able to provide cost differences between the variants, then the model needs to be fixed to produce the answer.[354]

500. We are confident that traffic dimensioning has been incorporated into our model correctly, and that our model appropriately provides TSLRIC, on average, across each of the variants. However, there is only a very small proportion of cost that varies with bandwidth, particularly because all the UBA variants use the same DSLAM and the same backhaul. For this reason, we have not been able to determine an appropriate price differential across the UBA variants from our TSLRIC model.

501. In the absence of using our TSLRIC model to determine a price differential, throughout our FPP pricing review determination process we have considered the following approaches for determining differential prices for the UBA variants:[355]

    501.1 determine a price differential based on a price consisting of two components, ie, the price per customer plus a uniform price per megabits per second (Mbps); or

    501.2 determine a price differential based on a gradient approach, whereby the difference between the prices for the variants is based on an appropriate gradient, in a way such that the average revenue from these products equals the average TSLRIC.

502. Attachment O (Alternative methods to set prices for the UBA variants) to this determination explains these alternatives in further detail.

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353 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [208].

354 Wigley and Company "Cross submissions as to draft UCLL and UBA FPP determinations" 20 March 2015, paragraph [15.2].

355 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraphs [338]-[364]; Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraphs [374] and [380].

503. A price differential based on a price consisting of two components requires data on traffic at peak hour to determine a price per Mbps. However, the main disadvantage with this approach is that it requires either customer number and peak hour traffic forecasts for each operator, which are difficult to determine at such a granular level over the five-year regulatory period, or actual customer number and peak hour traffic data, which makes the pricing approach volatile.

504. We have therefore rejected an approach that determines a price differential based on a price consisting of two components.

505. Turning now to the gradient approach, Chorus supported the use of the gradient approach (based on the gradient determined in the UBA IPP determination, which we discuss further below).[356]

506. In contrast, Wigley and Company argued that the gradient approach is not legally open to us and the pricing for the different UBA variants must be cost-based.[357] Similarly, WIK submitted that a gradient approach does not reflect the structure of costs, and so in applying this approach we are not applying a TSLRIC-based pricing approach.[358]

507. However, Analysys Mason submitted that a gradient approach is not a departure from the TSLRIC approach and stated that a gradient approach has been used in LRIC models in Denmark and Sweden. Analysys Mason also considered the gradient approach as a simplified Ramsey-pricing approach.[359] Chorus submitted that the gradient approach was appropriate because there is no specific cost-based evidence in New Zealand that can be used to differentiate the UBA variants.[360]

508. We disagree with Wigley and Company, and WIK, and we consider the Act does not direct us to cost each variant individually. Rather, we are broadly required to determine the TSLRIC of the UBA service as a whole. How the costs making up the wider UBA service are allocated to different UBA variants is a matter for us to decide in accordance with the regulatory framework under which we set a price for the UBA service. We are comfortable that prices remain cost oriented under the gradient approach because the total cost of all the UBA variants is equal to the UBA TSLRIC.

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356 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [231].

357 Wigley and Company "Cross submissions as to draft UCLL and UBA FPP determinations" 20 March 2015, paragraphs [15.1]-[15.2]; Wigley and Company “Submission on Further Draft Pricing Review UCLL and UBA Determinations” 13 August 2015, paragraph [18.2].

358 WIK-Consult “Submission in response to the Commerce Commission’s Draft pricing review determination for Chorus’ unbundled bitstream access service and unbundled copper local loop service including the cost model and its reference documents” CONFIDENTIAL, 20 February 2015, paragraph [86].

359 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 20 March 2015, Section 3.11.

360 Chorus "Cross submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 March 2015, paragraph [243].

Accordingly, the gradient is simply a way to allocate the total UBA cost between the different variants.

509. Moreover, we consider that the gradient approach is appropriate for the following reasons.

509.1 To the extent that the gradient reflects the different willingness to pay of end-users, then it likely best promotes allocative efficiency. This is consistent with the TSLRIC objective/outcome of providing incentives for efficient use of infrastructure and the efficiency considerations under the section 18 purpose statement.

509.2 We view it as relevant to consider how other regulators have implemented TSLRIC models, and the gradient approach is international practice, being used in Denmark and Belgium, for example.[361]

510. Our final decision is therefore that we will determine prices for the UBA variants based on a gradient approach.

We determine the gradient based on benchmarking from the UBA IPP determination

511. Throughout our FPP process we have considered alternative ways to determine the gradient.[362] We provide further detail on the various approaches we have considered, and their advantages and disadvantages, in Attachment O – Alternative methods to set prices for the UBA variants.

512. In our December 2014 UBA draft determination paper and our July 2015 UBA further draft determination paper, our preference was to use the gradient based on price differentials taken from the UBA IPP determination.[363]

513. In submissions on this issue, Chorus supported the use of the gradient determined in the UBA IPP determination.[364] At the conference, Spark and Vodafone both indicated that they had no concerns in relation to this issue or how it is addressed.[365]

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361 Denmark was one of the international benchmarks used in the UBA IPP determination, and Belgium was used as a cross check in the UBA IPP determination. At the conference, Analysys Mason noted that the countries that have thought most about this gradient issue are Denmark, Sweden and Belgium (Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 286).

362 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [352]; Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [1097].

363 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [353]; Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream service" 2 July 2015, paragraph [395].

364 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [231]; Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 13 August 2015, paragraph [177].

514. In contrast, Wigley and Company submitted that by benchmarking against the UBA IPP determination, the FPP does what it is designed to replace in the IPP.[366] Further, Wigley and Company submitted that benchmarking against the UBA IPP determination involves using only the Belgian benchmark, and ignores the Swedish benchmark (for which there is no price differential).[367]

515. While we agree with Wigley and Company that the FPP process is intended to replace the benchmarking approach in the IPP, in this instance we consider that a benchmarking approach is the best available option that is open to us, in the absence of pricing differentials determined by the cost model. We note also that, as discussed above, the total cost across the UBA variants is based on the results of the TSLRIC model.

516. We also set out in our reasons above, why we consider it is appropriate to have a price differential across the UBA variants, and these reasons are also applicable to why we have not chosen Sweden as a benchmark (where there is no price differential).

517. Overall, we consider that the gradient determined in the UBA IPP determination from the Belgian benchmark is the best approach to determining a gradient for the UBA variants. In Belgium there is a real time traffic pricing profile for carrying wholesale bitstream traffic, and this pricing profile is actually applied in practice. As a result, we consider that this provides the best available evidence of the likely willingness to pay for the different UBA variants, and therefore best provides for allocative efficiency (consistent with our TSLRIC objectives/outcomes and the section 18 purpose statement).

518. Moreover, as we discuss in Attachment O, alternative approaches to calculating the gradient suffer from problems such as not adequately reflecting willingness to pay, or having inadequate data to undertake the calculation.

519. Accordingly, our final decision is that the gradient based on the UBA IPP determination is the best approach, given that the TSLRIC model for UBA does not provide a cost differential for the variants.

520. We note also that, after we have set TSLRIC-based prices for the different UBA variants, access seekers still have the option of negotiating a commercial deal with Chorus regarding the prices paid for the Enhanced UBA variants, up to the cap determined by the TSLRIC-based prices. We raised this issue with parties at the

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365 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 284.

366 Wigley and Company "Cross submissions as to draft UCLL and UBA FPP determinations" 20 March 2015, paragraph [15.10].

367 Wigley and Company "Cross submissions as to draft UCLL and UBA FPP determinations" 20 March 2015, paragraph [15.10].

conference, and Chorus agreed that there was the potential for a commercial solution to arise.[368]

521. In the UBA IPP determination we identified that Belgium has a wholesale bitstream transport service with a real time customer Class of Service (CoS) profile.[369] In order to calculate the percentage difference for the additional cost of the UBA variants, we have calculated the percentage mark-up of the costs required to provide a real time CoS in addition to the costs of providing a best effort CoS to the Belgian distant handover point.[370]

522. The gradient determined in the UBA IPP, based on Belgium, is presented in Table 4.3.[371]

Table 4.3: Gradient determined in UBA IPP, based on Belgium[372]

Bitstream service	Price (EUR)	Mark-up
32 kbps best effort service	4.56	
32 kbps best effort service + 40 kbps real time service	5.53	21.32%
32 kbps best effort service + 90 kbps real time service	5.77	26.57%
32 kbps best effort service + 180 kbps real time service	6.20	36.02%

523. For each year of the regulatory period, we have applied these percentage mark-ups to the monthly unit TSLRIC for the UBA increment, to determine monthly unit prices for each of the four UBA variants. We have also taken account of the distribution of customers across each of the UBA variants, so that the total TSLRIC for the UBA increment are spread across the four UBA variants in proportion to this customer distribution.

524. Table 4.4 below provides the prices for the UBA increment determined based on our TSLRIC model and the gradient determined in the UBA IPP determination.

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368 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 288.

369 Commerce Commission “Unbundled Bitstream Access Service Price Review, Decision [2013] Final determination to amend the price payable for the regulated service Chorus’ unbundled bitstream access made under s 30R of the Telecommunications Act 2001” 5 November 2013, NZCC 20, paragraph [290].

370 We assumed a 32 kbps best effort CoS as the base service on top of which we have calculated the additional costs of the real time services.

371 The Belgian 32kbps base service is calculated assuming a 32kbps best efforts dedicated Ethernet Virtual Local Area Network (VLAN) to the regional handover point. The real time services also include a real time dedicated Ethernet VLAN.

372 Commerce Commission “Unbundled Bitstream Access Service Price Review, Decision [2013] Final determination to amend the price payable for the regulated service Chorus’ unbundled bitstream access made under s 30R of the Telecommunications Act 2001” 5 November 2013, NZCC 20, paragraph [292].

Table 4.4: Nominal monthly unit prices for UBA increment for each UBA variant (NZ$)

	Year 1	Year 2	Year 3	Year 4	Year 5
BUBA	$11.44	$11.22	$11.01	$10.83	$10.67
EUBA40	$13.87	$13.61	$13.36	$13.14	$12.94
EUBA90	$14.47	$14.20	$13.94	$13.71	$13.50
EUBA180	$15.55	$15.26	$14.98	$14.73	$14.51

Source: Commission's TSLRIC model for final determination

Price profile

525. In this final determination we are required to determine prices for the UBA increment in each year over a five-year regulatory period. We have therefore considered what the appropriate profile of prices should be over that five-year period.

526. Throughout our FPP pricing review determination process we have considered two possible options for the price profile: a constant (levelised) nominal price that remains unchanged for each year of the five-year regulatory period; or a varying price profile in which we set different prices for each year over the regulatory period.

527. Our final decision is for a price profile of different prices for each year over the regulatory period. We explain our reasons for this decision in more detail below.

Our choice of the appropriate price profile

528. In considering the choice of either a constant or varying price profile, we note that it is possible to ensure that both approaches are equivalent in net present value (NPV) terms. That is, a constant price profile can be determined in such a way so that the stream of cash flows arising from the constant levelised price has the same NPV as the stream of cash flows arising from the increasing nominal prices over the regulatory period.[373] As a result, both approaches achieve efficient cost recovery (consistent with our TSLRIC objectives/outcomes) in present value terms over the regulatory period.

529. However, the advantage of a varying price profile is that it is likely to reduce the size of price changes at the start and end of the regulatory period, because changes in prices are spread out over the regulatory period. In contrast, using a price path based on nominal prices for each year over the regulatory period would result in a larger price change at the start of the regulatory period, as well as at the end of the regulatory period when prices are reset.

530. Submitters generally agreed with this point. WIK submitted that a constant price profile approach can be disruptive to the market at the start and end of the

[373] A formula for ensuring this was set out in Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [412].

regulatory period if there is a steady cost trend.[374] Similarly CallPlus submitted that a constant levelised price creates problems for unbundlers by effectively increasing the price they pay in years 1 and 2 of the regulatory period.[375] Spark agreed that a varying price profile will mitigate the risk of price shocks, and added that "it will also avoid one set of access seekers and end-users (those who purchase services at the beginning of the period) subsidising a different set (those who purchase services at the end)".[376]

531. We note also the submissions by Spark and WIK, that a constant price over the regulatory period provides price signals that risk distorting efficient choices.[377,378] To some extent we agree – a varying price more closely reflects costs in each year over the regulatory period. Even so, this is not a major factor in choosing a price profile. This is because averaging within the TSLRIC model and the requirement to determine a geographically averaged price undermines, to some extent, the ability for prices to closely reflect costs.[379]

532. While most submitters supported a varying price profile,[380] at the conference, Chorus indicated that it had a "slight preference" for a constant levelised price over the regulatory period. Chorus stated that setting constant levelised prices is a

374 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [91].

375 CallPlus "Submission on the Commerce Commission's Draft determinations for UBA and UCLL services" CONFIDENTIAL, 20 February 2015, paragraph [58-63].

376 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [315].

377 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [312].

378 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [91]; and WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [194].

379 Sapere made a similar point – see Sapere Research Group Limited "Report for Chorus - Economic Comment on UCLL and UBA Pricing Issues" 11 August 2015, paragraph [125].

380 Sapere made submissions that it stated related to the price profile within the regulatory period (Sapere Research Group Limited "Report for Chorus - Economic Comment on UCLL and UBA Pricing Issues" 11 August 2015, paragraph [120]-[121]). However, Sapere's arguments appear to relate to the implementation of the price profile on the assumption that backdating to December 2014 occurs. Therefore we do not consider Sapere's submissions are relevant to our choice of either the constant price profile or varying price profile.

pragmatic approach that will provide stability over the regulatory period.[381] Chorus also submitted that a constant price profile has the advantage of simplicity.[382]

533. While we agree with Chorus that a constant price profile can provide price stability, it does so only within the regulatory period. A constant price profile does not provide stability between regulatory periods due to the increased likelihood of price shocks when prices are reset. In contrast, as noted above, such price shocks are mitigated to a greater extent with a varying price profile. In any case, we do not believe that such stability is beneficial enough to outweigh the detrimental impacts of a constant levelised price.

534. Regarding the simplicity of a constant price, given the complexity of TSLRIC modelling, any additional simplicity added by a constant nominal price (relative to a price that varies over the regulatory period) is unlikely to be material. Indeed, we agree with the submissions of Trustpower, who noted that an annual adjustment to prices is "hardly onerous",[383] and Wigley and Company, who suggested that an annual adjustment is relatively simple.[384]

Our final decision regarding the price profile

535. Our final decision is for a price profile of different prices for each year over the regulatory period. We consider that this approach best reduces the size of price changes at the start and end of the regulatory period. This implies that the prices determined from our TSLRIC model in each year of the regulatory period and taking into account the other adjustments explained in this Chapter (as set out in Table 4.4 above), are our final prices for the UBA increment for the four different variants of the UBA service.

536. To implement our preferred approach we factored in the effect of price trends on the network build. Our TSLRIC model uses cost data collected in 2014, the most recently available data when we began to collect data and implement our model. However, our final decision is issued in December 2015. To account for this timing difference, the prices shown as Year 1 in our price path have factored in a year's price trend (so Year 1 in our price path is the second year in the TSLRIC model).

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381 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 283.

382 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)" 13 August 2015, paragraph [281].

383 Trustpower "Trustpower cross submission: Further draft pricing review determinations" 24 September 2015, paragraph [10.3.1].

384 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraphs [11.6]-[11.7].

Chapter 5: Price adjustments for UBA

Purpose

537. In this Chapter, we set out our consideration of the following concepts.

537.1 Whether the mid-point estimate of the WACC used to determine the TSLRIC price for the UBA service is likely to best give effect to the section 18 purpose statement.

537.2 Whether the central estimate of the TSLRIC price for the UBA service is likely to best give effect to the section 18 purpose statement.[385]

537.3 Whether a specific adjustment should be made to the central estimate of the TSLRIC prices for the UCLL or UBA services to give effect to the relativity requirements of the Act.

538. We have set out in more detail our analysis of whether an adjustment should be made to the TSLRIC price and WACC in Chapter 5 of the UCLL final determination. As noted below, we consider that the aforementioned analysis also applies with respect to the UBA service. We provide some further specific comment below which relates to the UBA service.

Our final decision

539. Our final decision is that it is appropriate to use the mid-point estimate of the WACC to determine the TSLRIC price for the UBA service in this pricing review determination. In our view, the link between a WACC uplift and incentives to invest is not sufficiently robust to support an uplift in this case.

540. We also consider that the central estimate of the TSLRIC price for the UBA service is likely to best give effect to the section 18 purpose statement. Having considered the potential consequences of increasing the regulated price above our central TSLRIC estimate, we consider that such an uplift would not promote competition for the long-term benefit of end-users.

541. On relativity, our final view is that we should be neutral towards unbundling and should not try to either promote or hinder it. Also, we should allow for unbundling to occur to the extent that it is efficient. Accordingly, we have not adjusted our central estimates of the TSLRIC-based prices of the UCLL and UBA services on the grounds of relativity.

[385] By "central estimate", we mean the unadjusted estimate that is produced by our TSLRIC model.

Why did we consider adjusting the final price?

542. As explained in Chapter 2, we take the price for the UCLL service and add to it the TSLRIC of the additional costs incurred in providing the UBA service, and in this pricing review determination we are only pricing the "UBA increment". The nature of a TSLRIC modelling exercise means that we have had to make a number of judgement calls as to how to model the service and which parameters to use. We note that TSLRIC modelling faces a degree of uncertainty. As such, people may disagree with one or more options given in a range of options for any decision made. We have provided further details on our judgement and views on modelling decisions in this final determination.

543. As we discuss in the UCLL final determination, over-estimating or under-estimating the regulated price may produce asymmetric effects. In particular, the costs of setting a regulated TSLRIC price that is too high would include the welfare losses to end-users from higher retail prices for copper-based services. The costs of setting a price that is too low could include losses from less investment in innovative new services and slower migration to fibre-based services. The potential that the costs of setting a price that is too low might exceed the costs of setting a price that is too high led us to consider whether an uplift might be justified.

544. In the case of the UBA increment, an uplift may have two potentially conflicting effects on migration.

    544.1 It will determine the price of access to the UBA network relative to alternative networks. Therefore, a higher price will make alternative networks (ie, fibre) relatively more attractive to end-users.

    544.2 It will directly affect the incentives for access seekers to unbundle Chorus' copper network and, potentially, thereby reduce migration to alternative networks.

545. In our view any potential concerns around migration are likely to be best addressed by considering whether to depart from the central estimate of the TSLRIC price for the UCLL service rather than the TSLRIC price for the UBA service. This is because the UCLL service underpins both UCLL-based and UBA-based retail services and will, therefore, affect all copper-based services. In addition, an increase in the UBA increment may have an offsetting effect to the extent that it promotes unbundling.

546. The final output of the model represents our central estimate of the "forward-looking" TSLRIC for the UBA service, as determined in accordance with the framework set out in Chapter 2. In other words, the final output reflects the various modelling choices, many of which have a range of reasonable options. For this reason, we consider that there is more than a single reasonable TSLRIC for the UBA service. Any assertion that a properly conducted TSLRIC modelling exercise automatically produces the "true TSLRIC" is misconceived. Accordingly, in the present context, we consider our TSLRIC output as a central estimate which could be said to lie within a "plausible range".

547. Although we have not tried to derive a quantitative range of TSLRIC-based UBA prices for the same reasons as given in the UCLL final determination, we consider that our central estimate of the TSLRIC price sits within a "plausible range", and we believe that it is appropriate to consider whether there are good reasons to move away from this central estimate. Our starting point is that setting a price based on our best estimate of the TSLRIC price will meet our section 18 purpose statement. Accordingly, before setting a different price, we would need to be satisfied that moving above or below our central estimate would best meet our section 18 purpose statement to promote competition in telecommunications markets for the long-term benefit of end-users of telecommunications services.

548. In Chapter 5 of the UCLL final determination, we set out our final decision not to adjust our mid-point estimate of the WACC. In our view, the link between a WACC uplift for UCLL and UBA under the TSLRIC pricing principle and benefits from earlier deployment of new services is too weak to justify an uplift, when compared to the certain (and potentially very large) cost to consumers. Therefore, our view is that a WACC uplift for UCLL and UBA would not best achieve the section 18 purpose statement.

549. We have included further detail of our consideration of whether the mid-point estimate of the WACC should be adjusted in our separate cost of capital report released with this final determination.[386]

550. In Chapter 5 of the UCLL final determination, we also set out our final decision not to adjust our central estimate of the TSLRIC-based price for the UCLL service. This is on the basis that the positive network effects from faster migration to fibre are unlikely to outweigh the welfare losses from higher prices for copper-based services. For the same reasons, the benefits of an uplift applied to the UBA increment resulting in faster migration to fibre are unlikely to outweigh the welfare losses from higher copper prices. This conclusion is reinforced in the case of the UBA increment to the extent that the uplift encourages greater unbundling and potentially reduces migration to alternative networks. Given that an uplift to the UBA increment may have an offsetting migration effect to the extent that it promotes unbundling, we have concluded that no adjustment should be made to our central estimate of the TSLRIC-based price for the UBA increment.

Consideration of the relativity requirement in the Act

Our final determination about the relativity between the UCLL service and the UBA service

551. Section 19(b) of the Act requires us to consider any additional matters specified in Schedule 1 that focus on the application of the section 18 purpose statement. For both the UCLL service and the UBA service, that additional matter is the relativity between the UCLL service and the UBA service.

386 Commerce Commission "Cost of capital for the UCLL and UBA pricing reviews: Final decision" 15 December 2015.

552. The UCLL and UBA services relate to each other because access seekers can "unbundle" a cabinet or exchange. To unbundle, access seekers install their own digital subscriber line access multiplexer (DSLAM) in the cabinet/exchange. To provide a broadband service to end-users served by that cabinet/exchange, access seekers who have unbundled only need to purchase the UCLL service from Chorus and not the UBA service. In contrast, access seekers who do not unbundle must purchase the UBA service from Chorus to provide a broadband service to end-users.

553. The relativity of the price of the UCLL service to the price of the UBA service will therefore affect incentives to unbundle. The price of the UBA service is the price of the UCLL service plus the "TSLRIC of additional costs incurred in providing" the UBA service, [387] which we term here "the UBA increment". The greater the UBA increment is, the greater the incentive on access seekers to unbundle, since the UBA increment is the cost access seekers avoid by unbundling.

554. We note that the issue of relativity is particularly important for the UBA service, as relativity will influence the incentives for efficient unbundling decisions. We have set out our final views on the relativity requirement in Chapter 5 of the UCLL final determination. We consider that the conclusions we have drawn on relativity in the UCLL final determination apply equally to the UBA service.

555. We conclude that we should be neutral towards promoting unbundling, and allow for unbundling to occur to the extent that it is efficient. Accordingly our final determination is not to adjust our central estimates of the TSLRIC-based prices of the UCLL and UBA services on the grounds of relativity.

Overall conclusion on section 18 considerations

556. For the reasons given above, we consider that our mid-point WACC estimate is likely to give best effect to the section 18 purpose statement. We also consider that our central estimate of the TSLRIC price for the UBA service is likely to give best effect to the section 18 purpose statement.

557. We have also decided not to adjust our central estimates of the TSLRIC-based prices of the UCLL and UBA services on the grounds of relativity.

387 Subpart 1 of Part 2 of Schedule 1 of the Act.

Chapter 6: Non-recurring charges (UBA)

Purpose

558. NRC are the charges levied on access seekers to recover time and material costs that are incurred outside of the UBA monthly recurring charges.

559. In this Chapter we set out our decisions on the scope, approach, and modelling choices we have used to set the TSLRIC prices for UBA NRC.

