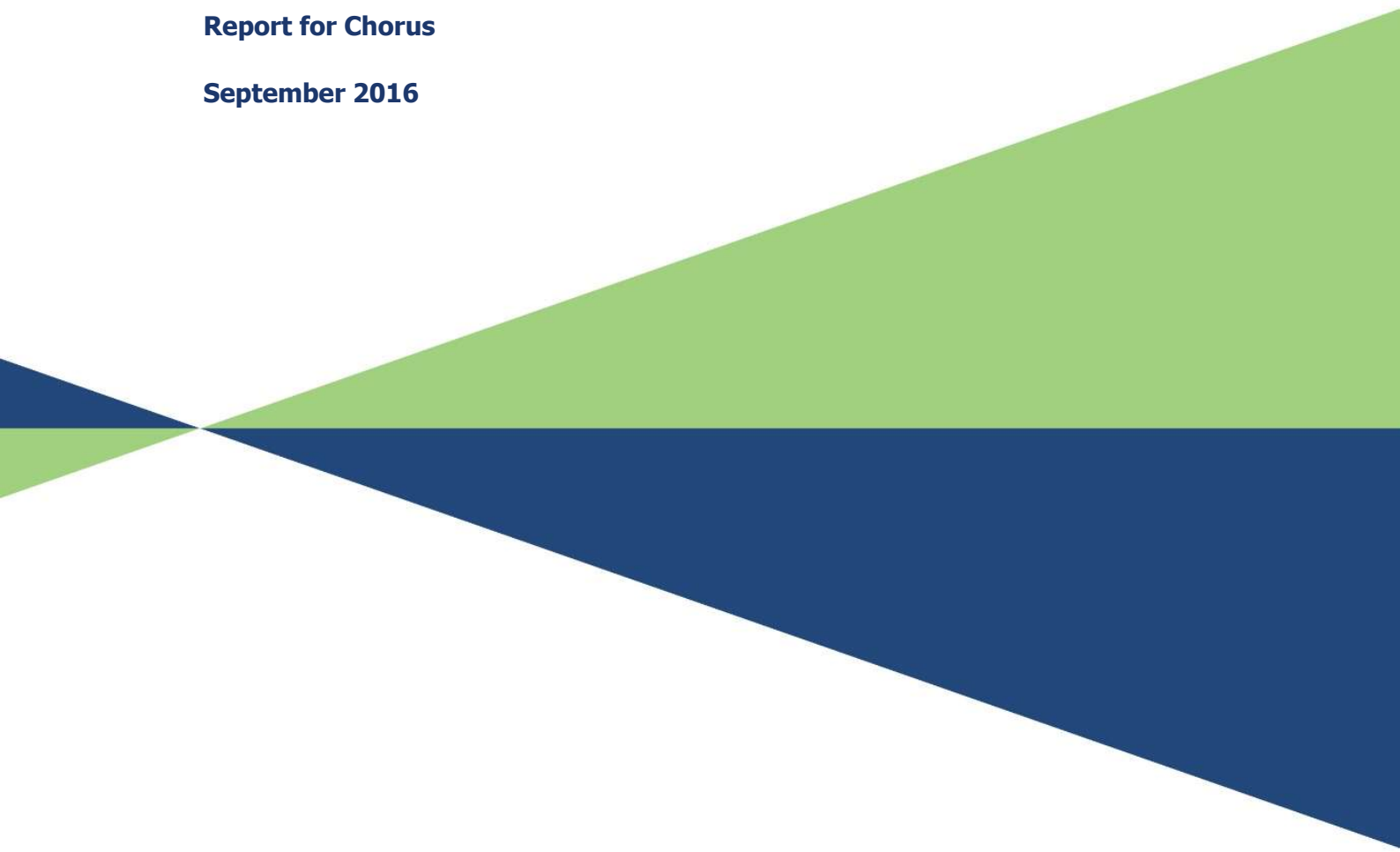
Regulatory asset valuation for the Chorus copper and fibre networks

Report for Chorus

September 2016



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1. Introduction and summary

1.1.1 Introduction

The Ministry for Business, Innovation and Employment (MBIE) is currently reviewing various aspects of the policy settings for the telecommunications industry in the future, and one of the aspects under consideration is the method and implementation of regulation that is applied to fixed line services in the period after 2020. After this date the initial contracts for the ultra-fast broadband rollout expire and the current price paths for the copper-based services (set on the basis of an estimate of "total service long run incremental cost, or TSLRIC) also expire.

The MBIE has indicated that it is looking to implement the "building block approach" to the regulation of both the fibre and copper networks from 2020. The effect of this would be to regulate fixed line telecommunications in a manner that is similar to how utility firms (like energy networks and water businesses) are regulated in New Zealand, Australia and the United Kingdom. The primary implication of applying the building block approach is that regulated prices would be set with reference to the actual costs incurred (or the forecast of costs to be incurred) in the provision of the regulated services and actual demand. This compares to a reliance on hypothetical values as applies under the current TSLRIC regime.

Implementing the building block approach requires the establishment of an initial regulatory asset value for the relevant assets.[1] Establishing this value when transitioning to the building block approach is not necessarily straightforward. However, as we elaborate further below, regulators have commonly dealt with the challenges in establishing an initial asset value by looking to set a value that provides a reasonable balance of interests between all parties.

In this report we describe the methods that economic regulators have applied to set the initial asset value for firms that have transitioned to the building block approach. In doing so we also provide a recommendation on the method we consider most appropriate in the context of Chorus' copper and fibre network.

1.2 Summary

1.2.1 Objective for setting the initial regulatory asset value

Economic principles do not provide definitive guidance as to how the initial regulatory asset value for "sunk" infrastructure assets should be determined at the transitional to formal cost based regulation, only that the value lie somewhere between:[2]

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1 The terms "