Decisions

560. Our decisions, reasons and detailed analysis of the following issues are the same as those for UCLL NRC, in this regard:

560.1 all NRC are included in the scope of this TSLRIC pricing review;

560.2 no new NRC will be introduced as part of this final pricing process;,

560.3 we have modelled NRC based on the efficient costs of providing the relevant services in respect of a copper access network;

560.4 the implementation of the NRC modelling approach, being that the best data available is data from the third party service companies to which Chorus subcontracts the relevant services. As such, NRC will be priced on a top-down approach with efficiency adjustment;

560.5 neither the Chorus overhead nor the Chorus service company overhead require any adjustments for efficiency and

560.6 where we cannot apply our top-down with efficiency adjustment approach, NRC will be priced either:

560.6.1 on an hourly rate plus materials basis, with updated figures based on current New Zealand labour rates taken from Chorus service company contracts; or

560.6.2 on a Price on Application (POA) basis. All NRC that were set as POA charges in the UBA STD last published on 5 November 2013 will remain as POA, except for UBA NRC 1.50 Additional charge for wiring, which is now set using an hourly rate plus materials approach.

(a) This charge was set as a POA in the UBA STD and in our July 2015 further draft determination we proposed that it remain as POA. But we have decided to change this to an hourly rate plus materials charge following submissions supporting a reduction in the number of NRC priced as POA.

561. These decisions and reasoning are set out in full in the UCLL December 2015 final determination at Chapter 6 - Non-recurring charges. The exception to this is our decision relating to the UBA NRC 1.50 Additional charge for wiring, which is set out below, as are our decisions on specific UBA NRC issues that were raised in submissions, being:

    561.1 a change in our July 2015 further draft determination for the pricing structure of UBA NRC 1.48 Remapping design charge, from a fixed charge as set out in the UBA STD to a POA pricing basis; and

    561.2 additional UBA NRC that should be made available.

562. The implications of our decisions on each NRC are listed in Tables 6.1 and 6.2.

UBA 1.50 Additional charge for wiring

563. The STD pricing structure for NRC is based on the following.

    563.1 Fixed rates.

    563.2 A set hourly charge.

    563.3 POA.

564. These price structures are discussed in detail in the "Background" section of Chapter 6 - Non-recurring charges of the UCLL December 2015 final determination.

Initial views

565. In our July 2015 further draft determination we proposed no changes to the NRC that were set on the basis of POA. This included UBA NRC 1.50 Additional charge for wiring.

Submissions

566. WIK commented that Chorus has a schedule of prices for non-STD in-home work and that this suggested a similar approach could be taken to UBA NRC 1.50 Additional charge for wiring.[388] WIK considered there should be sufficient data available to determine fixed prices for this service.[389]

567. Spark considered it was infeasible to obtain competing quotes due to the high volume and small size of each order.[390] Spark proposed that we should define prices for two scenarios:

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388 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [119].

389 Ibid.

390 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [335b].

567.1 where a service company is already on site; and

567.2 when a standalone truck roll is required.[391]

568. As an alternative, WIK proposed that a labour plus materials pricing structure could be used for a preliminary period until sufficient data could be collected to determine a fixed price for this service.[392] Vodafone recommended that 1.50 Additional charge for wiring should not be priced according to POA. [393]

Analysis

569. We have decided that the UBA NRC 1.50 Additional charge for wiring will be changed from POA in the UBA STD to an hourly rate plus materials price.

570. We agree with Spark that, due to the high volume of transactions relating to this NRC, it is not practical for Chorus to obtain quotes for this particular NRC.

571. We have considered WIK's proposal for a fixed charge, however we do not have data available to develop a fixed cost which does not risk either under or over-recovery of costs. Similarly we do not have sufficient data to establish a two scenario pricing structure as proposed by Spark.

572. We note WIK's alternative proposal for a labour plus materials pricing structure to be set on an interim basis. As WIK observed, this was a recommendation put forward by TERA. However, we do not agree that this should be used as an interim pricing structure as our purpose is to establish final pricing for NRC.

573. We consider it is appropriate to set pricing on an hourly rate plus materials basis. As discussed for UCLL NRC, we have applied an updated hourly rate using the available and up-to-date New Zealand-based data.[394]

574. For other UBA NRC charges set as POA we have decided not to make any changes. We have found that transaction volumes for these charges are very low and that they remain of a bespoke and complex nature. Where transaction volumes are low and the task is complex and variable, establishing a fixed charge using average task times could result in either under or over-recovery of cost.

575. In the absence of more detailed information, we believe the current price change mechanisms within the STD are sufficient.[395]

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391 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [336].

392 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [120].

393 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, p. 28, Recommendation 6.

394 Hourly rates were provided by Chorus for all service companies as part of a s98 request.

NRC price changes

Initial views

576. In our July 2015 further draft determination, we proposed to change the price for UBA NRC 1.48 Remapping design charge from a fixed charge as set out in the UBA STD to a POA pricing basis. We accepted TERA's recommendation that this charge should be set as POA on the basis of the bespoke, complex and low volume nature of this NRC.

Submissions

577. Submissions received on POA showed a general preference for fewer POA charges.

578. Chorus submitted that it had a general preference for fixed charges based on feedback it had received. Chorus commented that a "fixed price provides RSPs with cost certainty".[396] Chorus further suggested that the STD annual review of POA charges "may provide an appropriate way to address these specific matters if sufficient volume data allows a fixed price to be set."[397]

579. WIK considered it was critical to determine fixed prices or a price formula to promote the long-term benefit of end-users.[398]

580. Specifically UBA 1.48 Remapping design charge was raised in submissions.

581. Chorus expressed a preference for the UBA NRC 1.48 Remapping design charge to remain as a fixed price.[399] Chorus stated it was "able to provide a cost breakdown if it would be of assistance".[400]

582. WIK stated that only significant cost "variances, which cannot be forecasted sufficiently, should necessitate POA pricing".[401] WIK argued that a fixed charge is

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395 UBA STD Sch. 2 12 Dec 2007 Consolidated 5 November 2013, paragraphs [3.1.3].

396 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - CONFIDENTIAL version" 13 August 2015, paragraph [457].

397 Ibid, paragraph [458].

398 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [116].

399 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - CONFIDENTIAL version" 13 August 2015, paragraph [443].

400 Ibid, paragraph [444].

401 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [122].

justified for UBA NRC 1.48 Remapping design charge. WIK additionally suggested modifying pricing on the basis of "a fixed sum per DSLAM location".[402]

583. Spark agreed with WIK's proposal for pricing on a per DSLAM basis, and noted that as work for this service was performed by internal Chorus resources it was not feasible to obtain competing quotes.[403] Vodafone recommended that 1.48 Remapping design charge should not be priced according to POA. [404]

Analysis

584. We acknowledge the preference for fewer POA charges and have reviewed all of the POA charges listed in both the UBA and UCLL STDs. Therefore we are not making changes to NRC proposed as POA in our July 2015 further draft determination, other than the NRC discussed above.

585. We acknowledge WIK's argument that a fixed price or defined pricing formula has certain benefits for end-users. We consider that there is a benefit if access seekers know the charges they will incur as they can advise end-users who can then make an informed decision to either accept or reject the NRC service. However, these benefits do not arise for every type of NRC. We consider that the POA charging mechanism is still relevant and appropriate for certain NRC that are low volume, bespoke and complex.

586. However, the UBA NRC 1.48 Remapping design charge will be retained as a fixed price as set out in the UBA STD. We agree with submissions from Chorus, Spark, Vodafone, and WIK that this charge should not be set as POA. Based on submissions we are not going to change the pricing of this NRC.

587. We disagree with Spark and WIK that an alternative pricing structure using a per DSLAM charge is appropriate. We do not have data which demonstrates that costs for this charge correlate to the number of DSLAMs involved.

588. To review this price we requested from Chorus information detailing the breakdown of costs involved to deliver this service.

589. [ ]**CNZCI**

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402 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [122].

403 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [335a].

404 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, p. 28, Recommendation 6.

590. TERA advised us that based on Chorus' response, it did not have sufficient data to impose an efficiency adjustment.

591. In addition to this, TERA were unable to find a comparable task within the countries including in the international data set that we were using for the purposes of performing the task time efficiency adjustment.

592. For this reason, TERA recommended we maintain our July 2015 further draft determination position of setting this NRC as a POA charge. However, based on submissions that preferred less POA, we are not going to set additional POAs.

593. We have not applied an efficiency adjustment due to both an absence of data from Chorus and due to the absence of a suitably comparable task performed in other jurisdictions. The price for the NRC UBA 1.48 (handover link remapping design charge) is therefore retained at the current UBA STD price.

Additional UBA NRC

Initial views

594. In our July 2015 further draft determination we stated that we had reviewed all of the NRC listed in the UBA STD.[405] We considered that all NRC listed in the UBA STD were in scope of the FPP review. We did not propose to create any additional NRC.

Submissions

595. We received submissions from Spark, Vodafone, and WIK proposing additional UBA NRC services that should be made available.[406,407,408]

596. These included:

596.1 a 10 GigE handover service;[409] and

596.2 a proposed "Network investigation" service.[410]

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405 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [450].

406 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [331].

407 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, p. 29, "Recommendation 7".

408 WIK "Submission in response to the Commerce Commission's Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)'" 8 October 2014, paragraphs [123-129].

409 Current handover services in the STD include a 1 Gbps for Ethernet option This is commonly referred to as 1 GigE. The 10 GigE proposal is for an Ethernet service running at 10 Gbps.

597. WIK noted that Chorus supplies a 10 GigE service on a commercial basis which WIK considered to be costed at a significantly inflated level.[411]

598. In its cross submission Chorus argued that amending the STD fell outside of the price review process and that the proposed new services needed to be considered under a section 30R review.[412]

Analysis

599. As discussed in Chapter 6 - Non-recurring charges of the UCLL December 2015 final determination, we have decided that all NRC listed in the STD are within the scope of the FPP review.

600. However, we agree with Chorus' cross submission that proposals for new NRC services or changes to NRC services are outside of the scope of this FPP review. Access seekers can use alternative processes outside of this review to request changes to the STD.

601. This means that we have decided not to introduce any new NRC, including a NRC for a 10 GigE Handover service or a "Network investigation" service.

Final pricing for UBA NRC

602. We have documented final pricing in the tables below. The tables contain the former STD prices, transaction volumes, new prices and any specific considerations relevant to the new price. Where these considerations have been addressed by TERA we have reviewed its assessment. Where we agree with TERA we refer to TERA's NRC report for detailed information. Where we disagree we make note and provide our reasoning.

Structure of price tables

603. We have established a set of reasons for our pricing decisions. For each NRC the decisions resulting in the final price can generally be categorised into one of the reasons below.

603.1 Reason 1 - This NRC price is set using a fixed pricing approach with an efficiency adjustment applied. This NRC was set on a fixed pricing approach in the UBA STD. The modelling details are set out in the TERA NRC report.[413]

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410 The proposed "network investigation service" was described as a service where a site visit is made to determine if there is network availability at the end-user's premise.

411 WIK "Submission in response to the Commerce Commission's Consultation on setting prices for service transaction charges for UBA and UCLL services (25 September 2014)'" 8 October 2014, paragraph [127].

412 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL, 24 September 2015, paragraphs [104-105]

413 TERA Consultants "TSLRIC price review determination for the UCLL and UBA services non-recurring charges Methodology document" November 2015, paragraph [1.2.1.1].

603.2 Reason 2 – This NRC price is based on the POA pricing approach. This is the same pricing approach used for this NRC as in the UBA STD. We discuss POA in the UCLL NRC Chapter within the "Implementation of the NRC modelling approach" section.

603.3 Reason 3 – This NRC price is set based on the hourly rate pricing approach. The hourly rate has been adjusted using updated New Zealand service company labour rates. This is the same pricing approach used for this NRC in the UCLL STD. We discuss hourly rates in the UCLL NRC Chapter within the "Implementation of the NRC modelling approach" section.

603.4 Reason 4 – This NRC price is unchanged. We maintain our reasoning as set out in the UBA STD.

603.5 Reason 5 – This NRC price is changed. The original reasoning in the UBA STD established pricing on the basis of cost recovery of software systems which were developed to deliver this NRC service. System costs are discussed under Chorus Overheads in the UCLL NRC Chapter. In order to avoid double recovery of systems costs we have not included additional IT costs into our model. On that basis NRC which were originally priced to recover system costs are now priced at nil charge.

Table 6.1 UBA core charges

Transaction name	Service component	Transaction volume All volumes **CNZCI**	Former STD price	Final STD price	Considerations
New connection - no site visit required (remote connection)	1.1	[ ]**CNZCI**	$15.85	$6.94	Reason 1.
New connection - exchange or cabinet visit required	1.1	[ ]**CNZCI**	$73.51	$45.35	Reason 1.
New connection - site visit required	1.1	[ ]**CNZCI**	$169.73	$131.27	Reason 1.
Other broadband service to any UBA service change plan (no DSLAM port change)	1.9	[ ]**CNZCI**	$15.85	$6.94	Reason 1.
Other broadband service to any UBA service change plan (DSLAM port change)	1.9	[ ]**CNZCI**	$73.51	$45.35	Reason 1.
Any UBA service to any other UBA service change plan (no DSLAM port change)	1.10	[ ]**CNZCI**	$15.85	$6.94	Reason 1.
Any UBA service to any other UBA service change plan (DSLAM port change)	1.10	[ ]**CNZCI**	$73.51	$45.35	Reason 1.
Transfer of Basic UBA Service from an Access Seeker to a Basic UBA Service with another Access Seeker (DSLAM port change)	1.31	[ ]**CNZCI**	$73.51	$45.35	Reason 1.
Transfer of Basic UBA Service from an Access Seeker to a Basic UBA Service with another Access Seeker (no DSLAM port change)	1.31	[ ]**CNZCI**	$15.85	$6.94	Reason 1.
Transfer of Basic UBA Service from an Access Seeker to an Enhanced UBA Service with	1.32	[ ]**CNZCI**	$73.51	$45.35	Reason 1.

Transaction name	Service component	Transaction volume All volumes **CNZCI**	Former STD price	Final STD price	Considerations
another Access Seeker (DSLAM port change)					
Transfer of Basic UBA Service from an Access Seeker to an Enhanced UBA Service with another Access Seeker (no DSLAM port change)	1.32	[ ]**CNZCI**	$15.85	$6.94	Reason 1.
Transfer of EUBA Service from an Access Seeker to a BUBA Service with another Access Seeker (DSLAM port change)	1.33	[ ]**CNZCI**	$73.51	$45.35	Reason 1.
Transfer of EUBA Service from an Access Seeker to a BUBA Service with another Access Seeker (no DSLAM port change)	1.33	[ ]**CNZCI**	$15.85	$6.94	Reason 1.
Transfer of EUBA Service from an Access Seeker to an EUBA Service with another Access Seeker (DSLAM port change)	1.34	[ ]**CNZCI**	$73.51	$45.35	Reason 1.
Transfer of EUBA Service from an Access Seeker to an EUBA Service with another Access Seeker (no DSLAM port change)	1.34	[ ]**CNZCI**	$15.85	$6.94	Reason 1.
Transfer of other broadband service from an Access Seeker to a Basic UBA Service with another Access Seeker (DSLAM port change)	1.35	[ ]**CNZCI**	$73.51	$45.35	Reason 1.
Transfer of other broadband service from an Access Seeker to a Basic UBA Service with another Access Seeker (no DSLAM port	1.35	[ ]**CNZCI**	$15.85	$6.94	Reason 1.

Transaction name	Service component	Transaction volume All volumes **CNZCI**	Former STD price	Final STD price	Considerations
change)					
Transfer of other broadband service from an Access Seeker to an Enhanced UBA Service with another Access Seeker (DSLAM port change)	1.36	[ ]**CNZCI**	$73.51	$45.35	Reason 1.
Transfer of other broadband service from an Access Seeker to an Enhanced UBA Service with another Access Seeker (no DSLAM port change)	1.36	[ ]**CNZCI**	$15.85	$6.94	Reason 1.
UBA service relinquishment	1.39	[ ]**CNZCI**	$0.00	$0.00	Reason 4.
UBA service move address - remote connection without port	1.40	[ ]**CNZCI**	$15.85	$6.94	Reason 1.
UBA service move address - exchange or cabinet jumper only	1.40	[ ]**CNZCI**	$73.51	$45.35	Reason 1.
UBA service move address - site visit required	1.40	[ ]**CNZCI**	$169.73	$131.27	Reason 1.
Data interleaving toggle	1.41	[ ]**CNZCI**	$15.85	$6.94	Reason 1.

Table 6.2 UBA sundry charges

Transaction name	Service component	Transaction volume All volumes **CNZCI**	Current price	Final price	Considerations
Exception to BAU order	1.37	[ ]**CNZCI**	POA	POA	Reason 2.
Multiple order for single end-user support	1.38	[ ]**CNZCI**	$0.00	POA	Reason 2.
Access Seeker handover connection installation - GigE capacity Basic UBA service only	1.42	[ ]**CNZCI**	$551.08	$524.24	Reason 1.
Access Seeker handover connection installation - GigE capacity Enhanced UBA service only	1.43	[ ]**CNZCI**	$551.08	$524.24	Reason 1.
Access Seeker handover connection installation - STM1 capacity	1.44	[ ]**CNZCI**	$551.08	$524.24	Reason 1.
Access Seeker handover connection installation - STM4 capacity	1.45	[ ]**CNZCI**	$551.08	$524.24	Reason 1.
Relinquishment of access seeker handover connection	1.46	[ ]**CNZCI**	POA	POA	Reason 2.
Handover fibre installation	1.47	[ ]**CNZCI**	POA	POA	Reason 2.
Remapping design charge	1.48	[ ]**CNZCI**	$1,989.29	$1,989.29	Reason 4.
Access remapping fee	1.49	[ ]**CNZCI**	$1.19	$1.19	Reason 4.
Additional charge for wiring	1.50	[ ]**CNZCI**	POA	$47.21 per hour	Reason 3.

Transaction name	Service component	Transaction volume All volumes **CNZCI**	Current price	Final price	Considerations
				plus materials.	
Modem installation	1.50	[ ]**CNZCI**	$38.01	$38.01	Reason 4.
Automatic address pre-qualification order	3.1	[ ]**CNZCI**	$0.00	$0.00	Reason 5.
Special manual pre-qualification investigation order	3.2	[ ]**CNZCI**	$118.78 per hour	$117.60 per hour	Reason 3.
No fault found	3.3	[ ]**CNZCI**	$112.63	$88.34	Reason 1.
Abortive end-user site visit	3.4	[ ]**CNZCI**	$99.66	$32.01	Reason 1.
Cancellation of exception to BAU support order	3.5	[ ]**CNZCI**	POA	POA	Reason 2.
Additional OO&T training	3.6	[ ]**CNZCI**	$112.32 per hour	$58.70 per hour	Reason 3.
Additional OFM training	3.7	[ ]**CNZCI**	$112.32 per hour	$58.70 per hour	Reason 3.
OO&T licence fee	3.8	[ ]**CNZCI**	$24.00 per month	$0.00	Reason 5.
OFM licence fee	3.9	[ ]**CNZCI**	$24.00 per month	$0.00	Reason 5.
Additional copies of invoice	3.10	[ ]**CNZCI**	$112.32 per invoice	$0.00	Reason 5.
Additional billing information	3.11	[ ]**CNZCI**	POA	POA	Reason 2.
Handover fibre maintenance charge	3.12	[ ]**CNZCI**	$0.00	$0.00	Reason 4.
Cancellation charge (pre-truck roll)	3.13	[ ]**CNZCI**	$4.94	$8.21	Reason 1.
Cancellation charge (post truck roll)	3.14	[ ]**CNZCI**	$99.66	$32.01	Reason 1.

Transaction name	Service component	Transaction volume All volumes **CNZCI**	Current price	Final price	Considerations
Fixing fault which access seeker no right of access	3.15	[ ]**CNZCI**	POA	POA	Reason 2.
Additions to the approved modem list	3.16	[ ]**CNZCI**	$1,500.00	$1,500.00	Reason 4.

Monthly space rental charge and handover connections

Initial views

604. Different to NRC, but also modelled separately, are the prices we have set for a unique recurring charge, that are not captured elsewhere.

Monthly space rental

605. The UBA STD includes a monthly space rental charge for fibre to connect access seeker equipment with Chorus at the handover point of the UBA service. As such, this is not a charge that is levied against every end-user connection but its applicability varies depending on an access seeker's handover location.

606. To set the forward-looking incremental long run cost for this service we sought up-to-date costs for providing a tie cable. TERA was able to identify the cost of 25 m and 50 m tie-cables. TERA then computed a linear interpolation in order to determine the cost of a 100 m tie cable. We reviewed TERA's analysis and agreed with the results.

Handover connection

607. The UBA STD also includes four charges for access seeker handover connections:

607.1 service component 2.9, GigE capacity for Basic UBA service only;

607.2 service component 2.10, GigE capacity for Enhanced UBA services only;

607.3 service component 2.11, STM1 capacity; and

607.4 service component 2.12, STM4 capacity.

608. The prices for service components 2.9, 2.11 and 2.12 were based on legacy ATM-based handover connections. However, because the UBA network we modelled was based on an Ethernet aggregation network we set prices for these services based on the cost of providing an Ethernet handover connection. We considered this approach to be consistent with setting efficient investment incentives.

Submissions

<u>Monthly space rental submissions</u>

609. No submissions were received on UBA monthly space rental charges.

<u>Handover connection submissions</u>

610. Chorus submitted that the costs used to calculate the handover connection did not include all the assets required, including the Optical Fibre distribution Frame (OFDF) and the fibre cables from the First Data Switch (FDS) to the OFDF.[414] Analysys Mason

[414] Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - CONFIDENTIAL version" 13 August 2015, paragraph [172.3].

agreed with Chorus and noted the Chorus Owned Equipment included in the STD definition for a handover connection.[415]

611. No other submissions or cross submissions appeared to discuss these charges.

Analysis

Monthly space rental analysis

612. In the absence of submissions on monthly space rental we have maintained our initial approach to setting a price. Accordingly, we have set the following price for the handover fibre space rental service:

Table 6.3 Handover fibre space rental charges

	Year 1	Year 2	Year 3	Year 4	Year 5
2.13 Handover fibre space rental charge	$11.06	$11.37	$11.69	$12.01	$12.35

Handover connection analysis

613. We agree with Chorus and Analysys Mason and requested TERA to consider the cost components identified in submissions. TERA has modelled prices for handover connections and recommended the following prices with which we agree. Accordingly, we have set the following prices for the four types of handover connections:

Table 6.4 connection charges

	Year 1	Year 2	Year 3	Year 4	Year 5
GigE capacity for Basic UBA service only	152.72	150.70	148.99	145.89	141.70
GigE capacity for Enhanced UBA services only	152.72	150.70	148.99	145.89	141.70
STM1 capacity	152.72	150.70	148.99	145.89	141.70
STM4 capacity	152.72	150.70	148.99	145.89	141.70

415 Analysys Mason "Report for Chorus - UCLL and UBA FPP further draft determination submission" CONFIDENTIAL, 11 August 2015, paragraph [4.4].

Chapter 7: Backdating

Purpose

614. In this Chapter we set out the Commission's final decision regarding whether to commence the UBA FPP regulatory period after the Commission's final determination, or at an earlier date, ie, to backdate the determination.

615. This Chapter largely follows the framework and reasoning set out in Chapter 7 of our UCLL final determination, published alongside this UBA final determination, except insofar as we have identified particular aspects as being applicable only to UCLL or UBA (as the case may be). Some of the key considerations in our backdating decision across both services have been:

615.1 what guidance we can draw from previous consideration of backdating by the Courts;

615.2 what impact backdating is likely to have on investment incentives and retail market competition; and

615.3 whether early signalling of an intention to backdate by the Commission would be likely to result in more efficient retail prices getting into the market earlier.

Our final decision

616. The Commission's final decision is that the regulatory period should start on 16 December 2015. While mindful of the Court's previously expressed views on backdating, in the particular circumstances of the UBA FPP Commissioners Gale and Welson (the majority) consider that immediate implementation of the determination best promotes incentives that promote competition for the long-term benefit of end-users.

617. The majority were concerned that backdating would harm those incentives, particularly because of the negative impact (regardless of how it was implemented) backdating would be likely to have on retail markets. In the majority's view there were not countervailing benefits from backdating, in terms of promoting investment incentives or price signalling, that would adequately balance out this negative impact.

618. The majority considered whether the UBA transitional provisions in the Act, that required the Commission to make reasonable efforts to complete the UBA FPP by 1 December 2014, change the balance of this decision. While taking account of these provisions, the majority did not find them decisive, and noted particularly the language Parliament had chosen, and the limits of its direction, which effectively left any timing decisions if the 1 December 2014 date was not met to the Commission.

619. Commissioner Duignan considers an alternative start date of 1 December 2014, would best promote competition for the long term benefit of bitstream end users since:

619.1 The most notable feature of this start date decision regarding the UBA price review is that the Commission has the opportunity to ensure that the entity

subject to regulation does not suffer loss as a result of the Commission's inability to complete the review by the date that Parliament required it make reasonable efforts to meet. The key issue is not the relatively small monetary amount involved but rather the Commission's willingness to remedy the effects of the delay in completion of the review.

619.2 Aligning the start date with the date that Parliament required the Commission to make reasonable efforts to meet ought to be seen as an appropriate approach even by those opposed to backdating as a general policy. If explained in this way there are beneficial effects without any detriment.

620. Commissioner Duignan considers that a lump sum settlement of the difference between the IPP and FPP prices prior to the final determination should apply.

Analysis

621. As set out in Chapter 7 of our UCLL final determination, we consider that:

621.1 we have a discretion to set an earlier start date for the UBA FPP regulatory period;

621.2 the Courts have supported backdating such that the FPP price replaced the IPP price *ab initio*, but acknowledged that the Commission retains a discretion regarding when to commence an FPP price, and

621.3 section 18 of the Act guides the exercise of that discretion in the specific circumstances the Commission is considering.

622. In Chapter 7 of the UCLL further draft determination we have set out in some detail our analysis of the various factors which inform our section 18 assessment in this case, including our consideration of submissions. We have also set out the reasoning underpinning the different conclusions on backdating reached by the majority and minority Commissioners.

623. In a large part, that analysis applies equally in the UBA context. Specifically, in terms of the reasoning of Commissioners Gale and Welson that underlies the Commission's UCLL final decision, the same core conclusions apply to UBA, particularly as regards the harm that backdating, whether implemented by claw-back or lump sum, may cause in retail markets:

623.1 *Claw-back:* by reversing an earlier "error" through adding a margin to future prices¸ backdating introduces a further and different distortion as a result of increasing future prices above the central TSLRIC estimate. This would result in demand for broadband services on the copper network being artificially depressed. It would also likely distort the relativity between the UCLL and UBA services (due to the level of IPP "errors" in each of the services being different) in a way that is inconsistent with our obligations under section 19 of the Act, as described in Chapter 5 of the final determination.

623.2 *Lump sum:* we do not expect the prospect of a one-off lump sum payment or cost in the future to be fully accounted for in current prices. Lump sum backdating would therefore normally result in a windfall gain or loss for the access seekers, neither of which is necessarily helpful to promoting competition. In the current circumstances where the FPP prices are higher than the IPP prices, and price increases by some access seekers have at most recovered a part of any backdating amount, imposing a lump sum recovery mechanism would result in an expropriation of shareholder value from access seekers. That would have a chilling effect on investment and innovation in the retail markets where we expect most end-user benefits to be realised.

624. Finally we note that the difference between the UBA IPP and FPP (levelised) prices ($10.92 compared to $11.06), is much less significant than for UCLL so the implications of backdating will be less pronounced.

625. In addition to his reasoning in the UCLL paper, Commissioner Duignan notes that competition in the bitstream market has the following features relevant to the backdating decision:

625.1 Unbundlers (rather than access seekers simply taking the UBA service) provide the form of competition that has originated much innovation in the bitstream market. Vigorous competition among access seekers simply taking UBA is assured but is most obviously focussed on price and data caps. Access seekers can adjust their prices and scale of operation or exit if the margins they earn do not compensate for the risks they face. Accordingly, provided the regulator's policies are stable, it is appropriate to expect retail margins will adjust to provide access seekers with ex ante compensation for risk, including risks relating to backdating.

625.2 Providers offering new copper bitstream technologies eg, vectoring are candidates for subsidies under the UFB2 initiative. Such providers would expect to be regulated and consequently would be disadvantaged by any asymmetry in backdating decisions.

626. As discussed more fully in the contemporaneous UCLL decision, investors are likely to be concerned regarding the difficulty of avoiding an asymmetric outcome unless the general policy is to backdate. That difficulty arises where a price review reveals that the access provider has been receiving a higher price than detailed modelling supports. In that case it would be difficult for the Commission to justify to the public why it is not exercising the discretion to backdate which the Court of Appeal endorsed. Investors may well take the view that it would be unsustainable for the Commission to have a policy of not backdating.

Attachment A: UBA network footprint and demand

Purpose

A1 This Attachment sets out in more detail our final decisions relating to the network footprint and demand for UBA.

A2 The network footprint determines the number of connections that comprise the bitstream network, informs where the modelled network will be deployed, and is a key determinant of the network's cost.

A3 The network demand determines the number of paying customers over which total modelled costs will be spread to produce a cost per user.[416]

A3.1 Setting constant network demand leaves the relationship between network footprint and demand fixed throughout the regulatory period, and the cost per user remains fixed. Alternatively, modelling demand migration allows the demand to move, which flows through to the cost per user calculations.

A3.2 The time the modelled network takes to attract demand and reach full load is reflected in the level of demand assumed to be served from Day 1. This could mean a higher cost per user in the early years as demand builds.

Our final decisions

A4 Our final decisions are that:

A4.1 the hypothetical efficient operator's network connects every address with an active UBA connection;

A4.2 the hypothetical efficient operator has demand equal to the number of end-users paying for a UBA service;

A4.3 there is constant demand on the hypothetical efficient operator's network; and

A4.4 the end-users comprising the network demand all take services from the hypothetical efficient operator from Day 1.

A5 Our key reasoning for these decisions is based on:

A5.1 the need for us to select an appropriate network scale to determine a representative price for the regulated service, which we consider is best achieved by selecting a network footprint aligned to Chorus' UBA service availability;[417]

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416 Throughput requirement, which is the average minimum bandwidth each UBA end user demands during peak times, is an independent modelling parameter addressed in Attachment B.

417 As set out in our Framework, the purpose of our TSLRIC exercise is to set robust and representative wholesale prices for the regulated services in accordance with the section 18 purpose statement.

A5.2 the need for us to consider incentives to unbundle;[418] and

A5.3 relevant real-world information, which has informs our geospatial and demand considerations.[419]

The hypothetical efficient operator's network connects every address with an active UBA connection.

A6 The network footprint determines the number of connections that comprise the access network, informs where the modelled core network will be deployed, and is a key determinant of the core network's cost.

A7 Our final decision is that the hypothetical efficient operator's network connects every address with an active UBA connection.

A8 We have considered the availability of Chorus' UBA service, and the network footprint that best preserves incentives for efficient unbundling.

Initial view

A9 Our December 2014 UBA draft decision was to match the modelled footprint to Chorus' actual footprint. We reached this view on the basis that Chorus' copper network was the underlying network presupposed by the service description in the Act.[420]

Submissions

A10 We received various submissions on the legality of our position, which are addressed in Attachment B. We received little comment on whether or not our proposed network footprint was appropriate for the provision of the UBA service. However, Wigley and Company did support basing the UBA footprint on Chorus' actual network.[421]

A11 Our July 2015 UBA further draft decision was unchanged, and we did not receive any further submissions on this matter.

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418 As set out in our Framework, we find that relativity guides us less towards attempting to promote unbundling, and more towards the efficiency aspects of the section 18 purpose statement. We consider that we should be neutral in promoting unbundling, and allow for unbundling to occur to the extent that it is efficient.

419 As set out in our Framework, many of our decisions involve matters that are, to some extent, objectively measurable. In these cases we believe it is appropriate to use data and evidence, which may include data from Chorus and others, to determine our best estimate of what an objective value is, rather than relying on subjective assertions or speculation. This does not detract from the approach of the hypothetical efficient operator concept; rather, it uses real-world information to inform our assessment of this concept.

420 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraphs [420-421].

421 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [3.1].

Analysis

A12 Our final decision is that Chorus' active UBA connections are an appropriate footprint for the hypothetical efficient operator's network.

A13 We consider that a network footprint that is aligned to Chorus' UBA service availability will provide an appropriate scale to determine a representative price for the regulated service.

A14 We discuss below issues in relation to the implementation of this approach.

A15 In light of our decision to include all buildings and dwellings in the UCLL footprint, we further considered the alternatives open to us in relation to the UBA footprint.

A16 We reached the view that modelling a UBA network footprint that connects all active bitstream fixed lines (cable, fibre, FWA, etc,), or alternatively, that connects all buildings does not fit with our consideration of unbundling incentives. A footprint parameter set at these levels (all else held constant) would increase the cost of UBA and would not be neutral towards unbundling.

The hypothetical efficient operator serves demand for all active UBA connections

A17 The network demand determines the number of paying customers over which total modelled costs will be spread to produce a cost per user.

A18 Our final decision is that the hypothetical efficient operator has demand equal to the number of end-users paying for a UBA service.

A19 In reaching this decision, we have considered the demand that best preserves incentives for efficient unbundling.

Initial view

A20 Our December 2014 UBA draft decision was that modelled UBA demand should match Chorus' actual demand for UBA.[422]

Submissions

A21 Similar to our discussion of the UBA network footprint, we received little comment on whether or not our proposed network footprint was appropriate for the provision of the UBA service. However, Wigley and Company did support basing the UBA footprint on Chorus' actual network.[423]

Analysis

A22 As we have stated previously, we remain of the view that this level of demand is appropriate for the provision of the UBA service, and best meets our requirements

422 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraphs [420-421].

423 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [3.1].

under the Act.[424] Setting demand equal to the footprint, as we have done, will be more likely to achieve a position of competitive neutrality, where unbundling will occur if it is efficient to do so.[425]

There is constant demand on the hypothetical efficient operator's network

A23 Our modelling assumptions in relation to demand growth and migration are relevant for calculating unit costs over time. We must determine to what extent changes in the market – population growth and/or migration to or away from the network – should be modelled.

A24 Setting constant network demand leaves the relationship between network footprint and demand fixed throughout the regulatory period, and the cost per user remains fixed. Alternatively, modelling demand migration allows the demand to move, which flows through to the cost per user calculations.

A25 Our final decision is that there is constant demand on the hypothetical efficient operator's network.

A26 In reaching this decision, we have assessed relevant real-world information relating to population growth; and been guided by the EC's recent demand recommendation on migration.

A27 Please refer to the Attachment A of the UCLL final determination paper for our reasons and a detailed analysis of the issues around our constant network demand assumption.

The end-users comprising the network demand all take services from Day 1

Initial view and submissions

A28 The time the modelled network takes to attract demand and reach full load is reflected in the level of demand assumed to be served from Day 1. This could mean a higher cost per user in the early years as demand builds.

A29 In our draft decision, we noted that (coupled with constant demand) our fully-loaded demand and instantaneous take-up assumptions were efficient because they would result in a price sufficient to cover the cost of any refurbishment, replacement or expansion of the hypothetical efficient operator's network.[426]

A30 In response, WIK, for Spark and Vodafone, stated that it fully supports the principle of a fully-loaded network assumption. Vodafone also, separately, provided its support for instantaneous demand take-up, as did Wigley and Company. [427,428,429]

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424 Section 19(b) of Schedule 1 of the Act.

425 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [423].

426 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [509].

427 WIK-Consult "Submission in response to the Commerce Commission's 'draft pricing review determination for Chorus' unbundled bitstream access service' and 'draft pricing review determination for Chorus'

Analysis

A31 As we did not receive any submissions recommending an alternative approach to our December 2014 UBA draft decision and our July 2015 UBA further draft decision, we considered the implementation and consistency of our fully-loaded assumption.

A32 Our UBA demand is equal to our UBA network footprint connections.

A33 Unlike a UCLL access network, which although fully-loaded will always have more network connections than demand, a bitstream network can be more flexible and better match connections and demand. The reason for this is that bitstream infrastructure (DSLAM line cards) can be easily swapped out and redeployed where demand exists. This is not the case for access networks (ducts and poles) that are sunk investments.

A34 We consider that the re-arrangement of line cards is an efficient activity our hypothetical efficient operator would undertake in delivering the UBA service. Therefore, our assumption is that this enables our UBA hypothetical efficient operator to match demand to network connections. Accordingly, the hypothetical efficient operator's network is fully-loaded.

A35 Assuming that demand builds over time would result in initial prices that were higher than the efficient long run price (because the same total cost would be spread over a smaller number of connections initially). We do not think that such an outcome would be justified in terms of the TSLRIC objectives or the section 18 purpose statement.

A36 Accordingly, our final decision is that the end-users comprising the network demand all take services from Day 1.

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unbundled copper local loop service' including the cost model and its reference documents" 20 February 2015, paragraph [413].

428 Vodafone "Submission to the New Zealand Commerce Commission on process paper and draft pricing review determinations for Chorus' unbundled copper local loop and unbundled bitstream access services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [G7].

429 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraph [3.1].

Attachment B: Selecting the MEA for the UBA service

Purpose

B1 This Attachment sets out our final decisions on the MEA for the UBA service.

B2 We have selected a MEA approach as an appropriate tool for determining the efficient forward-looking costs of providing the UBA service.

B3 There are several methodologies within a forward-looking TSLRIC exercise that we could use to determine the cost of the network and so determine a price for the UBA service (including indexation and absolute valuation, both of which re-value the assets of the existing network).

B4 Of the available approaches, the International Telecommunication Union (ITU) has recommended using a MEA whenever possible.[430] In the ITU's view, a MEA approach is the most accurate valuation approach to reflect the cost of an efficient operator, since it captures the associated costs that an efficient operator would face, if entering the market at a specific time. We agree.

B5 We also consider that the MEA approach fits with our hypothetical efficient operator and the principles for the *Vodafone TSO* case in relation to the modelling of the most efficient modern technologies.

B6 The Body of European Regulators for Electronic Communications (BEREC) defines MEA as follows:[431]

> Gross MEA value is what it would cost to replace an old asset with a technically up to date new one with the same service capability, allowing for any differences both in the quality of output and in operating costs. For the replacement cost valuation to be appropriate it is not necessary to expect that the asset will actually be replaced.
>
> The new technologies are usually superior in many aspects to the older technologies in terms of functionality and efficiency. However, since MEA values are required to reflect assets of equivalent capacity and functionality, it may be necessary to make adjustments to the current purchase price and also the related operating costs - for example, the new asset may require less maintenance, less energy and less space. Other adjustments may also be required in the calculation of current costs, e.g. surplus capacity.

B7 BEREC defines "equivalent" as an asset with the same service capability. A "modern" asset is defined to be a technically up-to-date or current asset, consistent with the forward-looking concept discussed in Chapter 2. BEREC notes that the MEA generally incorporates the latest available and proven technology.

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430 International Telecommunication Union "Regulatory Accounting Guide" March 2009, p. 18.

431 ERG COMMON POSITION "Guidelines for implementing the Commission Recommendation C (2005) 3480 on Accounting Separation & Cost Accounting Systems under the regulatory framework for electronic communications" p. 13. The European Regulators Group (ERG) was the predecessor to BEREC.

Our final decisions

B8 The UBA price has two components: the price for Chorus' UCLL network; and the TSLRIC of the "additional costs" of the UBA service. The first component is set by the UCLL pricing review determination. Accordingly, the MEA for the UBA service is relevant only for determining the TSLRIC of the "additional costs" of the UBA service.

B9 The first issue we have addressed is the appropriate underlying access network that we use as the baseline for determining the UBA increment. Some submitters suggested that the Act dictates a particular answer, but have disagreed whether this is Chorus' copper network or the FTTH/FWA network modelled for UCLL. We consider that we have a discretion as to the appropriate underlying access network.

B10 Our decision is that starting with a copper network as the underlying access network will likely best allow for competition through unbundling where it is efficient. This is because access seeker decisions regarding unbundling are made in respect of the existing copper access network. That is, a potential unbundler compares the cost of installing its own equipment on the existing copper access network against the TSLRIC of the additional costs of the UBA service. Therefore, in our view a MEA for the UBA service that is built over a copper access network will better promote efficient build/buy decisions by access seekers, compared with the modelled UBA network being built over a hypothetical fibre access network.

B11 Accordingly, on balance, our view is that section 18, and the requirement to consider relativity between the UCLL and UBA services (as previously explained in Chapter 2 and Chapter 5), lead us to prefer a MEA for the UBA increment that is built over a copper-based access network.

B12 Having determined that a copper network is the appropriate underlying access network, we then determined the MEA for the UBA increment. In our view the MEA for the UBA increment would utilise an Ethernet-based layer 2 aggregation network to transport the data traffic to the handover point. In our view it is the most efficient and best performing layer 2 technology available to provide the UBA service.

B13 We have also considered bitstream throughput requirements. Our modelled network includes the cost of additional network elements that are required to meet the growing bitstream throughput at a 50% per annum growth rate in traffic.

Analysis

Our framework for selecting the MEA for the UBA service

B14 The FPP for the UBA service is:[432]

> The price for Chorus's unbundled copper local loop network plus TSLRIC of additional costs incurred in providing the unbundled bitstream access service.

B15 As we set out in Chapter 2, we take the price for the UCLL service and add to it the "TSLRIC" (as defined in the Act) of the additional costs incurred in providing the UBA service (the UBA increment). Therefore the UBA FPP exercise is limited to calculating

[432] Telecommunications Act 2001, Schedule 1, Part 2, Subpart 1.

the TSLRIC of the additional costs component of the UBA service, and we apply MEA principles to the UBA increment. In selecting the MEA for the UBA increment, the questions we ask are:

B15.1 what is the appropriate underlying access network that we use as the baseline for determining the UBA increment (ie, what are we determining the TSLRIC for); and

B15.2 having identified the appropriate underlying access network, what MEA would the hypothetical efficient operator employ in respect of the UBA increment (ie, what technology would the hypothetical efficient operator use to provide the active equipment and other assets required to provide the UBA service).

B16 It is important to keep these two questions distinct. That is, identifying the appropriate underlying access network is a necessary step in order to identify the "additional costs" component to which we apply TSLRIC. But, as explained below, our choice of the underlying access network is determined by our TSLRIC objectives/outcomes, section 18 considerations, and relativity considerations, rather than by hypothetical efficient operator/MEA considerations.

B17 Spark submitted that our choice of MEA for UCLL demonstrates that the hypothetical efficient operator would select the most future proof technology as the MEA. In Spark's view, our approach to determining the MEA for the UBA service is inconsistent with our approach for the UCLL service.[433]

B18 We do not consider that there is any inconsistency in our approach. For both the UCLL service and the UBA service we have in essence asked: what is the service that we are determining the TSLRIC for; and what is the MEA for that service? For UBA, we are determining the TSLRIC for the UBA increment, so we must determine what access network the MEA and associated costs are incremental to. In our view, this does not give rise to any inconsistency in approach between the two services.

We have modelled the MEA for the UBA increment over a copper underlying access network

B19 Our final decision is to use a copper underlying access network as the baseline for determining the TSLRIC of the UBA increment. In reaching our decision we have taken into account our TSLRIC objectives/outcomes, section 18 considerations, and the requirement in the Act to consider the relativity between the UCLL and UBA services.

B20 As we explained in the July 2015 UBA further draft determination, we consider that we are not restricted to using a particular network as the underlying access network.[434]

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433 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [138].

434 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraphs [753-761].

B21 Vodafone repeated its earlier submissions that we are required to adopt the same MEA for the UCLL and UBA services. Vodafone consider it an error of law for us to determine the UBA FPP price by using as the first component for the UBA FPP price a different price/model.[435]

B22 We have not, however, proposed using a different method in respect of the first component of the UBA price. As Vodafone has previously submitted, the pricing principle refers only to the *price* of the UCLL service and not the network.[436] We agree and in our view the pricing principle only instructs us to take the UCLL price as the first component, but does not restrict us in how we determine the TSLRIC of the "additional costs" of the UBA service. The issue we are considering for UBA relates to whether the MEA for the UBA service takes Chorus' copper access network as the starting point or is based on a hypothetical optimised access network. We also note that the UBA pricing review could have been conducted without a pricing review of UCLL: it is unclear what Vodafone's approach would require in relation to the second component if the first was based on international benchmarking.

B23 In contrast to Vodafone, Chorus submitted that copper is mandated by the structure and purpose of the Act.[437] In our view, the Act does not dictate this outcome and it is a matter for our judgment as to what underlying access network will best achieve the statutory purpose.

B24 Accordingly, we reject both Chorus and Vodafone's submissions.

B25 Given our view that the underlying access network on which we determine the MEA for the UBA increment is a matter of judgment, we have looked at the options available to us in considering the MEA for the UBA service.

B26 In the July 2015 UBA further draft determination, we considered the following options:[438]

B26.1 the hypothetical efficient operator provides the UBA service by building its UBA network over an optimised access network; or

B26.2 the hypothetical efficient operator provides the UBA service by building its UBA network over Chorus' copper network.

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435 Vodafone "Submission to the New Zealand Commerce Commission on further draft pricing review determination for Chorus' unbundled copper local loop service and further draft pricing review determination for Chorus' unbundled bitstream access service" CONFIDENTIAL, 13 August 2015, paragraphs [E1.2]-[E1.5]; Paul Radich QC "The use by the Commission of different MEAs when calculating TSLRICs for UCLL and UBA" 11 February 2015.

436 Vodafone "Submission on Draft UBA and UCLL pricing review determinations" CONFIDENTIAL, 20 February 2015, paragraph [C2]

437 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015) - Public version" 13 August 2015, paragraph [148].

438 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [763].

B27 While we considered that both options would utilise an Ethernet-based layer 2 aggregation network to transport the data traffic to the handover point, we noted that the active equipment required and the distance to the handover point was likely to differ.[439]

B28 As we explained in July, our approach is to select the underlying access network for the UBA service taking into account our TSLRIC objectives/outcomes, section 18 considerations, and the requirement in the Act to consider the relativity between the UCLL and UBA services.[440]

B29 We consider that a MEA for the UBA service that presupposes an underlying copper access network will likely better allow for competition through unbundling where it is efficient. This is because access seeker decisions regarding unbundling are made in respect of the existing copper access network. That is, a potential unbundler compares the cost of installing its own equipment on the existing copper access network against the TSLRIC of the additional costs of the UBA service. Therefore, in our view a MEA for the UBA service that is built over a copper access network will better promote efficient build/buy decisions by access seekers, compared with the modelled UBA network being built over a hypothetical fibre access network.

B30 Accordingly, on balance, section 18, and the requirement to consider relativity between the UCLL and UBA services (as previously explained in Chapter 2 and Chapter 5), lead us to prefer a MEA for the UBA increment that is built over a copper-based access network. Therefore, we have modelled the MEA for the UBA additional costs component based on a copper access network.

B31 In response to the July 2015 UBA further draft determination, Spark submitted that we had elevated relativity above the section 18 efficiency focus, and considered this an error as our justification for departing from section 18 was not supported by the available evidence.[441] Spark's submission was that a fibre underlying access network would be lower cost,[442] and that the lowest cost approach is the most efficient.[443] Similarly, Russell McVeagh, on behalf of Spark, submitted that we had failed to properly apply section 18 to our choice of MEA, and had applied reasoning that is not what section 18 requires when properly interpreted.[444]

B32 We disagree with Spark's submission that we have elevated relativity above efficiency considerations. Rather, we have considered both efficiency and relativity in the context of the section 18 purpose of promoting competition for the long-term benefit of end-users. In our view both considerations lead us to the same conclusion, that we should model the UBA increment over a copper underlying access network:

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439 Ibid, paragraphs [764-769].

440 Ibid, paragraphs [776-778].

441 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraphs [134],[140].

442 Ibid, paragraph [133a].

443 Ibid, paragraph [42b].

444 Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews" 24 September 2015,paragraphs [54]-[57].

B32.1 In terms of efficiencies, we disagree with the argument that the most efficient price always means the lowest cost. As we have set out in Chapter 2, we treat efficiencies as referring to static and dynamic efficiencies. In our view, modelling the UBA increment over a copper underlying access network will set a price for the UBA service that allows access seekers and end-users to make efficient choices between alternative technologies based on the efficient cost of providing services over those technologies. We consider that this will promote both static and dynamic efficiencies, and will promote competition for the long-term benefit of end-users by giving access seekers the price signal to unbundle if and only if it is efficient to do so. In our view, the choice of the underlying access network for the UBA increment is a good example of where simply choosing the modelling option that produces the lowest possible UBA price would risk conflicting with section 18.

B32.2 In terms of relativity under section 19(b) of the Act, our view remains the same as our July 2015 position – a MEA for the UBA increment that presupposes an underlying copper access network will likely better allow for competition through unbundling where it is efficient. This is because unbundling decisions are made in respect of the existing copper network, therefore a MEA for the UBA increment that is built over a copper network will better promote efficient build/buy decisions by access seekers in the real world. A MEA built over a FTTH/FWA access network might result in a higher or lower price for the UBA increment. If it was higher it might inefficiently encourage unbundling, and it if it was lower it might undermine incentives for unbundling to occur even where it would otherwise be efficient.

B33 A copper underlying access network is consistent with our TSLRIC objectives/outcomes of allowing for investment to occur where efficient, providing incentives for Chorus to minimise its costs in line with those incurred by an efficient provider (given that we optimise the UBA increment we model over copper), and allowing for the recovery of costs that are efficiently incurred. Again, decisions by Chorus and access seekers such as investment and cost minimisation are made in respect of the existing copper network.

B34 Spark also referenced its earlier submission that we should place less weight on the build/buy objective given access seekers have submitted that unbundling is less important to them given the deployment of the UFB network.[445]

B35 In our view present access seeker unbundling preferences do not undermine the build/buy rationale. Setting a price for the UBA increment that is built over a copper underlying access network allows RSPs to make unbundling decisions based on efficient price signals. That is, given this signal the market can determine the extent to which further unbundling occurs and by whom. This is also consistent with the staggered set of services in the Act, where access seekers can provide more or less of

445 Spark "UBA and UCLL FPP pricing review draft decision" CONFIDENTIAL, 20 March 2015, paragraph [104].

the end-to-end service depending on their own costs relative to the differences in the regulated prices.

B36 Spark suggested we should not actively seek to encourage unbundling.[446] Similarly, Wigley and Company submitted that our approach to the UBA MEA is not supported by our statement that we should be neutral towards the promotion of unbundling.[447] In Wigley and Company's view, our justification for selecting a copper underlying access network is that a greater margin facilitates unbundling.[448]

B37 However, we are not seeking to actively encourage or facilitate unbundling. Rather, we are seeking to set an efficient price signal that is neutral towards unbundling.

B38 We do not think that we should attempt to anticipate future access seeker investment decisions regarding unbundling (by either actively encouraging or discouraging it), but rather allow unbundling to occur if and where efficient. In this regard, and despite Spark's submission noted above, we note that unbundling has continued since the introduction of cost-based prices for the UBA increment, with 20 exchanges unbundled this year.

B39 If the price of a copper-based UBA increment is higher than a fibre-based UBA increment this does not mean we have set an inefficient cost or applied an "uplift". As explained above, we consider that using copper as the underlying access network will create price signals which will be statically and dynamically efficient and promote competition for the long-term benefit of end-users.

B40 A price based on a fibre underlying access network may in fact undermine incentives for efficient investment because investment decisions are made in respect of the actual network. For example, a fibre-based price above the copper-based price may lead to inefficient investment decisions being made by access seekers, while a fibre-based price below the copper-based price may act as a barrier to further investment by both Chorus and access seekers.

B41 Accordingly, on balance, our view is that section 18, and the requirement in section 19(b) of the Act to consider relativity between the UCLL and UBA services, leads us to prefer a MEA for the UBA increment that is built over a copper access network. Therefore, we have modelled the MEA for the UBA service based on an underlying copper access network.

B42 While we have set the cost of the UBA increment using a MEA for the UBA core network that utilises an underlying copper access network, we have also modelled

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446 Ibid.

447 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraphs [9.9]-[9.13].

448 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [9.4].

the cost based on an underlying fibre access network. We note that there is minimal difference in the cost of the UBA increment between the two approaches.[449]

The MEA for the UBA increment is a layer 2 Ethernet protocol

B43 In our view the hypothetical efficient operator would utilise an Ethernet-based layer 2 aggregation network to transport the data traffic to the handover point. In our view this is the most efficient and best performing layer 2 technologies available to provide the UBA service.

B44 We have previously set out that we consider there to be two technologies that meet the eligibility criteria – Ethernet (ie, ADSL2+) and Asynchronous Transfer Mode (ATM) (ie, ADSL1).[450] In our view, Ethernet is the most appropriate MEA as it is the best in use technology, and offers superior technical performance to ATM. We also note that ATM has largely been phased out due to the superior performance of Ethernet, and therefore does not strictly meet our 'modern' or 'equivalent' requirement.

B45 On behalf of Spark, Russell McVeagh submitted that we had failed to apply a consistent approach to selection of MEAs between the UCLL and UBA services. If we were to apply a consistent approach then we would build the network from scratch, with the assumption that all assets within the legacy network no longer exist.[451]

B46 We note that, as discussed above, before reaching the question of a MEA for the UBA increment we have had to ask what underlying access network should be used to assess the UBA increment. Having made that decision, and consistent with the UCLL FPP, we have applied a modified scorched node approach to the UBA increment, which we are applying TSLRIC to.

B47 We have modelled the additional components on our modified scorched node network as explained in Attachment C. In particular, we have kept the number and location of exchanges and active cabinets as in Chorus' copper network, with some modifications.

Other relevant aspects of the UBA service description

B48 The UBA STD describes the UBA service as "a DSL service that enables access to, and interconnection with, that part of Chorus' fixed public data network (PDN) that connects the end-user's building (or, where relevant, the building distribution

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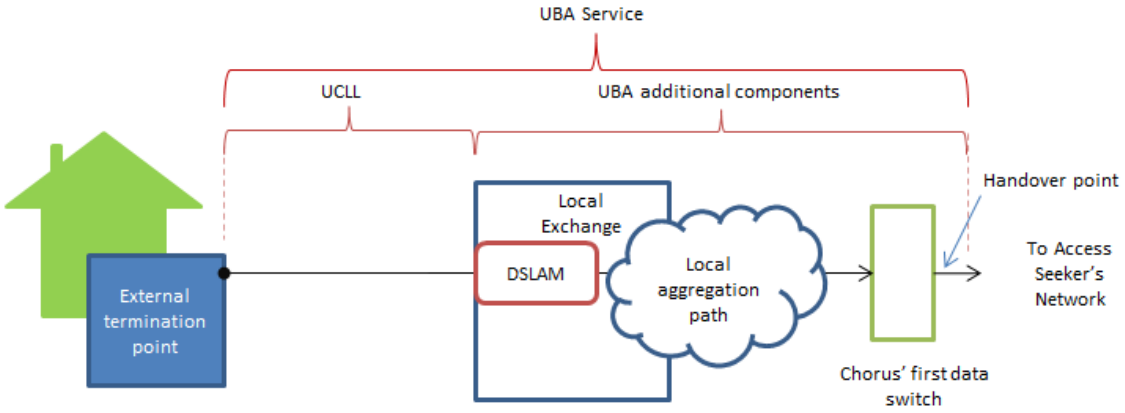
449 In its review of submissions, TERA notes that while there is less active equipment for a UBA increment over a fibre-based access network, the costs of the equipment are much more expensive. As a result, the two options are equivalent in terms of cost. See TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Analysis of the responses to the second consultation following the further draft determination" December 2015, p. 38.

450 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [260]; and Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [172].

451 Russell McVeagh "Chorus submission on further draft UCLL and UBA pricing reviews" 24 September 2015, paragraph [58].

frames) to Chorus' FDS (or equivalent facility), other than the DSLAM".[452] This is illustrated below:[453]

Figure B.3: The UBA service



B49 The UBA Service Description in the STD requires that the UBA service provide a minimum throughput of 32 kbps during any 15 minute period.[454]

B50 Specifying a minimum throughput metric allows for the average throughput level to evolve with changing end-user needs – that is, specifying a minimum throughput does not imply that the service is static or capped.

B51 We are aware that Chorus, and Telecom before it, provides average throughput well in excess of 32 kbps, which it has to this point increased over time to match increasing end-user throughput requirements.

B52 Given that the STD does not prescribe the average throughput of the UBA service we are setting the price of, we need to determine the level of throughput in our TSLRIC model.

B53 We consider that the hypothetical efficient operator would deploy a UBA core network capable of meeting current and future end-user throughput requirements, in order to protect against obsolescence. Further, this UBA service provided would be dynamic and evolve over time as throughput requirements increase.

B54 In the December 2014 UBA draft determination paper we noted that Chorus' existing DSLAM engineering provides for at least a single GigE backhaul per sub-rack. Our view was that this would be consistent with the level of capacity a hypothetical

452 Commerce Commission "Standard Terms Determination for Chorus' Unbundled Bitstream Access Service", Schedule 1 UBA Service Description, clause 2.2.

453 This is a logical diagram and does not describe any technical build.

454 Commerce Commission "Standard Terms Determination for Chorus' Unbundled Bitstream Access Service" Schedule 1 UBA Service Description, clause 3.12.

efficient operator would deploy.[455] Accordingly, we modelled a single GigE backhaul per sub-rack.[456]

B55 However, Chorus submitted that the model should be amended to account for changes to network assets required by future bitstream throughput increases.[457] Chorus recommended forecasting a per annum growth rate of 50%, which it considered to be consistent with a number of forecasts by other agencies.[458]

B56 WIK Consult recommended a growth rate for busy hour peak capacity of less than 40% should be adopted, given uncertainty going forward.[459]

B57 In the July 2015 further draft determination, our view was that a hypothetically efficient operator would seek to ensure that its UBA network was capable of meeting increasing bitstream throughput requirements, and would upgrade its equipment as it reached capacity.[460]

B57.1 We considered the sources used by Chorus to provide its forecast growth rate persuasive, and provided the most appropriate objective estimate of this growth rate. In contrast, we found no objective basis had been provided for the 40% figure proposed by WIK.

B57.2 Accordingly, we assumed a 50% per annum growth rate in traffic. Our modelled network includes the cost of additional network elements that are required to meet the growing bitstream throughput.

B58 We received no new submissions on our updated view in the July 2015 further draft determination. As a result, we remain of the view that a 50% per annum growth rate is appropriate.

B59 Our view remains that, if, as a result of meeting increasing bitstream throughput requirement over time, Chorus' costs materially increased, it could request that we initiate a section 30R review to consider if it is necessary to update the price.

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455 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [241].

456 For more information, see TERA "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services - Model Specification" November 2014, section 7.3.1.

457 Chorus "Submission on Draft UBA and UCLL pricing review determinations" CONFIDENTIAL, 20 February 2015, paragraph [198].

458 Ibid, at paragraph [535].

459 WIK-Consult "Cross-submission on Draft UBA and UCLL pricing review determinations" CONFIDENTIAL, 19 March 2015, paragraph [165].

460 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [785].

Attachment C: Network optimisation

Purpose

C1 This Attachment sets out our final decisions on the:

C1.1 optimisation of nodes;

C1.2 optimisation of active assets;

C1.3 optimisation of exchange buildings; and

C1.4 optimisation of cable paths.

C2 At a high level, optimisation within TSLRIC modelling is concerned with two aspects:

C2.1 how much of the existing network should be reflected in the modelling (all, none, or somewhere in between); and

C2.2 what will be the basis for deriving the costs – built-up from granular cost components (bottom-up), or adopting something closer to the network provider's aggregated accounts (top-down).

Our final decisions

Overall approach

C3 Consistent with our use of the hypothetical efficient operator concept to model the TSLRIC costs, we have taken a scorched earth approach as our starting point. However, for the reasons set out below, we consider that a modified scorched node approach is appropriate and provides an appropriate and reasonable approximation of the forward-looking efficient costs that would be incurred in supplying the UBA service.

Optimisation of nodes

C4 We have adopted a modified scorched node approach to optimisation, which retains the existing locations of active assets (ie, DSLAM and FDS) in Chorus' copper network. All other aspects of the core network have been scorched and optimised – notably the cable routes linking DSLAM and FDS locations. We consider that this provides an appropriate and reasonable estimate of a scorched earth approach.

C5 Our optimisation of cable routes has required us to implement minor modifications to take into account the location of notional nodes and network connectivity.

Optimisation of active assets

C6 The active assets in the model have been optimised based on the relevant demand. TERA has calculated the necessary number of assets required at each location to meet demand.

Optimisation of exchange buildings

C7 We have optimised the size of Chorus' exchange buildings based on a bottom-up calculation of the space required to house the active assets.

C8 Where available, we have used data provided by Chorus to inform the bottom-up calculation to model the most efficient deployment.

Optimisation of cable routes

C9 For practicality, and where applicable, we have constrained the modelled network to the road network. Cable routes follow the New Zealand road network, which we have determined includes motorways, private roads, and access ways.

Optimisation of nodes

C10 Our final decision is to use a modified scorched node approach to optimisation, which retains the existing locations of active assets (ie, DSLAM and FDS) in Chorus' copper network.

C11 All other aspects of the core network have been scorched and optimised – notably the cable routes linking DSLAM and FDS locations. We consider that this provides an appropriate and reasonable estimate of a scorched earth approach.

Submissions

C12 In December 2013 we set out the following possible approaches to optimising the modelled network.[461]

C12.1 No optimisation (which occurs in a top-down or bottom-up approach). Under this option, the number, location, topology and function of exchanges and cabinets in the current network are retained in the analysis. Additionally, the existing network infrastructure (for instance ducts and poles) is also retained and the network is not optimised to reflect projected demand.

C12.2 Complete optimisation ("scorched earth"). Under this option, the network is fully optimised. This scorched earth approach allows complete redesign of the network, without considering any past investment and existing node locations/numbers. However, this approach may not reflect a number of real-world issues such as the sunk costs and the irreversible nature of some of the investments that the regulated operator has made (for example, the number and the location of local exchanges).

C12.3 Scorched node optimisation. This approach lies midway between the previous two options. Under this option, the number, locations and functions of major network nodes (eg, exchanges) are left as they are. The access network is then optimised with respect to the number, location and function of the minor nodes (eg, cabinets) and the efficient routing and

461 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [93].

dimensioning of the local access network between these points and end-users' premises. There is therefore some degree of trade-off between efficiency and real-world/historic investment considerations.

C12.4 Modified scorched node optimisation. This option is a variant of the scorched node approach that provides a degree of flexibility on the level of network scorching that occurs.

C13 We noted that a modified scorched node approach is widely used internationally by regulators. The approach has significant practical advantages as it corresponds to a more realistic efficiency standard and acknowledges (to a degree) real-world investment decisions made by the network operator, while allowing for optimisation where efficiencies can be identified. It also allows for a greater degree of flexibility in approach.[462]

C14 In response to our December 2013 paper, Wigley and Company submitted that the Act requires us to model the MEA using a scorched earth approach, as any other approach would not reflect forward-looking costs.[463]

C15 In reaching our draft decision to adopt a modified scorched node approach, we stated in our December 2014 UBA draft determination that we disagreed with Wigley and Company, and considered both a scorched node approach and a modified scorched node approach to be consistent with a forward-looking approach.[464]

C16 Our view was that while a scorched earth approach was consistent with a forward-looking approach, we preferred the modified scorched node approach as better suited to meet our TSLRIC objectives.[465]

C16.1 A scorched earth approach may set an unrealistic standard for incremental build-outs for which a modified scorched node approach was better suited. Given a national roll-out is less likely than an incremental build, we considered that a modified scorched node approach was likely to better promote efficient investment.

C16.2 Regulators in other countries have also typically adopted a scorched node or modified scorched node approach.[466] In our view, a modified scorched node approach therefore better aligned with our then TSLRIC objective of predictability, including the fact that it is an orthodox approach.

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462 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [95].

463 Wigley and Company "UBA AND UCLL FPP Price Review Determinations – Memorandum for Cross-submissions on behalf of Orcon" 30 April 2014, paragraphs [2.1]-[2.26].

464 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraphs [441]-[442].

465 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [442].

466 Commerce Commission "Process and issues paper for determining a TSLRIC price for Chorus' unbundled copper local loop service in accordance with the Final Pricing Principle" 6 December 2013, paragraph [94].

C17 As we explain in Chapter 2, we now consider that we overstated the role of predictability in our December 2014 draft determinations. However, we still regard regulatory predictability as one of a number of factors that we should take into account in making a determination that best promotes the section 18 purpose.

C18 We explain below why our final decision is to apply a modified scorched node approach when modelling a hypothetical network.

C19 Chorus supported the use of the modified scorched node approach as being consistent with orthodox TSLRIC. Chorus considered the implementation of this approach is generally robust, subject to several technical aspects, which have been addressed by TERA.[467, 468, 469, 470]

C20 Analysys Mason for Chorus considered that the scorched node assumption is appropriate, as it is very commonly used in regulatory cost models.[471, 472]

C21 Spark agreed that a modified scorched node approach is a common approach taken by other regulators - an approach which balances real-world costs with the forward-looking choices an hypothetical efficient operator would make.[473, 474]

C22 While Spark supported the use of a modified scorched node approach, it considered that within this modelling construct, the number and location of FDS in the UBA network can and should be optimised.[475]

C23 WIK also argued that retaining the number and location of Chorus' FDS nodes is not necessarily the most efficient approach. In recent submissions (which are supported by Vodafone), WIK further suggested that the hypothetical efficient operator would

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467 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [91].

468 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination submission – CONFIDENTIAL" 20 February 2015, p. 25-26.

469 Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (2 July 2015)" 13 August 2015, paragraph [48].

470 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: Analysis of the responses to the second consultation following the further draft determination" December 2015, pp. 12, 69.

471 Analysys Mason "report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 20 March 2015, p. 7.

472 Analysys Mason "Report for Chorus – UCLL and UBA FPP draft determination cross-submission – PUBLIC" 22 September 2015, section [4.2].

473 Spark "Submission on UBA and UCLL FPP pricing review determination – CONFIDENTIAL" 20 February 2015, paragraph [59].

474 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" 13 August 2015, paragraph [197].

475 Spark "Submission on UBA and UCLL FPP pricing review determination – CONFIDENTIAL" 20 February 2015, paragraph [59c].

take more of a scorched earth approach, and our approach to optimisation missed synergies and cost savings.[476, 477, 478]

C24 Wigley and Company supported many of WIK's submissions on optimisation, and highlighted the choice of scorched node as an area where we have not chosen the lowest cost.[479, 480]

C25 We have received a large number of submissions addressing very specific and technical details relating to the implementation of our optimisation approach. TERA's responses to these points are set out in TERA's review of submissions.[481] We have reviewed and agree with TERA's responses to these submissions. We have therefore not included any separate responses in this Attachment.

Analysis

C26 As defined in Chapter 2, our hypothetical efficient operator operates in a world where Chorus' network does not exist. Our hypothetical efficient operator is therefore not constrained by the legacy decisions of Chorus.

C27 However, as also explained in Chapter 2, real-world information, and indeed that reflecting the legacy decisions of Chorus, may be used to inform our assessment of the constraints a hypothetical efficient operator would be likely to face and the decisions it would be likely to make.

C28 We accept that modelling a hypothetical network built from scratch based on a MEA would theoretically lead to a scorched earth approach being our starting point for network optimisation. However, for the reasons which follow we consider that a modified scorched node approach is appropriate.

C29 First, we consider that a modified scorched node approach produces a reasonable approximation of the cost that would be generated by a scorched earth approach.

C30 Optimising on a scorched earth basis, by eliminating or moving the location of DSLAMs, simply amounts to shifting cost between the access network and the core

476 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents – CONFIDENTIAL" 20 February 2015, paragraph [96].

477 WIK "In response to the Commerce Commission's 'Further draft pricing review determination for Chorus' unbundled bitstream access service' and 'Further draft pricing review determination for Chorus' unbundled copper local loop service' including the revised cost model and its reference documents" 12 August 2015, paragraph [225-226].

478 Vodafone "Cross submission to the New Zealand Commerce Commission on Further draft pricing review determination for Chorus' unbundled copper local loop service and Further draft pricing review determination for Chorus' unbundled bitstream access service" 24 September 2015, section [E.1].

479 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, appendix [A].

480 Wigley and Company "Cross-submission in relation to UCLL and UBA draft pricing review determinations" 24 September 2015, paragraph [6.10-6.11].

481 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Analysis of the industry comments following the December 2014 draft determinations" June 2015, pp. 12-13, 15, 19.

network. Eliminating or moving the location of FDSs will capture more or less of the core transport functions, which comprise both regulated and commercial backhaul services. This may not materially reduce the total costs of the network as each end-user will still have to be connected back to the node and from the node further back in the network.[482]

C31 We consider that optimising the number and location of active assets (as a scorched earth approach may dictate) would be unlikely to have a significant effect on the total network cost.

C32 We do not consider such cost shifting to be an "efficiency" or an "optimisation" that is important to our modelling or to the pricing of copper services as the whole link must be present for the service to be provided.

C33 Changing the number of "handover points" would risk distorting relativities as it would shift how much of the link from the end-user to the access seeker is included in UBA and how much is included in other services.

C34 Overall, we do not consider there to be a sound section 18 basis for this and consider that it would rather be an unwarranted consequence of the hypothetical efficient operator thought experiment.

C35 We have to make a judgement call as to how much of the link between the access seeker and the end-user is included in UBA, and we consider that this is best achieved by retaining the location of active assets.

C36 Secondly, we have also taken into account a number of other factors which support the case for keeping the exchange locations fixed.

C36.1 Deploying a network based on scorched earth involves a great deal of technical uncertainty which requires large judgement calls leading to larger risk of regulatory error.

C36.2 Optimisation based on (modified) scorched node is a commonly accepted modelling interpretation of TSLRIC, and we are not aware of any jurisdictions where a scorched earth approach to optimisation has been used for fixed access network costing.[483]

C37 For the reasons given above, we consider our modified scorched node approach to represent a limited (but necessary) compromise to the scorched earth concept.

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482 James Allan from Analysys Mason made a similar argument at the conference: Commerce Commission, "UBA and UCLL pricing review determination conference transcript", 15-17 April 2015, p. 84.

483 We note WIK "In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [303] identifies where scorched earth approaches have been taken in relation to setting mobile termination costs.

Optimisation of active assets

C38 Our final decision is that the active assets in the model should be optimised based on the relevant demand. TERA has calculated the necessary number of assets required at each location to meet demand.

Submissions and analysis

C39 Our July 2015 UBA further draft decision was to optimise the active assets in the model based on the relevant demand. As such, the power consumption and the air conditioning requirements reflect the modern assets being modelled.[484]

C40 While we did not receive any submissions on this draft decision, we did receive submissions addressing more technical details relating to the implementation of this decision.[485, 486, 487]

C41 We discussed these technical submissions with TERA. Responses to these points are set out in TERA's review of submissions, and have therefore not been included in this Attachment.[488] We have reviewed and agree with TERA's responses to the submissions made.

C42 Where we found these technical submissions to be relevant, we changed the model, however, they have not led us to change our general approach to optimisation of active assets.

Optimisation of exchange buildings

C43 Our final decision is to optimise the size of Chorus' exchange buildings based on a bottom-up calculation of the space required to house the active assets.

Submissions

C44 Our July 2015 draft UBA decision adopted a bottom-up approach to model the size of buildings, based on the modelled demand of the services provided, and the modern equipment required to provide those services.[489]

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484 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [792, 830].

485 Analysys Mason "Report for Chorus – UCLL and UBA FPP further draft determination submission – PUBLIC" 11 August 2015, section [4.1]-[4.3].

486 WIK "Cross-submission - In response to the Commerce Commission's 'Further draft pricing review determination for Chorus' unbundled bitstream access service' and 'Further draft pricing review determination for Chorus' unbundled copper local loop service' including the revised cost model and its reference documents" 22 September 2015, paragraph [145-149].

487 Vodafone "Cross submission to the New Zealand Commerce Commission on Further draft pricing review determination for Chorus' unbundled copper local loop service and Further draft pricing review determination for Chorus' unbundled bitstream access service" 24 September 2015, section [E3.8].

488 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Analysis of the industry comments following the July 2014 further draft determinations" December 2015, [pp. 12, 79].

489 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [829].

C45 In reaching this draft decision, we highlighted that with equipment becoming smaller in size and some exchange equipment no longer in use, a number of Chorus' buildings would not be fully utilised.[490]

C46 This raised the issue of whether to maintain the size of Chorus sites to reflect the historical deployment or to model optimised sites that reflect what a hypothetical efficient operator would deploy, given the modern equipment available.

C47 We considered that adopting a top-down approach based on Chorus' actual costs was likely to overestimate the cost for a hypothetical efficient operator, as it would include costs which are not relevant given the modern equipment available and the services provided.[491]

C48 We considered that a bottom-up approach was more consistent with how a hypothetical efficient operator would dimension its exchange buildings.

C49 We also used data provided by Chorus regarding relevant modern sites consisting of blueprints of a number of sites and linking current sites with the relevant modern buildings. Where available, TERA drew on this information to determine what, in its expert opinion, would be the most efficient deployment.[492]

C50 Spark noted that the use of Chorus' data in this context is appropriate, provided it had been tested against engineering best practice.[493]

Analysis and final decision

C51 In our July 2015 decision, we incorrectly stated that TERA, in determining the most efficient exchange configuration, was informed by blueprints of Chorus' modern exchange buildings.

C52 TERA has confirmed that it has not used this information, as it is difficult to derive robust inputs from these blueprints.

C53 We therefore still find that a bottom-up approach which has been tested against actual dimensioning rules for modern sites provides the best indication of how a hypothetical efficient operator would dimension its exchange buildings.

Optimisation of cable routes

C54 Our final decision is to constrain the modelled network to the road network.

C55 Cable routes follow the New Zealand road network, which we have determined includes motorways, private roads, and access ways.

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490 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [823].

491 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [825].

492 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [827].

493 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services", 13 August 2015, paragraph [198].

Submissions

C56 We stated in our July 2015 further draft decision that the optimised network follows the road network.

C57 In reaching our draft decision, we determined that the optimised network utilises motorways, private roads and access ways.[494]

C58 We noted that models overseas often exclude motorways, as gaining access is prohibitive. However, in New Zealand network operators have access to motorways under the Telecommunications Act and National Code of Practice for Utility Operator's Access to Transport Corridors.[495]

C59 We stated that a hypothetical efficient operator would pay consent costs and obtain access to deploy cables along motorways and private roads where it was efficient to do so.[496]

C60 To reflect the additional costs associated with the use of motorways and private roads, TERA (when calculating the shortest path from an individual property to an exchange building) applied weightings to minimise their use.

C61 WIK submitted that our weightings for private roads and motorways were arbitrary and resulted in more expensive solutions.[497]

C62 In response, Analysys Mason pointed out that the weights were not used to generate unit costs. They considered the use of weights to be appropriate, given they were only used to bias the route selection away from private roads.[498]

C63 Chorus and Analysys Mason noted that our approach will not take into account all major geographical constraints, such as waterways, mountains and railways.[499, 500]

Analysis

C64 As described by Analysys Mason, the network route weighting applied by TERA is basic modelling logic that prioritises cable routes along public roads, rather than

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494 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [793].

495 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraphs [454]-[455].

496 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [456].

497 WIK "In response to the Commerce Commission's 'Further draft pricing review determination for Chorus' unbundled bitstream access service' and 'Further draft pricing review determination for Chorus' unbundled copper local loop service' including the revised cost model and its reference documents" 12 August 2015, paragraph [200].

498 Analysys Mason "UCLL and UBA FPP draft determination cross-submission – PUBLIC" 22 September 2015, annex [A].

499 Chorus "Submission in response to the Commerce Commission's Draft Pricing Review Determinations for Chorus' UBA and UCLL services (2 July 2015)" 13 August 2015, paragraph [50].

500 Analysys Mason "Report for Chorus: UCLL and UBA FPP further draft determination submission" 11 August 2015 section [2.2].

motorways and private roads. The weights implemented in the model simply give effect to this logic.

C65 The weights for private roads and motorways are applied, such that if two network points can be connected using public roads in less than a specified factor of the alternate (motorway or private) road distance, then it is used.

C66 We found that the use of weights is far more significant than the weighting factors themselves, ie, a weight of 3 or 10 made little difference to the selection of motorway or private roads.

C67 As Table C1 shows, the weightings we applied have reduced the use of private roads, and reduced the overall road distance in the modelled network.

Table C1: Optimisation of cable routes – weighted and unweighted

	Normal Roads (KM)	Private Roads (KM)	Motorways (KM)	Total (KM)
Weighted	92,079	1,525	9	93,614
Unweighted	92,028	2,017	9	94,054

C68 Optimising cable routes is concerned with identifying the shortest network routes – not the lowest cost routes. The cost of routes can be calculated by applying the trenching unit costs (refer Attachment J). The unit costs for trenching are optimised independently, and applied to each road segment once the optimised cable routes have been identified. It is the combination of two independent optimisations (route length and trench cost) that produces our lowest cost route estimates.

C69 We are confident that our decision to constrain the optimisation of cable routes to the road network takes into account the major geographical constraints that Chorus identifies.

C70 Refer to TERA's Model Specification Paper for more detail on how these weightings were implemented. [501]

The Vodafone TSO case

C71 As explained in Chapter 2, the context and circumstances of the *Vodafone TSO case* are different from those in this FPP process, but we consider that our approach to determining the TSLRIC of the UBA service is aligned with the principles to be derived from the Supreme Court's judgment in that case.

C72 In relation to optimisation, we consider that we have appropriately optimised our model by taking an approach to the network optimisation that is efficient and appropriate to the current circumstances.

[501] "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: Model Specification" December 2015, section [3.2.7]

C73 Differently from the *Vodafone TSO case*, we did not choose a model based on the incumbent's existing network with limited optimisation. In particular, our model was only informed by the existing number of nodes and their existing locations. We have optimised the cable routes, building sizes and active equipment.

Attachment D: Underground infrastructure sharing

Purpose

D1 This Attachment sets out in more detail our final decisions on the level of underground infrastructure sharing with electricity distribution businesses (EDBs) and the savings generate from this sharing.

What it is and why it is relevant to TSLRIC

D2 Underground infrastructure sharing refers to the sharing of trenches (and sometimes ducts) between parties that both deploy cables underground for the purpose of distributing their network to end-users.

D3 Sharing underground infrastructure can reduce the cost of deploying underground infrastructure as the cost is split between two parties. Therefore, it is important that we try to set a realistic level of infrastructure sharing in the TSLRIC model to avoid setting a TSLRIC price that is too high or too low.

D4 Infrastructure sharing is relevant for the UBA service though its impact is far less significant than on UCLL. We consider the hypothetical efficient operator would seek such efficiencies in relation to the local aggregation path (LAP), which covers the trenches and ducts between the DSLAM and FDS locations.

Our final decisions

D5 Our final decisions are to:

D5.1 include 5% of underground infrastructure sharing with EDBs; and

D5.2 maintain the savings generated from infrastructure sharing at 50%, but not include any savings for the cost of installing ducts.

D6 The main reasons for our final decisions are as follows.

D6.1 We recognise that the hypothetical efficient operator would look to share infrastructure wherever possible.

D6.2 It would not be practical to re-open existing underground infrastructure to install the hypothetical efficient operator's infrastructure. Therefore, this will only take place when EDBs are looking to deploy their network underground.

D6.3 We base the extent of underground infrastructure sharing and the cost of infrastructure sharing on the best local current practice data that we have available. This is because we believe this is most representative of the conditions the hypothetical efficient operator will face.

Extent of underground infrastructure sharing

Our initial view and views of submitters

D7 In our December 2014 UBA draft determination paper, we did not consider that our hypothetical efficient operator might share underground infrastructure with EDBs.

D8 WIK, Network Strategies, Spark, and Vodafone all submitted that the hypothetical efficient operator would seek to share the cost of underground infrastructure.[502,503,504,505] WIK submitted that, in its experience, the relevant range of trenching cost reductions due to sharing was 5% to 30% of trenching cost.[506,507] Chorus also acknowledged that some degree of infrastructure sharing was likely to occur, but submitted that it should not take place in more than 5% of the network.[508]

D9 In light of these submissions, in our July 2015 UBA further draft determination paper we re-evaluated the question of infrastructure sharing by our hypothetical efficient operator.

D10 We considered that re-opening trenches and/or adding cables to existing ducts was unlikely to be a practical or economically-viable solution. Further, the market for duct access in New Zealand is not significant. Therefore, we believed that underground infrastructure sharing would only be possible when the different kinds of infrastructure were being rolled out simultaneously.

D11 We observed that, in a TSLRIC context, where the hypothetical efficient operator is assumed to be rolling out its network overnight and the EDBs' infrastructure is already in place, significant underground infrastructure sharing with EDBs seemed unlikely.

D12 If underground infrastructure sharing were to happen, it would be EDBs taking advantage of the hypothetical efficient operator's roll-out. This would be particularly relevant for EDBs that want to underground overhead power lines.

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502 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraphs [117 and 389-390].

503 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Modelling Fixed Wireless Access" CONFIDENTIAL, 20 February 2015, pp. 47-50.

504 Spark "Submission on UBA and UCLL FPP pricing review determination" CONFIDENTIAL, 20 February 2015, paragraph [68].

505 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, paragraph [F1.2].

506 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [390].

507 Since we assumed a 50% cost saving from the proportion of the network shared, and we assumed that 5% of underground infrastructure would be saved, the total cost savings from our July 2015 UCLL further draft determination paper is equal to 2.5%.

508 Chorus "Cross submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 March 2015, paragraph [128].

D13 According to Vector, the decision to underground in specific areas depends on a number of criteria, including:[509]

D13.1 the condition of the lines and equipment in the area;

D13.2 their performance history (capacity and faults);

D13.3 the number of customers who will benefit; and

D13.4 the level of other utility works planned for each area.

D14 In our July 2015 UBA further draft determination paper, to determine what percentage of underground infrastructure sharing could be expected, we looked at data from the LFCs.

D15 UltraFast Fibre shares between [ ]**UFFCI** of its underground network with other utilities depending on the area, with the average for the total network being [ ]**UFFCI**.

D16 Enable lists the level of trench sharing as [ ]**ECI** and only pertaining to the existing network where some trenching was shared with [ ]**ECI**.

D17 Against that background, we disagreed with WIK's statement that proper sharing assumptions would reduce the trenching costs by as much as 30%.

D18 The combination of the data provided by LFCs, Chorus' submission, and the lower end of WIK's range led us to include 5% of underground infrastructure sharing with EDBs.

D19 Spark and WIK have submitted that they are concerned that we have used Chorus' estimate which is below the lower end of the range indicated by WIK.[510,511] Spark argued that current practices are not necessarily indicative of what will happen in the future. It submitted that a 10% level of infrastructure sharing would be more reasonable.[512] WIK argued that given New Zealand's favourable conditions for infrastructure sharing, a 30% level of infrastructure sharing would be more realistic.[513]

D20 Analysys Mason provided a range of international evidence to support a 5% level of infrastructure sharing. It provided a series of data points that indicate that between less than 1% and 12% of international underground infrastructure networks are currently shared. It also noted a report from the Swedish government that

509 http://vector.co.nz/undergrounding.

510 Spark "Submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 13 August 2015, paragraph [184].

511 WIK-Consult "Submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 13 August 2015, paragraph [286].

512 Spark "Submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 13 August 2015, paragraph [187].

513 WIK-Consult "Submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 13 August 2015, paragraph [284].

highlighted the complexities with trench sharing which may limit its use in practice.[514]

Analysis and our final decisions

D21 We note that Spark and WIK have not provided us with any further data to justify their submissions. Given the real-world evidence from Chorus and LFCs, we consider 5% infrastructure sharing to be the best estimate.

D22 Therefore, our final decision is that 5% represents a reasonable level of infrastructure sharing.

Savings from infrastructure sharing

Our initial views and views of submitters

D23 In our December 2014 UCLL draft determination paper and our July 2015 UBA further draft determination paper, we assumed that where infrastructure sharing occurred, it would lead to a 50% cost saving relative to the cost where infrastructure was not shared. This is because we assumed that the infrastructure costs would be shared equally between two parties and the cost of digging these trenches would not change.

D24 In its cross submission, Analysys Mason suggested that savings from infrastructure sharing are likely to be lower than 50%. This is because the total cost of installing shared underground infrastructure will be greater than the cost of installing underground infrastructure to be used by one party.[515]

D25 Analysys Mason identified the cost of installing ducts and the cost of digging bigger trenches where separation between ducts is required. It pointed out that where infrastructure is shared, two ducts instead of one will need to be installed. As such, this portion of the cost will not be reduced. As a result, savings will range between 28% and 40% rather than the 50% assumed in our model.[516]

D26 Analysys Mason also claimed that in cases where a minimum level of separation is required between ducts, a larger trench will need to be dug. Analysys Mason noted that, when both the extra cost of ducts and the cost of digging a larger trench are taken into account, the savings will be between 7% and 22%.[517]

514 Analysys Mason "Cross submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 22 September 2015, pp. 21-22.

515 Analysys Mason "Cross submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 22 September 2015, pp. 20-21.

516 Analysys Mason "Cross submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 22 September 2015, p. 20.

517 Analysys Mason "Cross submission on UBA and UCLL FPP further draft pricing review determination" CONFIDENTIAL, 22 September 2015, pp. 20-21.

Analysis and final decisions

D27 We acknowledge Analysys Mason is correct in noting that no savings can be achieved on the cost of installing ducts. Accordingly, we have ensured that the hypothetical efficient operator does not achieve any saving from sharing ducts in the model.

D28 We have considered whether a minimum level of separation between ducts, and therefore larger trenches, would be widely required in the hypothetical world. We recognise that the network can be deployed in a number of ways (eg, ducts can be separated vertically or horizontally). Horizontal deployment in particular may lead to greater trenching costs for shared infrastructure relative to the cost of digging a trench for the hypothetical efficient operator alone. Depending on how costs were shared between the hypothetical operator and the EDB, this might mean that the cost savings the hypothetical operator would achieve from sharing trenches would be less than 50%.

D29 Even so, given the extra cost involved in horizontal separation, we do not believe that there is a strong reason to believe that horizontal separation would be favoured over vertical separation. Therefore our view is that, on balance, a 50% cost saving seems the most likely outcome.

Attachment E: Asset valuation

Purpose

E1 In this Attachment we set out our final decision on the appropriate asset valuation methodology to be used in our TSLRIC model for the UBA service.

Our final decision

E2 Our final decision is to use ORC for all assets as our asset valuation methodology in the context of implementing TSLRIC. The main reasons for this are as follows.

E2.1 ORC is consistent with our regulatory framework for carrying out the UBA pricing review determination which uses a hypothetical efficient operator building a new network from the ground up, and is unconstrained by the legacy choices made regarding the existing network that provides the regulated services. Our regulatory framework is not based on the actual costs of Chorus.

E2.2 ORC is consistent with the forward-looking and long run features of the definition of TSLRIC.

E2.3 ORC is consistent with the relevant TSLRIC objectives/outcomes, in particular encouraging efficient build/buy decisions, allowing for efficient cost recovery and incentivising the regulated entity to minimise its costs.

E2.4 ORC is efficient in terms of static and dynamic efficiency, which is consistent with our interpretation of section 18(2) of the Act.

E2.5 ORC is most likely to best give effect to the section 18 purpose of promoting competition for the long-term benefit of end-users.

E3 Although we have remained open to revisiting our decision to adopt an approach based on the hypothetical efficient operator, we are satisfied that the hypothetical efficient operator model is the appropriate approach to implementing TSLRIC. An approach based on the hypothetical efficient operator does not preclude the use of asset valuation methodologies other than ORC, but we are satisfied that ORC is the most appropriate methodology in the context of our approach to implementing TSLRIC.

E4 Please refer to Attachment E of the UCLL December 2015 final determination for our reasons and a detailed analysis of the issues around our final decision regarding the asset valuation methodology to be applied in the context of this TSLRIC-based FPP. As we are applying a similar conceptual economic framework to determine a TSLRIC price for the UBA service as we have used for the UCLL service, we consider that the asset valuation principles discussed in Attachment E of the UCLL December 2015 final determination are also relevant for the UBA service, subject to the following paragraph.

E5 As explained in Chapter 2, the MEA principles are only relevant to the "additional costs" component of providing the UBA service (which is the "UBA increment"). Therefore, the asset valuation principles are relevant to the "UBA increment". For

example, the use of ORC in determining the “additional costs” component of the UBA service is consistent with promoting efficient investment decisions by access seekers. In considering whether to purchase (“buy”) the UBA service or to invest in unbundling (“build”), an access seeker will only unbundle and install its own equipment (and bypass the “additional costs” component of the UBA service) where it can do so at a lower cost.

Attachment F: Asymmetric risk

Purpose

F1 This Attachment sets out in more detail how we have treated the issue of compensation for asymmetric risks in our TSLRIC model for the UBA service.

What it is and why it is relevant to TSLRIC

F2 We are required to set a cost-based price for the UBA service using TSLRIC. There are a range of factors in the future which may affect costs, whose settings are uncertain. We do not adjust the price for all of the uncertain factors (risks) because sometimes these factors are equally likely to decrease costs as to increase them. However, some factors only have the potential to increase the price. These factors, collectively known as asymmetric risk, will change the expected cost to the hypothetical efficient operator.

F3 We must consider how to adjust the single price (or otherwise incorporate this risk into the modelled cost). If we fail to take into account the fact that even a hypothetically efficient operator would face these risks, this would cause us to undercompensate this operator. This would be a barrier to the development of a robust telecommunications network.

F4 The two main forms of asymmetric risk that are relevant here are:[518]

F4.1 risks that arise through infrequent events that could produce large losses for the hypothetical efficient operator, such as natural disasters; and

F4.2 risks that derive from unpredictable events such as technology change, competitive entry or expansion.

F5 We have considered asymmetric risks in the context of regulating other services under Part 4 of the Commerce Act 1986. While a number of the issues we need to consider will be the same in the Part 4 and telecommunications contexts, we note that:

F5.1 in applying TSLRIC, we have chosen to model the costs of a hypothetical efficient operator building a new network. This is different to regulation under Part 4, where actual investment is recorded in the regulatory asset base and a return of and on capital is preserved, which significantly mitigates asset stranding risk; and

F5.2 our expectations are that the rate of technological change in telecommunications is greater than that for services regulated under Part 4. This creates a greater risk of asset stranding.

[518] Commerce Commission "Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper" 22 December 2010, paragraph [H12.4].

F6 We have considered whether to provide for an *ex ante* allowance for asymmetric risks in the following categories:[519,520,521]

F6.1 catastrophic risks;

F6.2 asset stranding due to technological change;

F6.3 asset stranding due to competitive developments; and

F6.4 asset stranding due to future regulatory decisions (re-optimisation).

Our final decisions

F7 Our final decisions in respect of asymmetric risks are:

F7.1 to provide for an *ex ante* allowance for the asymmetric risk of catastrophic events. This allowance is based on Chorus' costs but appropriate efficiency adjustments are applied (as discussed in Attachment M: Opex regarding the efficiency adjustments we apply to opex);

F7.2 to provide for an *ex ante* allowance for the asymmetric risk of asset stranding due to technological change by adopting asset lives that recognise the risk of asset stranding; and

F7.3 to not provide any *ex ante* allowance for the asymmetric risks of asset stranding due to competitive developments or future regulatory decisions.

Catastrophic risks

Our preliminary views and views of submitters

F8 In our December 2014 UBA draft determination, we proposed to provide an *ex ante* allowance for catastrophic risk.[522] Our reason for this was that we would expect the hypothetical efficient operator to prudently insure against catastrophic risk. We included an allowance for the asymmetric risk of catastrophic events in our TSLRIC model by:

F8.1 including costs for seismic bracing and backup generators; and

F8.2 including Chorus' insurance costs, which provide cover for catastrophic events.

F9 We received a number of submissions in response to this position. Chorus and CEG submitted that the costs that we included understated the costs Chorus incurred to

519 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [701.2].

520 We noted also in our December 2014 UCLL draft determination paper that we would not consider further the issue of an *ex post* allowance for asymmetric risks. We continue to hold this view.

521 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1329].

522 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2015, paragraph [534.1].

minimise catastrophic risk.[523, 524] They also noted that not all events could be insured against. [525]

F10 Conversely, WIK stated that allowing for catastrophe insurance and seismic strengthening provided sufficient compensation for the hypothetical efficient operator. [526] Further, it noted that WACC parameters compensated for any residual catastrophic risk. [527]

F11 In our July 2015 UBA further draft determination paper, we noted that we used Chorus' own costs as a starting point to determine the cost of addressing catastrophic risk. We also accepted that there may be some events that cannot be insured for. However, we felt that these risks do not create costs that would have a material impact on our final price decision. Therefore, we maintained the decision in our December 2014 UBA draft determination.

F12 In its submission on the July 2015 UBA further draft determination, Spark agreed that the hypothetical efficient operator would insure against catastrophic risk and supported applying an efficiency adjustment to Chorus' costs. However, Spark suggested that it would be more appropriate to use a bottom-up approach to determining the efficient cost, rather than relying on top-down accounting information.[528]

F13 We received no other submissions on the subject on catastrophic risk on our July 2015 UBA further draft determination.

Analysis and final decisions

F14 We believe that Chorus' costs offer valuable, real-world information about the hypothetical efficient operator. Further, we have adjusted Chorus' costs to reflect efficiency gains the hypothetical operator could be expected to achieve as discussed

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523 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services" CONFIDENTIAL, 13 August 2015, paragraphs [671]-[672].

524 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [673]; CEG "Uplift asymmetries in the TSLRIC price" CONFIDENTIAL, February 2015, paragraph [64].

525 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [674]; CEG "Uplift asymmetries in the TSLRIC price" CONFIDENTIAL, February 2015, paragraph [61].

526 WIK-Consult "Cross-submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service unbundled copper local loop services including the cost model and its reference documents - TSO/geospatial modelling related aspects" 31 March 2015, paragraph [70].

527 WIK-Consult "Cross-submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service unbundled copper local loop services including the cost model and its reference documents - TSO/geospatial modelling related aspects" 31 March 2015, paragraph [70].

528 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [243].

in Attachment M. Accordingly, we maintain our previous position that it is appropriate to adjust for catastrophic risk by including the cost of seismic bracing and backup generators for exchange buildings and Chorus' insurance cost.

Asset stranding due to technological change

Our preliminary views and views of submitters

F15 In the December 2014 UBA draft determination paper, we recognised that the high level of technological change in the telecommunications sector may result in asset stranding. This would mean that the engineering asset lives would be more likely to overestimate the economic lives of the hypothetical efficient operator's assets than to underestimate them. So using these asset lives would create an asymmetric risk. Accordingly, we addressed this by adopting Chorus' asset lives (see Attachment H – Setting Asset Lives for further discussion), which we considered better reflected the likely economic lives of the hypothetical efficient operator's assets.[529]

F16 Vodafone, WIK, Network Strategies and Wigley and Company opposed providing compensation to the hypothetical efficient operator to compensate it for the potential for technological change to cause asset stranding.[530,531,532,533] In particular, Vodafone, WIK and Wigley and Company argued the hypothetical operator was already compensated for this risk through the WACC asset beta. Vodafone, WIK and Network Strategies also argued that our approach was inconsistent with the approach other regulators took.

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529 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [711].

530 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [K3]; WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service and unbundled copper local loop service including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [78].

531 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [K3]; WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service and unbundled copper local loop service including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [78]; Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 83.

532 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [K3]; WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service and unbundled copper local loop service including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [78]; Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 83.

533 Wigley and Company "Submission on draft pricing review determination for UBA and UCLL services" 20 February 2015, paragraphs [10.29]-[10.31].

F17 Chorus and CEG disagreed that the risk of asset stranding due to technological change is captured in the asset beta. They argued that technological change does create cash flow risk that is not captured in the asset beta.[534,535]

F18 Chorus, CEG and L1 Capital argued that adopting Chorus' asset lives did not adequately compensate for the risk of asset stranding. This is because, in their view, the asset lives used for Chorus' financial statements did not sufficiently consider technological obsolescence and therefore an adjustment needs to be made.[536,537,538,539]

F19 Conversely, WIK felt it was fair to assume that Chorus has made a prudent choice of asset lives.[540] WIK also noted that major parts of Chorus' assets are fully depreciated but still in use. WIK argued that to apply shorter asset lives to these assets would not promote efficiency.[541]

F20 In our July 2015 UCLL further draft determination paper (we referenced the UCLL paper to support our UBA decisions),[542] we held that regardless of whether the asset beta of the WACC captures some of the risk, there is significant degree of firm-specific risk that is not captured by the asset beta.

F21 On balance, we continued to hold the view that Chorus' asset lives provided the best reflection of the likely economic lives of the hypothetical efficient operator's assets.

F22 We also recognised that asset lives which are developed to meet accounting standards may not perfectly reflect the risk of asset stranding. Nonetheless, based on evidence from Chorus' financial statements,[543] at the conference,[544] and in further

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534 CEG "Issues from submissions UCLL and UBA" March 2015, paragraph [44].

535 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 March 2015, paragraphs [301]-[303].

536 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraphs [677]-[679].

537 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [679].

538 CEG "Uplift asymmetries in the TSLRIC price" CONFIDENTIAL, February 2015, paragraph [96].

539 L1 Capital "Submission on draft UCLL and UBA pricing review determinations" 20 February 2015, p. 12.

540 WIK-Consult "Cross-submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 19 March 2015, paragraph [71].

541 WIK-Consult "Cross-submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 19 March 2015, paragraph [72].

542 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1353].

543 Chorus "Financial Statements for the year ended 30 June 2014" August 2014, p. 10.

544 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 294.

information provided to the Commission[545] we felt that Chorus' asset lives did make some allowance for the potential for assets to be rendered obsolete (see Attachment H – Setting asset lives for further discussion).

F23 We also undertook a comparison of Chorus' asset lives with the engineering lives of its assets.[546] This analysis showed that the shorter asset lives Chorus applied provided significant compensation. Therefore, we elected to maintain our position that Chorus' asset lives should be used as compensation for the risk of asset stranding due to technological development.

F24 In submissions on our July 2015 UBA further draft determination, Spark agreed that using Chorus' asset lives provided adequate compensation for the risk of asset stranding due to technological change.[547]

F25 Chorus repeated its argument that its asset lives were developed for the purposes of financial accounts and statements and do not adequately take into account the risk of asset stranding from technological change.[548] It also claimed that uncertainty in asset lives should be recognised by calculating an average annuity across a range of asset lives.[549]

F26 Vodafone argued that our further draft decision to use Chorus' asset lives was "unorthodox" in light of the decision of the Supreme Court *Vodafone TSO* case.[550] Network Strategies drew a comparison with the majority's finding in that case that we were wrong to exclude mobile technology on the basis that we would then need to allow compensation to Telecom for the consequential asset stranding.[551]

Analysis and final decisions

F27 We note that in the *Vodafone TSO* case,[552] the Court considered that the efficient service provider being modelled to determine the "net cost" of meeting the TSO obligations would not need to be compensated for assets stranded by the introduction of new technology. Elias CJ held that the costs of such assets were

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545 Chorus "Commission's follow up questions following FPP conference" Confidential, 12 May 2015, Question 3.

546 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 July 2015, paragraph [1360-1363].

547 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [246].

548 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, paragraph [279-280].

549 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, p. 16.

550 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [D8.1(e)], citing *Vodafone New Zealand Ltd v Telecom New Zealand Ltd* [2011] NZSC 138, [2012] 3 NZLR 153.

551 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" CONFIDENTIAL, 20 February 2015, p. 83.

552 *Vodafone New Zealand Limited v Telecom New Zealand Limited* [2011] NZSC 138, [2012] 3 NZLR 153.

avoidable and irrelevant to the costs of an efficient service provider.[553] Blanchard J considered that there was no case for compensation since those legacy assets had been overvalued by a replacement cost methodology.[554]

F28 We have explained in Chapter 2 the different context in which the *TSO case* was decided. In particular, the Court was concerned to ensure that the objective standard of an efficient service provider provided an effective cap on Telecom's recoverable costs. Since the purpose of the net cost formula was to allow Telecom to recover the cost to it of efficiently servicing its CNVCs, new technology should be introduced where more efficient than the existing network.

F29 The issue of stranded assets arises in a different context in this determination. Here we are modelling the cost to a hypothetical efficient operator of building a new network. We consider that in assessing that cost it is appropriate to take into account the asymmetric risk that the assets being used to construct the network will become stranded in the future. Contrary to Network Strategies' submission, we consider this is consistent with the forward-looking nature of the TSLRIC exercise. We are not compensating Chorus for receiving a lower return on and of its legacy assets, but reflecting the cost to a hypothetical efficient operator of building a new network. That cost reflects the risk that the relevant assets' economic lives would ultimately be shorter than their engineering lives.

F30 We note that, as referred to above, Spark was supportive of our approach.[555]

F31 With respect to Chorus' argument about using asset lives from their financial statements, as discussed previously based on evidence from Chorus' financial statements,[556] what Chorus said at the conference,[557] and in further information provided to us,[558] we note that Chorus' asset lives do make allowance for the potential for assets to be rendered obsolete.

F32 We do not dispute the mathematical analysis underlying CEG and Chorus' claim that we should use an annuity approach to calculate asset lives. However, to the extent that any downward bias did exist, it is not clear how this could be removed.

F33 CEG suggested formulating expectations of asset lives, but given the difficulties in determining a single economic lifetime for a particular asset, there is unlikely to be any robust and objective basis for determining multiple possible lifetimes (and the associated probabilities of occurrence) for a given asset.

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553 At [13]-[14].

554 At [75] for himself and McGrath and Gault JJ.

555 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [246].

556 Chorus "Financial Statements for the year ended 30 June 2014" August 2014, p. 10.

557 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p. 294.

558 Chorus "Commission's follow up questions following FPP conference" Confidential, 12 May 2015, Question 3.

F34 We also agree with the comments of Professor Vogelsang, who has stated that "[w]ithout concrete data it is hard to assess the size of this effect".[559]

F35 Accordingly, our final decision is to provide compensation for the risk of asset stranding due to technological change by using Chorus' asset lives except where they are out of line with international benchmarks.

Asset stranding due to competitive developments

Our preliminary views and views of submitters

F36 In the December 2014 UBA draft determination paper, we provisionally decided not to provide an *ex ante* allowance for asset stranding due to competitive developments.[560] Our reasoning for this was that, while competitive developments may leave assets stranded, it is difficult to separate the risk of asset stranding through competitive developments from that of technological change. Since we had already provided for *ex ante* compensation for the latter, we considered it inappropriate to provide an additional *ex ante* allowance for the former.

F37 We received a range of views from submitters. Vodafone and WIK were supportive,[561,562] while CEG and Chorus opposed this approach. [563,564] In particular, Chorus submitted that asset stranding due to new entry and changes to the demand base will not be taken into account in consideration of the asymmetric risk arising from technological change. Chorus submitted that these are further risks which should be accounted for.[565]

F38 In our July 2015 UCLL further draft determination (we referenced the UCLL paper to support our UBA decisions), we noted that there is an inherent circularity in reflecting any *ex ante* compensation for this form of competition. Typically competition manifests itself in prices falling, rather than rising. Indeed, we would not expect a hypothetical efficient operator to raise prices *ex ante* to compensate for the risk of asset stranding that arises from this competition, as to do so would encourage entry and/or competition that leads to the stranding in the first place.

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559 Ingo Vogelsang "Reply to Comments on my November 25, 2014, paper "Current academic thinking about how best to implement TSLRIC in pricing telecommunications network services and the implications for pricing UCLL in New Zealand"" 23 June 2015, paragraph [21].

560 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [534.2].

561 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys-Mason's TSLRIC models" 20 February 2015, paragraph [K3].

562 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access service and unbundled copper local loop service including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [79].

563 CEG "Uplift asymmetries in the TSLRIC price" CONFIDENTIAL, February 2015, paragraphs [101]-[102].

564 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [307].

565 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [307].

F39 Accordingly, we maintained the view that no *ex ante* compensation should be provided for the asymmetric risk of asset stranding associated with competitive developments.

F40 Spark supported our proposal not to provide an *ex ante* allowance for asymmetric risk from competitive development.[566] We received no other submissions on this particular issue.

Analysis and final decision

F41 We have not received any further submissions opposing our proposed approach. We continue to feel that while competitive developments may leave assets stranded, it is difficult to separate the risk of asset stranding through competitive developments from that of technological change. Since we had already provided for *ex ante* compensation for the latter, we considered it inappropriate to provide an additional *ex ante* allowance for the former. Therefore, our final decision is to maintain our draft decisions to not include any *ex ante* allowance for the asymmetric risk from competitive developments.

Asset stranding due to future regulatory decisions

Our preliminary views and views of submitters

F42 In the December 2014 UBA draft determination paper and our July 2015 UBA further draft determination paper, we proposed not to provide an *ex ante* allowance for asset stranding due to future regulatory decisions (re-optimisation).[567]

F43 Chorus and CEG submitted that the TSLRIC framework has the potential to strand the assumed investment of the hypothetical efficient operator, as the TSLRIC exercise is repeated in the future.[568,569]

F44 In our July 2015 UCLL further draft determination paper, we recognised that future regulatory decisions could result in the choice of a new MEA due to re-optimisation. However, we were not convinced that this justified any *ex ante* compensation. We were also unsure how any such compensation would be implemented.

F45 Therefore, we remained of the view that it is not appropriate to include any *ex ante* allowance for the asymmetric risk associated with future regulatory determinations.

F46 Spark supported our proposal not to provide an *ex ante* allowance for asymmetric risk from future regulatory decisions.[570] We did not receive any further submissions on this particular issue.

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566 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [246].

567 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraph [534.2].

568 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [684].

569 CEG "Uplift asymmetries in the TSLRIC price" CONFIDENTIAL, February 2015, paragraph [78].

Analysis and final decisions

F47 We have not received any further submissions opposing our proposed approach. Further we remain unconvinced that this justifies any *ex ante* compensation. Further, we are unsure how any such compensation would be implemented. Therefore we maintain our decision to not include any *ex ante* allowance for asymmetric risk associated with future regulatory determinations.

570 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services" CONFIDENTIAL, 13 August 2015, paragraph [246].

Attachment G: Depreciation

Purpose

G1 In this Attachment we set out how we have treated regulatory depreciation in our model for the UBA service.

Our final decision

G2 Our final decision remains that the tilted annuity method is the appropriate methodology for regulatory depreciation.[571] This approach combines an allowance for depreciation with the return on capital.

Relevance of depreciation to TSLRIC

G3 This approach is consistent with the regulatory framework principle to reflect the efficient costs of the hypothetical efficient operator.

G4 Please refer to Attachment G of the UCLL December 2015 final determination for our reasons and a detailed analysis of the issues around our treatment of regulatory depreciation. We consider that the same approach to depreciation for UBA and UCLL is appropriate as this ensures consistency in the depreciation treatment of those assets that are shared by both services.

[571] For calculating the hypothetical efficient operator's notional taxation, we have used diminishing value taxation.

Attachment H: Setting asset lives

Purpose

H1 This Attachment sets out in more detail our reasons for our final decisions regarding the asset lives used in our TSLRIC model.

What asset lives are and why they are relevant to TSLRIC

H2 Asset lives are the economic lives of the hypothetical efficient operator's assets. We use these asset lives to depreciate the hypothetical efficient operator's assets which determines how much of the cost of these assets is recognised each year. In effect, the economic life of an asset is the amount of time an asset can be used until it is replaced.

H3 In order to set a TSLRIC price that promotes efficiency, it is important that we set asset lives that are our best estimate of the economic lifetime of assets. If asset lives understate the economic lives of assets, the TSLRIC price will be set too high. This would mean that consumers would pay more than they need to. Similarly, if asset lives overstate the economic lives of assets, the TSLRIC price would be too low. This would mean that there would not be sufficient incentives for the hypothetical efficient operator to invest.

Our final decision

H4 Our final decision is to set the hypothetical efficient operator's assets lives equal to Chorus' except where:

- H4.1 Chorus' asset lives are out of line with international benchmarks; or
- H4.2 no Chorus data is available - in these cases we used international benchmarks to adjust/set asset lives.

H5 The main reasons for our final decision are:

- H5.1 we consider that the accounting asset lives supplied by Chorus provide a reasonable estimate of the economic lives of the hypothetical efficient operator's assets; [572] and
- H5.2 we believe that international benchmarks provide the most appropriate check for Chorus' asset lives.

[572] Chorus provided a list of asset categories and its estimation of the corresponding lives, as required by our section 98 Notice. TERA has allocated all of the assets in the model into one of these categories.

H6 Based on the reasoning above, we have decided to set asset lives to the following:

Table H1: Asset lifetimes used for our final determination

Assets	Lifetime
DSLAM	7
FDS	5
Power	15
Cooling	15
Site	18

Our framework for assessing asset lives in the UBA pricing review determination

Our initial views

H7 In our December 2014 UBA draft determination paper and our July 2015 UCLL further draft determination paper, we used asset lives provided by Chorus as a starting point. Where the asset lives seemed out of line with what has been observed in other jurisdictions, we used international benchmarks derived from TSLRIC models overseas.[573,574]

H8 Our framework allows for real-world information and reflections of the incumbent's legacy decisions to be used to inform our assessment of what constraints a hypothetical efficient operator would be likely to face and decisions it would be likely to make.[575]

Submitters' views

H9 WIK submitted that we should not adopt Chorus' assets lives as this involves consideration of the incumbent, and not the hypothetical efficient operator.[576]

H10 Chorus argued that WIK's argument is overly simplistic:

> It would be prudent (and efficient) for any HEO to consider the incumbent's experience. In addition, Chorus' asset lives are developed following thorough analysis by subject matter experts, which take account of the experience of New Zealand conditions. Asset life review occurs annually, including a detailed review by subject matters experts, in conjunction with audit advice on accounting standards.

573 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2014, paragraphs [306-309] and Attachment F and Attachment G.

574 Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop service" 2 December 2015, paragraphs [306-309] and Attachment F and Attachment G.

575 Refer to Chapter 2 of this Determination.

576 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraphs [78], [100-101], [356].

> There is no reason that an efficient HEO would not undertake an equivalent analysis, and reach equivalent conclusions. [577]

H11 Chorus also argued that the requirements for setting asset lives in financial accounts are different from the considerations that should be applied in determining the asset lives of the hypothetical efficient operator. In particular, Chorus claims that the Commission should give further consideration to the risk of asset stranding.[578,579]

Analysis

H12 We continue to believe that Chorus' asset lives offer valuable, real-world information about the hypothetical efficient operator. Chorus' asset lifetime data provides us with the best objective assessment of the lifetime of assets used in a fixed telecommunications network in New Zealand. We also believe that international benchmarks provide a strong check on the appropriateness of Chorus' asset lives.

H13 We discuss our analysis in respect of whether the asset lives appropriately address the asymmetric risk of asset stranding in Attachment F – Asymmetric risk.

Setting asset lives

Our initial views and submissions

H14 In our December 2014 UCLL draft determination paper, we considered it appropriate to use, as a starting point, information provided by Chorus to determine reasonable values for asset lives. Chorus explained that it calculates its asset lives as follows:

> Chorus reviews the useful life of assets annually, assessing the expected period of service, and the likelihood of the asset becoming obsolete as a result of technology advances.[580]

H15 In response to our December 2014 UCLL draft determination paper, WIK submitted that Chorus' asset lives were less than international asset lives.[581] However, Analysys

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577 Chorus "Cross-submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 March 2015, paragraph [335].

578 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [282].

579 Chorus "Submission in response to the Commerce Commission's Further Draft Pricing Review Determination for Chorus' Unbundled Bitstream Access and Unbundled Copper Local Loop Services" CONFIDENTIAL, 13 August 2015, paragraph [279-280]

580 Chorus "Commission's follow up questions following FPP conference" Confidential, 12 May 2015, Question 3.

581 WIK Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [78].

Mason has provided data which shows that Chorus' asset lives are either in line with or longer than international benchmarks.[582]

H16 In preparing our July further draft determination, we asked TERA to cross-check these asset lives against TSLRIC models overseas. TERA used Denmark and Ireland to compare Chorus' asset lives. They also confirmed that that these asset lives were consistent with asset lives in other jurisdictions. TERA selected these countries for pragmatic reasons since the information is well documented and transparent. We note that the countries TERA selected are consistent with our international benchmark analysis in Attachment P – International comparators.

H17 TERA found that Chorus asset lifetime for DSLAMs of [ ]**CNZCI** is significantly lower than any of the benchmark data collected:

H17.1 eight years in Ireland;[583] and

H17.2 eight years in Denmark.

H18 We reviewed TERA's analysis and agreed with it. We decided that the rate of technology change is not high enough to justify investment in replacement DSLAMs every two years. Accordingly, we have applied an intermediate value of seven years for DSLAM asset lives.

H19 There was nothing to suggest that the proposed asset lifetimes are overly long or overly short. As such, we considered that they are within a reasonable range for economic lifetimes of the relevant assets for the UBA service.

Analysis

H20 In light of the fact that we have not received any evidence that supports a change to our views, we find that there are no grounds for any further changes to be made to asset lives.

H21 Accordingly, our final decision is to set the hypothetical efficient operator's assets lives equal to Chorus' except where:

H21.1 Chorus' asset lives are out of line with international benchmarks; or

H21.2 no Chorus data is available - in these cases we used international benchmarks to adjust/set asset lives.

582 Analysys Mason "Report for Chorus UCLLL and UBA FPP draft determination cross submission" CONFIDENTIAL, 20 March 2015, Section [2.9.1].

583 ComReg "Response to Consultation Document No. 09/11: Review of the regulatory asset lives of Eircom Limited" 11 August 2009. We note that Ireland was not a comparable country in the UBA IPP determination. However, TERA indicated that if it were to consider other countries, the outcome would be the same.

H22 The main reasons for our final decision are as follows.

H22.1 We consider that the accounting asset lives supplied by Chorus provide a reasonable estimate of the economic lives of the hypothetical efficient operator's assets.[584]

H22.2 We believe that international benchmarks provide the most appropriate check for Chorus' asset lives.

[584] Chorus provided a list of asset categories and its estimation of the corresponding lives, as required by our section 98 Notice. TERA has allocated all of the assets in the model into one of these categories.

Attachment I: Price trends

Purpose

I1 In this Attachment we set out our final decision on the appropriate price trends to be used in our TSLRIC model for the UBA service.

Our final decision

I2 Please refer to Attachment I of the UCLL final determination for our reasons and final decision regarding price trends. The only price trend that is specific to UBA and is not included in the UCLL final determination, is the price trend for active assets. Therefore, this Attachment outlines our rationale and final decision regarding the price trend methodology for active assets.

What is it and why it is relevant to TSLRIC

I3 Active assets refer to electronic assets used to supply the UBA service. A price trend for these assets is used to forecast costs, and is applied as part of the tilted annuity depreciation formula to spread capital costs across the lifetime of the asset. Price trends are estimates of expected price changes during and beyond the regulatory period.

Active assets

I4 In the July 2015 further draft determination, we determined the long-term price trend for active assets in our TSLRIC model based on international benchmarks. International benchmarks included were Australia, Denmark, Sweden, France, and Norway.

I5 A number of active equipment price trends are required in the UBA increment calculation[585]:

- I5.1 DWDM links (active part) ;
- I5.2 DSLAM (card/subrack/rack);
- I5.3 Switches/routers (card/subrack/rack/SFP);
- I5.4 Power equipment; and
- I5.5 Air conditioning equipment.

I6 Following the December 2014 draft determination, Network Strategies criticised the inclusion of Australian data as the data used is over five years old and historic.[586]

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585 Cost additional to the UCLL service that are required to provide the UBA service.

586 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" 20 February 2015, section 6.1.

CEG, in its cross submission, disagreed with Network Strategies' recommendation to exclude the Australian data.[587]

I7 Our July 2015 further draft determination included the Australian benchmark because it provides a representative benchmark set to determine the price trends for active assets in New Zealand. If we were to exclude Australia, only European countries would remain in the benchmark set.[588] The inclusion of the Australian benchmark has an impact on the long-term price trend for DSLAMs.

I8 In response to the December 2014 draft determination, Network Strategies further submitted that we should use a median rather than an average to reduce the impact of extreme values. We agreed with Network Strategies that it is more appropriate to determine the median instead of the average to estimate the price trend for active assets. This is also consistent with our approach in previous determinations, where we used the median in our calculations. We note that the use of a median instead of an average has no material impact.

I9 Network Strategies also criticised the Card/Rack split used to set its price trends for DSLAMs and switches (these are based on benchmark data), and proposed that we use the split derived from the capex model. Network Strategies indicated that using the split derived in the capex model would make the price trend calculation consistent with the capex model.[589]

I10 Our July 2015 further draft determination was to adopt Network Strategies' proposal and to use the Card/Rack split taken from the core model instead of benchmark ones. The impact of this change is that the long-term price trend for DSLAMs would change from -4.80% to -4.24%, and switches from -4.98% to -4.70%.

I11 Network Strategies also submitted that a more recent version of the Swedish model used in the benchmark data is available.[590] Vodafone also submitted that out of date data should either be updated or excluded.[591]

I12 In the July 2015 further draft determination, we agreed with submissions that we should update the data and use the most recent Swedish data. TERA advised that the price trends in the updated Swedish model were the same as the old one, so this should have no impact on the model. The only difference was that the latest version of the Swedish model included price trends for power and air conditioning that were

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587 CEG "Issues from submissions UCLL and UBA" March 2015, paragraph [68].

588 In the IPP benchmarking exercise, our benchmark set mostly comprised European countries and was based on comparability. In a TSLRIC modelling exercise we consider it would be appropriate to include Australian data in the benchmark set to determine prices trends for active assets.

589 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" 20 February 2015, section 6.1.

590 Ibid.

591 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, section H2.

not used in our draft TSLRIC model. [592] TERA advised that the Swedish inputs for power and air conditioning should be used.

I13 In the July 2015 further draft determination, we agreed with TERA because the updated Swedish data was the most recent and provided the best estimate for a long-term price trend for power and air conditioning.

I14 The impact of this was to change the long-term price trend for power from 0.80% to 1.00%, and air conditioning from 0.50% to 0.80%.

I15 We did not receive any submissions or cross submissions in response to our position on active asset price trends outlined in the July 2015 further draft determination and have no other reason to change our position. Therefore, the decisions reached in the July 2015 further draft determination with regards to active assets are also our final decision.

592 Network Strategies "Final report for Spark New Zealand and Vodafone New Zealand - Commerce Commission draft determination for UCLL and UBA" 20 February 2015, Section 6.1.

Attachment J: Trenching costs

Purpose

J1 Trenching involves the techniques used to deploy telecommunications infrastructure underground: specifically, the ducts and cables which are deployed along roadways and into homes and workplaces to deliver telecommunications services, such as the UBA service.

J2 Various types of trenching methodologies can be used; the choice of method depends on cost and circumstances that are encountered. These include the type of soil, the dimensions of the required trench (ie, length, depth, and width), and its location.

J3 Trenching is a critical input when establishing the TSLRIC of the UBA service. Trenches and ducts are required to house the cables between the active equipment used to deliver the UBA service.

J4 As part of our TSLRIC exercise, for trenching, we carried out three phases of work:

J4.1 soil type analysis;

J4.2 trenching methodologies; and

J4.3 representative trenching costs.

J5 Under each phase we have made a series of decisions to determine the representative costs for trenching.

Decisions

J6 Based on advice from Beca we have identified:

J6.1 five rural soil types and a single soil type for urban areas; and

J6.2 several accepted trenching methodologies that are used in New Zealand for consideration in our model.

J7 We have decided to deploy a fully ducted network as this approach is consistent with New Zealand and international best practice.

J8 In our view the hypothetical efficient operator would not deploy ducts larger than necessary, therefore the size of ducts being deployed would be 50 mm for the FTTH network and 110 mm for the FTTN network.

J9 In our view the hypothetical efficient operator would not use sub-ducts in its network. As set out in Attachment A, we have assumed constant demand, therefore the benefits of sub-ducting will not be realised for our hypothetical efficient operator. As such, the hypothetical efficient operator would not incur the additional expense of sub-ducting its network.

J10 Based on current New Zealand practice and advice from TERA, we have provided for network resilience of critical trenches ([ ]CNZCI or more lines) by double trenching rather than trench reinforcement.

J11 We have relied on Beca for the setting of trenching costs. We consider that the Beca costs are based on objective and independent data that used:

J11.1 historical data held by Beca from previous tenders;

J11.2 limited supplier pricing;

J11.3 indicative "cover-all" rates; and

J11.4 pricing methodologies received from contractors from throughout New Zealand.

J12 We asked Beca to review trenching costs supplied by Chorus and the LFCs. Beca noted there were challenges on comparing its data with the Chrous data as the Chorus data was not as granular as the Beca data and was therefore difficult to rely on for the purpose of modelling trenching costs.

J13 However, Beca has used the data received from Chorus' UFB roll-out and data from LFCs, as a cross-check of its trenching cost data.

J14 Beca concluded that its costs were not dissimilar to the Chorus' UFB data and the LFCs data with its trenching costs. We are therefore satisfied that Beca has provided us with an independent, robust, and representative estimate of trenching costs the hypothetical efficient operator would incur.

J15 We have used a weighted set of trenching methodologies, provided by Beca. We consider that this ensures the trenching methodologies used in our approach are representative of what the hypothetical efficient operator would likely encounter.

J16 We are not applying any discount over and above Beca's cost estimates. We do not consider the hypothetical efficient operator would be able to achieve any discount further to the trenching costs set by Beca.

J17 Please refer to Attachment J of the UCLL December 2015 final determination for our reasons and a detailed analysis of the issues around our final decision regarding the trenching for the purposes of our TSLRIC exercise. As we are applying a similar conceptual economic framework to determine a TSLRIC price for the UBA service as we have used for the UCLL service, we consider that the reasoning and principles discussed in Attachment J of the UCLL December 2015 final determination are also relevant for the UBA service.

Attachment K: Capital contributions

Purpose

K1 The purpose of this Attachment is to consider the type of capital contributions relevant for UBA and the treatment of these capital contributions in our UBA TSLRIC model.

Our final decision

K2 In our December 2014 UBA draft determination paper, we said "we have accounted for the cost of providing bitstream in RBI areas by removing the modelled TSLRIC costs relating to the number of DSLAMs and active cabinets deployed by Chorus under the RBI initiative."[593]

K3 In our July 2015 further draft determination paper we remained of the view that this is the appropriate treatment of RBI subsidies for UBA capital contributions.

K4 We continue to remain of the view that this is the appropriate treatment of RBI subsidies for UBA capital contributions.

Submissions on the December 2014 UBA draft determination paper and the July 2015 further draft determination paper

K5 In its submission on the December 2014 draft determination paper, Chorus said that we had excluded the capital costs of significant volumes of DSLAMs, but it did not receive funding for these DSLAMs, and the hypothetical efficient operator could not require capital contributions for DSLAMs.[594] In Chorus' cross submission on the July 2015 further draft determination paper, it reiterated that "UFB and RBI are both irrelevant to TSLRIC".[595]

K6 In response to our December 2014 draft determination paper, Spark submitted that RBI and UFB funding for network elements should not form part of the modelled cost.[596] Vodafone submitted that we must either consider only the network a profit-maximising hypothetical efficient operator would build, or assume the hypothetical efficient operator operates with the same policy settings as Chorus, and therefore receives subsidies for both fibre and FWA roll-outs.[597]

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593 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream service" 2 December 2014, paragraph [645].

594 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [50].

595 Chorus, "Cross-submission for Chorus in response to Draft Pricing Review Determination for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services (2 July 2015)", 24 September 2015, paragraph [52].

596 Spark "Submission on UBA and UCLL FPP pricing review determination" CONFIDENTIAL, 20 February 2015, paragraph [198].

597 Vodafone "Submission on process paper and draft pricing review determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and comments on Analysys Mason's TSLRIC models" 20 February 2015, recommendation [8].

K7 Responding to our further draft, Vodafone submitted that we must either include or exclude both RBI and UFB subsidies, and that if we included lines within our TSLRIC model, we must also include any subsidy provided for that line.[598]

Analysis

K8 Unlike the hypothetical efficient operator of our modelled UCLL network, the hypothetical efficient operator of our UBA network does not have an obligation (equivalent to the TSO) to serve a prescribed network footprint. Therefore, we assume that the hypothetical efficient operator of the UBA network does not seek or receive any capital funding from end-users to extend its network. Submissions have, however, focussed on the capital funding Chorus has received from government initiatives to improve and extend its UBA network.

K9 The government funding in question is, of course, the UFB and RBI programmes.

K10 In relation to UFB and RBI, the questions we have considered are: do we assume the hypothetical efficient operator receives this funding, and if so, what bearing has this had on the deployment and capital costs of the UBA network footprint?

K11 Consistent with our treatment of capital funding in the UCLL context, we consider the hypothetical efficient operator obtains the same level of capital funding as Chorus (to the extent it applies to the provision of the regulated service). To our knowledge, the UFB funding has not benefited the UBA network we are modelling. Therefore, this funding is not a relevant consideration for our hypothetical efficient operator.

K12 Accordingly, in the context of UBA, the relevant funding that the hypothetical efficient operator would receive is the same level of funding Chorus received through the RBI programme.

K13 While we do not fully support Spark's view that the full RBI funding should be excluded from the modelled costs for the UBA network, we do believe that some account has to be made for RBI funding in the UBA model. As discussed above, this funding has been provided by the government to Chorus to improve and extend its rural copper-based UBA network. Our modelled UBA network footprint is based on Chorus' current UBA connections, and there are connections within this footprint that would not exist were it not for the RBI funding.

K14 As stated in our UCLL draft determination,[599] we consider that the Act demonstrates a general intention that Chorus should not over-recover its costs and we consider that this principle also applies in respect of the UBA service. [600]

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598 Vodafone's "Submission to the Commerce Commission on Further Draft Review Determination for Chorus' Unbundled Copper Local Loop Service and Further Pricing Review Determination for Chorus' Unbundled Bitstream Access Service" 13 August 2015, paragraph [K3.6].

599 Commerce Commission, "Further draft pricing review determination for Chorus' unbundled copper local loop service", 2 July 2015, Attachment K paragraph [30].

K15 However, we are mindful of the impact that would occur if we deducted, in full, the RBI subsidy from the TSLRIC of UBA. Doing so would in effect negate the government subsidy, clawing it back from Chorus.

K16 Similarly, it would also be extraordinary if Chorus' participation in the RBI resulted in an increase in the cost of the service for other end-users. Thus, any increase in the TSLRIC of the UBA network resulting from Chorus receiving the RBI subsidy should be removed.

K17 We are aware that much of the RBI subsidy received by Chorus was applied to upgrading the network to be capable of offering broadband to end-users by providing fibre optic feeders to the cabinets (or to the sites of new cabinets). Since the cost of the trench over these routes is already included in our TSLRIC model, this upgrade has had no (or very low) impact on the TSLRIC cost of the UBA network.

K18 Accordingly, and as set out in our December 2014 UBA draft determination paper, we consider it is appropriate not to deduct the full amount of the subsidy from the TSLRIC. Rather, we have identified the network elements in the UBA network that are present because of the RBI subsidy. These are the upgrades to active cabinets and the DSLAMs.

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600 The definition of TSLRIC in Part 1 Subpart 1 in Schedule 1 of the Act states that:

TSLRIC, in relation to a telecommunications service-

(a) Means the forward-looking costs over the long run of the total quantity of the facilities and functions that are directly attributable to, or reasonably identifiable as incremental to, the service, ***taking into account the service provider's provision of other telecommunications services….*** **[emphasis added]**

Attachment L: Modelling basis for taxation

Purpose

L1 In this Attachment we set out how we have treated tax in our model for the UBA service.

Our final decision

L2 Our final decision remains that the TSLRIC-based price we derive will be a pre-tax amount. Given that the price we derive will be a pre-tax amount, our final decision is to adjust the tilted annuity capital charges for each type of asset by taking into account an appropriate tax depreciation rate. This is the same approach as presented in our July 2015 UBA further draft determination paper, December 2014 UBA draft determination paper and July 2014 regulatory framework and modelling approach paper.[601]

L3 The reason for our final decision is to ensure that the result is not an inaccurate TSLRIC-based price due to an over estimation of the tax position of the hypothetical efficient operator, which would occur if the tax model adopted a simple pre-tax calculation that assumed the corporate tax rate.[602]

L4 We consider that this is consistent with our framework for carrying out the pricing review.

L5 We note that the assets used to provide the UBA service are often different to those used to provide UCLL, however we do not consider that this warrants a change in our approach to depreciation. We consider that the same approach to taxation for UBA and UCLL is appropriate, as taxation applies to the hypothetical efficient operator as a whole, and not at a service level.

Relevance of the modelling basis for taxation to TSLRIC

L6 Please refer to Attachment L of the UCLL final determination for a summary of our approach, our reasons and a detailed analysis of the issues around our treatment of tax.

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601 Commerce Commission "Regulatory framework and modelling approach" (draft determination, 9 July 2014) paragraphs [253-258].

602 In New Zealand, a firm can reduce its taxation payments by deducting depreciation from the taxable earnings. This depreciation tax shield is computed as the amount of allowable depreciation multiplied by the tax rate. The use of accelerated depreciation methods during the early years of an asset's life will provide for a greater tax shield during the asset's early life and, hence, increase the NPV of the tax shield.

Attachment M: Operating expenditure

Purpose

M1 In this Attachment we explain our final decisions regarding the treatment of operating expenditure (opex) in our TSLRIC model for the UBA service.

M2 We note that the discussion in this Attachment is at a relatively high level. TERA has built a separate model to calculate the opex that is used as an input into the TSLRIC model, and the opex model has a number of detailed implementation aspects. We have discussed the implementation of the opex model with TERA, and we agree with the specific details of the model. For a discussion of the detailed treatment of opex in this model see TERA's Model Specification and Model Documentation papers.[603]

Our final decisions

M3 Our final decision in respect of opex for the UBA service is that our starting point is to use Chorus' financial accounts to determine opex in our TSLRIC model. For a detailed discussion of our reasons and our analysis of the issues in respect of the use of Chorus' opex as a starting point please refer to Attachment M – Opex of our December 2015 UCLL final determination.

M4 As we are applying a similar regulatory framework to determine a TSLRIC-based price for the UBA service as we have used for the UCLL service, we consider that the principles regarding opex discussed in Attachment M of the December 2015 UCLL final determination are also relevant for the UBA service, subject to the following paragraphs.

M5 In Attachment M – Opex of our December 2015 UCLL final determination, we discuss a 40% adjustment to opex for a fibre access network. This opex adjustment has not been applied in respect of the opex related to the UBA network, as our modelled opex for UBA is not affected by whether the access technology is copper or fibre.

M6 We note that in Attachment M – Opex of our December 2015 UCLL final determination, we also discuss an adjustment based on line fault indexes as a proxy for the likely higher fault rates of our hypothetical efficient operator's UCLL network. This has a larger proportion of aerial deployment relative to Chorus' copper network. This adjustment has not been applied in respect of the opex related to the UBA network, as aerial deployment is not a relevant consideration in respect of the UBA assets.

M7 We have also received submissions addressing more specific and technical details relating to our treatment of opex. We have discussed these with TERA. Responses to these points are set out in TERA's analysis of industry comments paper and therefore

603 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Model Specification" December 2015, section [2]; and TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Model documentation" December 2015, section [3].

have not been included in this Attachment. We have reviewed this TERA document and we agree with TERA's proposed responses to the submissions made.[604]

604 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access Services – Analysis of the responses to the second consultation following the further draft determination" December 2015.

Attachment N: Cost allocation

Purpose

N1 In this Attachment we explain our final decisions with regard to the allocation of forward-looking common costs in the TSLRIC model for the UBA service.

N2 In particular, in this Attachment we:

N2.1 outline our final decisions in respect of how we allocate forward-looking common costs;

N2.2 explain the relevance of cost allocation to TSLRIC and some cost definitions we use in this Attachment;

N2.3 outline how we have determined the total quantum of forward-looking common costs to be allocated;

N2.4 describe our allocation approach for network and non-network costs; and

N2.5 explain our approach for avoiding double recovery in allocating costs between UCLL and UBA.

Our final decisions

N3 Our final decisions and reasons in regards to how we allocate forward-looking common costs in our TSLRIC model for the UBA service are as follows.

N3.1 For network costs, we use a capacity-based allocation approach. We consider that this provides a reasonable allocation of network costs because of the use of this approach by regulators elsewhere, its greater objectivity and transparency (relative to alternative approaches), and the support for this approach by submitters. This approach is implemented:

626.1.1 for active assets, by using specific allocation keys identified for different categories of network costs;

626.1.2 for the cost of the fibre link between the cabinet and the exchange, by allocating 100% of the cost to the bitstream services, so as to avoid double counting where costs have already been allocated to fibre leased lines; and

626.1.3 for the cost of the fibre link between the exchange and the FDS, by using the method of equi-proportional mark-up (EPMU) that is modified to be based on revenue-shares (which we refer to in this final determination as “modified EPMU”), as we do not have appropriate data to undertake a capacity-based allocation approach.

N3.2 For non-network costs, we use the method of EPMU. We consider that this provides a reasonable allocation of non-network costs because of the use of

this approach by regulators elsewhere, its greater simplicity (relative to alternative approaches), and the support for this approach by submitters.

626.1.4 For the allocation of non-network costs between UCLL and UBA (in aggregate) and other services (for example, co-location and NRC), we use modified EPMU based on each service's share of revenue, as we do not have appropriate data to undertake a standard EPMU approach.

626.1.5 For the allocation of non-network costs between the regulated services (UCLL and UBA), we do have the appropriate data so we use the standard EPMU approach based on each service's share of total attributable costs.

Relevance of cost allocation to TSLRIC

N4 The Act's definition of TSLRIC includes reference to "a reasonable allocation of forward-looking common costs". As we discuss in more detail below, this requires us to consider costs that cannot be wholly or solely associated with a service, and include an allocation of these costs in our TSLRIC model. Relevant issues to consider are the nature and quantum of "forward-looking common costs", and an appropriate methodology to provide for a "reasonable allocation" of these costs to be included in our TSLRIC model. We discuss these issues in more detail in this Attachment.

Cost definitions

N5 In order to explain our approach to the allocation of forward-looking common costs, it is helpful to start with some definitions of the costs that we are considering.

N6 The definition of TSLRIC contains two limbs.[605] Limb (b) refers to "a reasonable allocation of forward-looking common costs". As we have explained in Chapter 2, together the two limbs of the definition capture all relevant forward-looking costs.

N7 The Act defines "forward-looking common costs" as "those costs efficiently incurred by the service provider in providing the service that are not directly attributable to providing an additional unit to that service".

N8 There are certain costs that are not directly attributable to providing an additional unit to the service, but that only relate to a single service. Because these are contained within limb (a) of the definition of TSLRIC, we do not include these within the category of "forward-looking common costs". Accordingly, we only consider costs not directly attributable, ie, those that cannot be wholly or solely associated with a service.

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605 Telecommunications Act 2001, sch 1, pt 1, sub-pt 1 provides that: '**TSLRIC**, in relation to a telecommunications service,—

(a) means the forward-looking costs over the long run of the total quantity of the facilities and functions that are directly attributable to, or reasonably identifiable as incremental to, the service, taking into account the service provider's provision of other telecommunications services; and

(b) includes a reasonable allocation of forward-looking common costs.'

N9 As a subset of costs not directly attributable we define two further cost categories, network costs and non-network costs.[606]

N9.1 Network costs are costs associated with network elements, such as the racks and subracks in the DSLAM, which are used in the provision of more than one service. These include costs which are incurred in producing a given set of services (joint or shared network costs), or all services (network common costs). These costs are incurred in providing services associated with the telecommunications network itself, and relate to a group of, or all, services (rather than only a single service). For consistency with the terminology in our previous papers,[607] we will refer to these costs as "network costs", although it is important to bear in mind that it is only the joint and common network costs that are of concern for our cost allocation exercise.

N9.2 Non-network costs comprise corporate overheads, such as finance, human resources, legal and planning departments. They are also referred to as "non-network common costs". These are costs which are not directly incurred in providing services associated with the telecommunications network itself, but are nonetheless required to operate a telecommunications company. For consistency with the terminology in our previous papers, we will refer to these costs as "non-network costs".

The quantum of network and non-network costs

N10 Our TSLRIC model determines the total quantum of network and non-network costs to be allocated, and then allocates some proportion of these costs across the relevant shared services.

N11 Network costs consist of capital expenditure (capex) and operating expenditure (opex) that are incurred in providing a group of, or all, network services. Network capex is determined as discussed throughout this final determination, depending on the nature of the capital equipment (see, eg, Attachment E – Asset valuation, and Attachment J – Trenching costs), while network opex is derived from Chorus' financial accounts (see Attachment M – Operating expenditure).

N12 As noted above, non-network costs comprise corporate overheads, and as such relate only to opex. The total non-network costs to be allocated were determined from Chorus' financial accounts.

N13 In submissions, WIK was critical of the lack of any checks or adjustments for efficiency in respect of non-network costs.[608]

606 See also our earlier draft determination, Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [676].

607 In particular, our July 2014 regulatory framework and modelling approach paper, our December 2014 UCLL draft determination paper, and our July 2015 UCLL further draft determination paper.

608 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review

N14 While no specific efficiency adjustment has been made to non-network costs, we have excluded some non-network common costs taken from Chorus' financial accounts because they were considered to be out-of-scope.

N15 Aside from this, we note that it is difficult to undertake an objective assessment of what is efficient or reasonable in respect of non-network common costs such as salaries, IT expenditure, etc. The most appropriate and objective way to do so would likely be to obtain comparable data on non-network common costs for a similar business, against which to compare Chorus' non-network common costs.

N16 In regards to comparable data, WIK has submitted that an efficiency check can be undertaken by comparing the share of non-network common costs in the TSLRIC model against international benchmarks.[609] However, the difficulty with applying international benchmarking in these circumstances is that the scope of what is covered in non-network common costs compared with network opex can vary across countries due to regulatory accounting rules on where the different costs are classified.

N17 In addition, Chorus is a vertically separated business but other countries have vertically integrated telecommunications providers, and this makes it difficult to compare non-network common costs in New Zealand with elsewhere. That is, because telecommunications providers overseas have both a wholesale and retail business, their corporate overheads may be quite different from those of Chorus, with just a wholesale business.

N18 Similarly it is difficult to benchmark non-network common costs against New Zealand telecommunications operators. In considering the potential New Zealand benchmarks, while LFCs operate a wholesale-only business, they do not have the scale of operations that Chorus does. Large access seekers such as Vodafone and Spark may have a similar scale to that of Chorus, but are vertically integrated businesses with both wholesale and retail operations, including for mobile telecommunications networks.

N19 Similar points were made in submissions by Analysys Mason, with which we agree:[610]

> …it is worth noting that there are economies of scale in overheads, so comparison to larger countries will not be a good comparison. In addition to this purely national effect, Chorus, being structurally separated, does not have the same economies of scale in overhead costs relative to e.g. retail telcos.

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determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraphs [288] and [358].

609 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [359].

610 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 20 March 2015, section 4.12.

N20 Accordingly, because of the practical difficulties in undertaking an objective assessment of the efficiency of non-network costs, we have not undertaken such an assessment.

N21 Even if it were possible to check the efficiency of non-network common costs, it is not clear how an efficiency adjustment could be applied if it were considered necessary. We are not aware of any approach that could be used to undertake such an efficiency adjustment in an objective manner, and submitters have not proposed how such an adjustment should be made.

N22 On balance, we are satisfied that we have appropriately addressed the issue of using Chorus' financial accounts to determine the quantum of non-network common costs to be allocated across services.

Allocating network costs

Our choice of allocation approach

N23 In our previous papers throughout this FPP process we considered two possible approaches for the allocation of network costs, a Shapley-Shubik approach or a capacity-based approach to allocate network costs.[611]

N23.1 A Shapley-Shubik approach allocates network costs based on the average share of incremental costs for each service, where the average is determined across all possible combinations of the different "orderings"[612] of the relevant services (based on multiple model runs).[613]

N23.2 A capacity-based approach allocates network costs based on the share of network capacity required by each service.

N24 Our final decision is to use a capacity-based approach for the allocation of network costs, for the reasons set out below.

N25 We consider that a capacity-based allocation is a more objective and transparent approach than the alternative Shapley-Shubik approach. This has been recognised by some submitters. For example, Analysys Mason submitted that the Shapley-Shubik approach "leads to an undesirable dependence of the result on the number of services modelled", and lacks transparency because of the difficulties in comparing multiple model runs to assess the rationale for a particular cost allocation.[614]

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611 Commerce Commission "Consultation paper outlining our proposed view on regulatory framework and modelling approach for UBA and UCLL services" 9 July 2014, paragraph [279]; Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [677].

612 For example, if there were two services, then there are two possible orderings of the services: service one comes first, then service two; and vice versa.

613 For an example of this approach, see TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Reference Paper" December 2015, section 4.1.1.

614 Analysys Mason "Report for Chorus – Response to Commission consultation on regulatory framework and modelling approach for UCLL and UBA" 6 August 2014, paragraph [1.17.2].

N26 We also view it as relevant to consider how regulators elsewhere have implemented TSLRIC models. A capacity-based allocation is a common (albeit not ubiquitous)[615] approach used by regulators to allocate costs between services.[616]

N27 Our expert advisor TERA supports the use of the capacity-based approach, and notes that this approach follows the cost drivers and allocates a proportionately larger share of network costs to services that have a proportionately greater network loading.[617] We agree that this provides a further rationale for the use of a capacity-based approach over the Shapley-Shubik approach.

N28 In submissions on our previous papers throughout the FPP process, submitters have agreed that we should implement a capacity-based allocation approach rather than a Shapley-Shubik approach.[618] In further submissions and cross submissions on our July 2015 UBA further draft determination paper, Chorus continued to support the use of a capacity-based approach rather than a Shapley-Shubik approach,[619] and Spark more generally supports our choice of cost allocation methodologies for network costs.[620]

N29 Accordingly, our final decision is to use a capacity-based approach for the allocation of network costs. It is relevant to consider how regulators elsewhere implement TSLRIC models, and a capacity-based approach is a common approach used by regulators to allocate network costs. Along with the greater objectivity and transparency of the capacity-based approach (relative to Shapley-Shubik), and the support for this approach by submitters (as noted above), we consider a capacity-based approach provides a reasonable allocation of network costs.

Implementation of the capacity-based allocation approach for active assets

N30 We implement the capacity-based approach when the costs of different active network elements are shared across multiple services. This occurs in particular when the costs of different active infrastructure assets are shared across different services. For example, the costs of the racks, subracks and line cards in a DSLAM can relate not only to the provision of UBA, but also to the SHDSL service. In these cases, we use a measure of capacity to allocate a proportion of these costs to the UBA service modelled in our TSLRIC model.

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615 For example, TERA has noted that the Shapley-Shubik approach has been considered by regulators in France and Ireland (TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Reference Paper" December 2015, section 4.1.1).

616 TERA Consultants "TSLRIC literature review on UBA and UCLL costing approaches" June 2014, p. 33.

617 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Reference Paper" December 2015, section 4.1.1.

618 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [683].

619 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, paragraph [174].

620 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 13 August 2015, paragraph [308].

N31 The relevant measure of capacity that we use to allocate costs depends on the nature of the infrastructure assets for which costs are being allocated. TERA has recommended that the most appropriate measures of capacity to use as "allocation keys" with which to allocate network costs for active assets are as follows.[621]

N31.1 For active assets of the core network, the number of customers.

N31.2 For FDS costs, the number of ports used.

N32 Throughout this FPP process we have not received any submissions on the choice of the appropriate measures of capacity with which to allocate costs for active network assets using the capacity-based approach. As noted above, however, there was acceptance of the capacity-based allocation approach more generally.

N33 Our final decision is to use the allocation keys as set out above to implement the capacity-based allocation approach for active assets. We consider that the capacity-based allocation keys are reasonable and provide a valid basis for allocating network costs for active assets. Consistent with our regulatory framework, we consider that the determination of appropriate allocation keys is largely an evidential matter, and we consider that the allocation keys set out above provide the best objective way of allocating network costs for active assets.

Implementation of the capacity-based allocation approach for passive assets

N34 Similar to active assets discussed above, we implement the capacity-based approach for passive assets when the costs of different passive infrastructure assets are shared across different services. This occurs in respect of the cost of the fibre links between the active cabinets and their parent exchange, and between the exchanges and the FDS. These links relate not only to the UBA service, but also to other services such as leased lines, legacy services, and dark fibre.

N35 In allocating the cost of the fibre link between the cabinet and the exchange, TERA has recommended that an appropriate measure of capacity to use as an allocation key is the fibre count, ie, costs are allocated in proportion to the number of fibres used for the UBA service against other services (such as fibre leased lines).

N36 However, our TSLRIC model already captures a share of costs that are allocated to fibre leased lines.[622] Therefore to also allocate costs to fibre leased lines through our cost allocation approach would amount to double counting. Accordingly, in our TSLRIC model our final decision is to allocate 100% of the cost of the fibre link between the cabinet and the exchange to the bitstream services.

N37 In regards to this approach, Chorus submitted that it is "comfortable with the approach taken". Chorus also submitted that the proposed allocation "more appropriately reflect[s] that UBA is the key traffic driver of peak hour traffic on the

621 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: – Model Specification" December 2015, section [8.7.2.1].

622 As discussed in TERA's Model Specification Paper – TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Model Specification" December 2015, section [3.11].

network", so that a high allocation of costs to the UBA service is appropriate.[623] Spark submitted more generally that it supports our choice of cost allocation methodologies for network costs.[624]

N38 For the allocation of the cost of the fibre link between the exchange and the FDS, we lack definitive data with which to determine an appropriate capacity-based allocation key to implement the capacity-based allocation approach. In light of this, our final decision is to use modified EPMU to allocate the fibre link costs between the exchange and the FDS, for the reasons set out below.

N39 Throughout our FPP process we considered various alternatives to the allocation of the cost of the fibre link between the exchange and the FDS in the absence of relevant data to determine an allocation key. One possible approach was set out in our December 2014 UBA draft determination paper, where our proposed draft approach was to allocate costs in proportion to the number of services using the fibre link. Across the three services that we assessed as using the fibre link (bitstream, voice and leased lines) this resulted in 1/3 of the cost being allocated to the bitstream services and 2/3 to the other services.

N40 Submitters were critical of this approach. For example, Chorus submitted that if this approach intends to reflect a capacity-based allocation then it results in a very low allocation to UBA services.[625] WIK submitted that simply splitting the costs between three services was not a systematic approach.[626]

N41 An alternative approach is to allocate costs based on traffic. This was the approach taken in the cost model provided by Analysys Mason. However, TERA advised us that traffic is not the main driver of the cost of the fibre link.[627] We also note that, despite Chorus' expert Analysys Mason using traffic to allocate network costs for passive assets in its own cost model, Chorus itself has suggested using a modified EPMU approach.[628] Analysys Mason also submitted that either traffic or EPMU based on

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623 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, paragraphs [174]-[175].

624 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 13 August 2015, paragraph [308].

625 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [223].

626 WIK-Consult "Submission in response to the Commerce Commission's Draft pricing review determination for Chorus' unbundled bitstream access and unbundled copper local loop services including the cost model and its reference documents" CONFIDENTIAL, 20 February 2015, paragraph [398].

627 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [1069].

628 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [223].

revenue are possible approaches,[629] and at the conference Analysys Mason stated that the choice between these two is "arbitrary".[630]

N42 The standard EPMU approach is also a possible alternative for the allocation of these costs, although in this instance the relevant data from Chorus' accounts is not available to provide a breakdown of costs by the services using the fibre link between the exchange and the FDS.

N43 However, the modified EPMU approach can be implemented, as Chorus' financial accounts do provide the relevant revenue breakdown across these services. Modified EPMU provides a robust, data-based, approach to allocating costs, in the absence of definitive data for a capacity-based approach. It is also consistent with the cost allocation approaches we have used elsewhere in our model where we were also faced with a lack of data to implement our preferred approach (as discussed later in this Attachment in respect of non-network cost allocation).

N44 The modified EPMU approach was also supported by our expert advisor, TERA,[631] and submitters. Chorus submitted that modified EPMU would give a better and more realistic allocation of costs based on known cost drivers.[632] More generally both Chorus and Spark submitted that they support our approach taken for the allocation of common network costs.[633,634]

Allocating non-network costs

Our choice of allocation approach

N45 In our FPP process we have considered two possible approaches for the allocation of non-network costs, EPMU and Ramsey-pricing.[635]

N45.1 EPMU allocates non-network common costs to services in proportion to the share of total attributable costs across the services.

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629 Analysys Mason "Report for Chorus - UCLL and UBA FPP draft determination cross-submission" CONFIDENTIAL, 20 March 2015, section [3.10].

630 Commerce Commission "UBA and UCLL pricing review determination conference transcript" 15-17 April 2015, p.411.

631 As discussed in TERA's Model Specification Paper – TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services – Model Specification" December 2015, section [8.7.2.2].

632 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services and Process and Issues Update Paper for the UCLL and UBA Pricing Review Determinations" CONFIDENTIAL, 20 February 2015, paragraph [223].

633 Chorus "Submission for Chorus in response to Draft Pricing Review Determinations for Chorus' Unbundled Copper Local Loop and Unbundled Bitstream Access Services - Public version" 2 July 2015, paragraphs [174]-[175].

634 Spark "Further draft pricing review determination for Chorus' UBA and UCLL services - Public version" 13 August 2015, paragraph [308].

635 Commerce Commission "Draft pricing review determination for Chorus' unbundled copper local loop services" 2 December 2014, paragraph [860-863]; and Commerce Commission "Further draft pricing review determination for Chorus' unbundled copper local loop services" 2 July 2015, paragraph [1718].

N45.2 Ramsey-pricing allocates non-network common costs to services based on the relative price elasticity of demand for the service.

N46 Our final decision is to use EPMU for the allocation of non-network costs, for the reasons set out below.

N47 EPMU is a relatively simple method to implement, compared to Ramsey-pricing. The latter requires the estimation of demand elasticities for different services, which can be difficult to determine. This requires specific data on demand which may not always be available, and where the data is available the analysis required can often be complex and contentious. In contrast, EPMU is a more transparent approach that utilises cost data, which is typically available in the regulated business' accounts, and involves a relatively straightforward calculation based on that cost data.

N48 We also view it as relevant to consider how regulators elsewhere have implemented TSLRIC models, with EPMU being used by regulators as a methodology to allocate non-network costs between services.[636]

N49 Given its use by regulators elsewhere, and its relative simplicity, our expert advisor TERA also supports the use of the EPMU methodology.[637]

N50 In submissions throughout our FPP process, submitters have agreed that EPMU was a preferable approach to Ramsey-pricing for the allocation of non-network costs.[638] For example, Chorus supported the use of EPMU,[639] as did Spark, who submitted that Ramsey-pricing is "difficult to implement practically".[640] While, in principle, Ramsey-pricing is a valid methodology, it is the practical difficulties with implementing the approach that are of concern.

N51 Accordingly, our final decision is to use EPMU for the allocation of non-network costs. It is relevant to consider how regulators elsewhere implement TSLRIC models and EPMU is a common approach used by regulators to allocate costs to services. Along with the relative simplicity of EPMU (compared to Ramsey-pricing), and the support for this approach by submitters, we consider that the EPMU approach provides a reasonable allocation of non-network costs.

N52 We explain below that in some respects the necessary data to implement a standard EPMU approach is not available, and we have instead adopted a modified EPMU approach.

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636 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Reference Paper" December 2015, section [4.1.2]).

637 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Model Reference Paper" December 2015, section [4.1.2]).

638 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [699].

639 Chorus "Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraph [112].

640 Spark "UCLL and UBA FPP: consultation on regulatory framework and modelling approach – Cross submission Commerce Commission" 20 August 2014, paragraph [131].

Implementation of the EPMU allocation approach

N53 We implement EPMU by allocating a share of non-network common costs to each of the relevant services, in proportion to the share of total attributable costs across the services. The cost shares for implementing EPMU are typically identified using accounting cost data from the regulated firm's accounts.[641] However, based on our review of Chorus' financial accounts, a breakdown of costs by service is not necessarily always available.

N54 In the absence of a breakdown of costs by service, a proxy for the EPMU approach is to allocate costs based on a breakdown of revenue by service, where the revenue breakdown is available in the financial accounts. As noted above, we refer to this approach in this final determination as modified EPMU.

N55 Our final decision is to apply the modified EPMU approach to allocate a share of non-network costs to the UCLL and UBA services (in aggregate), while the remaining share of non-network costs is allocated to other services (for example, co-location and NRC). We apply the modified EPMU approach in this instance because Chorus' financial accounts did not provide a sufficient breakdown of costs to apply the standard EPMU approach.

N56 However, we were able to use Chorus' financial accounts to implement a standard EPMU approach to allocate non-network costs between the regulated UCLL and UBA services. Our final decision is therefore to apply the standard EPMU approach in this instance.

N57 While we have applied modified EPMU in one instance and EPMU in another, as we discussed in our July 2015 UBA further draft determination,[642] we consider that this is a valid approach. We are of the view that an allocation approach based on EPMU is preferable where the data are available. We have only used modified EPMU where the data necessary to implement a standard EPMU approach are not available. Modified EPMU would not be an appropriate cost allocation approach to apply if the data were otherwise available to apply the standard EPMU approach (which is the case for allocation between the UCLL and UBA services). Since our July 2015 UCLL further draft determination, none of the submitters have questioned our use of modified EPMU in one instance and standard EPMU in another.

N58 In the absence of data we consider that the modified EPMU approach is the most suitable available proxy.[643] The suitability of this approach as a proxy for EPMU relies on the assumption that revenue is distributed across services in similar proportions to total attributable costs.

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641 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [702]; Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2014, paragraph [1075].

642 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access services" 2 July 2015, paragraphs [1081]-[1083].

643 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [705].

N59 Where this is not the case (which may be because the mark-up on costs is proportionately greater for some services than for others, for example, those services for which demand is relatively more inelastic), the modified EPMU approach has some similarities with the Ramsey-pricing approach. Under the modified EPMU allocation approach, relative to the traditional EPMU approach, an access provider would only under-recover its costs of providing the service for which we set a regulated price if it were to earn a greater profit margin on unregulated services relative to regulated services.

N60 In our December 2014 UBA draft determination paper, when we implemented the standard EPMU approach we allocated costs in proportion to each service's share of opex only, rather than both capex and opex. However, we corrected this approach in our July 2015 UBA further draft determination paper, where we agreed with submitters that the correct approach was to use total attributable costs, which reflect both capex and opex.[644] We have maintained the corrected approach for this final determination.

Avoiding double recovery in allocating costs between UCLL and UBA

N61 We have explained earlier in this final determination that when we calculate the additional costs of the UBA service we use a MEA for the UBA increment that utilises a copper-based access network, whereas for the UCLL service, we are modelling a hypothetical network based on a MEA that includes FTTH. In our previous papers throughout this FPP process we identified the potential for double recovery arising from this.[645] We noted that this is because the same trench and duct (between the active cabinet and the MDF) is covered more than once in the TSLRIC model for UBA and the TSLRIC model for UCLL.

N62 As discussed in Chapter 2, clause 4B of the Act requires that we must ensure no double recovery of costs in prices of designated or specified services.

N63 Chorus disagreed that there was double recovery in this particular case, arguing that the intention of the Act is that the UBA price would cover both trenching costs.[646] In contrast, Spark submitted that Chorus' approach "makes no sense" as it would involve the deployment of overlay trenches and the double counting of costs within the model.[647]

N64 We agree with Spark that there is clear evidence of double recovery in this instance. Our final decision is to use the following approach to ensure that there is no double recovery in this particular case.

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644 Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access services" 2 July 2015, paragraph [1084].

645 Commerce Commission "Draft pricing review determination for Chorus' unbundled bitstream access service" 2 December 2014, paragraph [710]; Commerce Commission "Further draft pricing review determination for Chorus' unbundled bitstream access service" 2 July 2015, paragraph [1085].

646 Chorus "Submission in response to the Commerce Commission's Consultation paper outlining its proposed view on the regulatory framework and modelling approach for UBA and UCLL services (9 July 2014)" 6 August 2014, paragraph [152].

647 Spark New Zealand "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Cross-submission Commerce Commission" 20 August 2014, paragraph [143].

N64.1 Calculate the potential double recovery as a result of the trench shared between UBA and UCLL.

N64.2 Allocate trench and duct costs between UBA and UCLL. The cost allocation is based on the capacity-based allocation approach as outlined earlier in this Attachment.

N64.3 UBA TSLRIC are reduced by the UCLL share to ensure against any potential double recovery.

N65 This approach is recommended by our expert advisor, TERA.[648] We agree with TERA's view, and consider that it provides an appropriate way to ensure against this particular source of double recovery. Spark supported our approach to remove this source of double recovery,[649] but we have otherwise received no further submissions on this particular issue.

[648] TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: – Model Specification" December 2015, section [8.9.2.2].

[649] Spark New Zealand "UCLL and UBA FPP: consultation on regulatory framework and modelling approach - Cross-submission Commerce Commission" 20 August 2014, paragraph [147].

Attachment O: Alternative methods to set prices for the UBA variants

Purpose

O1 The purpose of this Attachment is to explain the alternative ways to set prices for the four different variants of the UBA service specified in the UBA STD (the UBA variants). Our final decisions regarding the UBA variants are provided in Chapter 4.

O2 As discussed in Chapter 4, one of the approaches to setting prices for the UBA variants is to set the same price across the different variants. In Chapter 4 we concluded that we do not consider this to be an appropriate approach. We therefore do not discuss this approach any further in this Attachment.

O3 Another approach is to use cost differentials derived from our TSLRIC model. Again, as noted in Chapter 4 that we concluded that this was not an appropriate approach, and we do not discuss this further in this Attachment.

O4 The other approaches for determining differential prices are to:

O4.1 determine a price differential based on a price consisting of two components, ie, the price per customer plus a uniform price per Mbps; or

O4.2 determine price differentials based on a gradient approach, whereby the difference between the prices for the variants is based on an appropriate gradient, in a way such that the average revenue from these products equals the average TSLRIC.

O5 We describe these two approaches in more detail (including different variations of the gradient approach) in this Attachment.

Determining a price based on two components

O6 Under this approach, the price would consist of one price made up of:

O6.1 a uniform price per customer; and

O6.2 a uniform price per Mbps at peak hour.

O7 Under this approach traffic at peak hour would be measured. If an operator has, for example, 100 customers generating a total of 30 Mbps (300 kbps per customer), then the operator will pay 100 multiplied by the uniform price per customer, plus 30 multiplied by the uniform price per Mbps.

O8 This approach is used in some other countries, including France, Ireland and Italy.

O9 However, under this approach, it is necessary to make customer number and peak hour traffic forecasts for each operator. Forecasts at such a granular level are very difficult to make, especially over a five-year regulatory period. Alternatively, in the absence of forecasts, it is necessary to adjust the price every year using actual customer number and peak hour traffic data, which makes the pricing approach volatile.

Determining a price based on the gradient approach

O10 This approach uses a gradient to determine price differentials for the UBA variants. In applying a gradient, we would set prices for the UBA variants so that the average revenue from these products equals the average TSLRIC for the UBA increment. The difference between the prices for the variants is calculated based on an appropriate gradient.

O11 The gradient aims to reflect customers' relative willingness to pay for the different variants. As discussed in more detail in Chapter 4, prices remain cost oriented because the total cost of all the UBA variants is equal to the UBA TSLRIC.

O12 To determine price differentials, we have considered using a gradient that is:

O12.1 based on guaranteed throughput;

O12.2 based on throughput at peak hour;

O12.3 based on retail-minus ratios that applied before 1 December 2014; or

O12.4 in place from 1 December 2014 from the UBA IPP determination, based on international benchmarking.

O13 We provide further detail on each of these options below.

Gradient based on guaranteed throughput

O14 This option bases the price differentials for the UBA variants on the relative guaranteed throughputs for each of the regulated UBA variants. The guaranteed throughputs are:

O14.1 32 kbps for BUBA;

O14.2 72 kbps (32 kbps plus 40 kbps) for EUBA40;

O14.3 122 kbps (32 kbps plus 90 kbps) for EUBA90; and

O14.4 212 kbps (32 kbps plus 180 kbps) for EUBA180.

O15 Under this approach, the EUBA40 price will be 72/32 times higher than the BUBA price, the EUBA90 price 122/72 times higher than the EUBA40 price, and the EUBA180 price 212/122 times higher than the EUBA90 price.

O16 However, the problem with this approach is that a gradient based on throughput does not necessarily reflect customers' willingness to pay. Willingness to pay might be quite different compared to, for example, a relationship based on the guaranteed throughput of EUBA40 being 72/32 times higher than BUBA.

Gradient based on throughput at peak hour

O17 The throughputs quoted above are guaranteed throughputs but they do not reflect actual throughputs experienced at peak usage. One approach to calculating the gradient is therefore to use the relative throughputs at peak usage for each of the UBA variants.

O18 A similar approach was proposed by WIK, which submitted that the price differential could be determined based on either "average volume per user" or "average capacity required/used during the busy hours".[650]

O19 However, this approach has three main disadvantages.

O19.1 It requires data on either average traffic or average peak traffic for each UBA variant, which Chorus has advised is not available.

O19.2 Even if the data were available, average peak traffic changes regularly, so prices could quickly become out of date. To avoid this would require regular price reviews, with the potential for prices to change quite often.

O19.3 It might result in an inappropriate cross-subsidy if Chorus were to launch a commercial UBA service that has high usage.

Gradient based on retail-minus ratios

O20 This option uses historic ratios established under the former retail-minus approach. The retail-minus ratios were established by reference to retail services in the United Kingdom.[651]

O21 Given that we are undertaking a pricing review determination by implementing TSLRIC, we consider it would be undesirable to revert to ratios set under the previous pricing principle of retail-minus.

Gradient based on price differentials in place under the IPP determination is appropriate

O22 This option uses price differentials in place from 1 December 2014 from the IPP determination, which are based on international benchmarking against Belgium, which has a wholesale bitstream service with a real time CoS profile.

O23 As discussed in more detail in Chapter 4, we consider that this gradient is the best approach to set prices for the UBA variants.

650 WIK-Consult "Submission In response to the Commerce Commission's "Further draft pricing review determination for Chorus' unbundled bitstream access service" and "Further draft pricing review determination for Chorus' unbundled copper local loop service" including the revised cost model and its reference documents" 12 August 2015, paragraph [209].

651 Commerce Commission "Standard Terms Determination for the designated service Telecom's unbundled bitstream access" 12 December 2007, Decision 611, paragraphs [182]-[187].

Attachment P: International comparators

P1 The international comparator evidence presented by Spark in response to the December 2014 draft determination relates to the UCLL charges and we discuss this more thoroughly in Attachment P of our UCLL final determination.[652]

P2 The UCLL component, together with the additional costs of UBA, comprises the total UBA charges.

P3 With respect to the additional costs of UBA, we note that the levelised price for UBA of $11.06 is broadly similar to the UBA IPP determined price of $10.92; which in turn was based on a full examination of international comparators.

652 Spark "UBA and UCLL FPP pricing review draft decision" 20 February 2015.

Attachment Q: Chorus' cost model

Purpose

Q1 This Attachment sets out our view of Chorus' cost model and how it has been considered as part of the UBA and UCLL final determinations.

Our final decision

Q2 Our final decision is not to use Chorus' cost model to set the prices of UCLL and UBA services in New Zealand.

Q3 Chorus' cost model has been used to update and inform some aspects of our TSLRIC model, including unit costs and opex allocation.

Background

Q4 As part of the consultation process, Chorus submitted its own cost model developed by Analysys Mason. The model calculated prices (in constant nominal terms) to be:

Q4.1 $74.10 for UCLL;

Q4.2 $81.43 for sub-loop unbundling (SLU); and

Q4.3 $16.57 for UBA. [653,654]

Q5 In addition to the model being subject to submissions and cross submissions, we asked TERA to review the model and compare it to the model developed by TERA.[655] TERA's review was published along with our July 2015 further draft determination.

Q6 TERA's report and the comparison of the two models were based on the December 2014 version of TERA's model.

Analysis

Q7 We generally agree with submitters that Chorus' cost model does not reflect the costs of an efficiently built network. It is primarily a top-down model based on Chorus' copper network with some minor efficiency adjustments, rather than a bottom-up model based on an optimised MEA network with significant efficiency adjustments applied where needed.

Q8 Chorus' cost model is not consistent with our framework. While some of the differences between the output of Chorus' and TERA's cost models relate to the use of different input parameters which can be changed like the WACC and asset lifetimes, they are also the result of fundamental methodological differences like the choice of MEA, the degree of optimisation and most importantly, the starting point

653 Analysys Mason "Model user guide for UCLL hybrid bottom-up model" Public Version 28 November 2014, paragraph [2.1]

654 Analysys Mason "Model user guide for UBA model" Public Version 28 November 2014, paragraph [2.1].

655 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Analysis of Chorus cost model" March 2015.

of the cost calculations (top-down or bottom-up). In addition, Chorus' cost model does not estimate costs for NRC.

Q9 However, we have considered how aspects of Chorus' cost model can inform our modelling. Chorus' cost model has been used to update some aspects of our model, including unit costs and opex allocation. These are outlined in TERA's changes to modelling document.[656] In addition, we have reviewed the trenching component of Chorus' cost model to assess whether our costs are reasonable. We discuss Chorus' trenching costs in more detail in Attachment J.

Q10 For the above reasons we find that Chorus has not presented us with an appropriate TSLRIC model that can be used to set the prices of the UCLL and UBA services in New Zealand.

Q11 Please refer to Attachment Q of the UCLL final determination for our detailed analysis of the issues relating to our review of Chorus cost model. Our review in Attachment Q of the UCLL final determination is a review of all of Chorus' cost models – both the UCLL and the UBA part.

656 TERA Consultants "TSLRIC price review determination for the Unbundled Copper Local Loop and Unbundled Bitstream Access services: - Implemented Changes" June 2015, p. 8, 14.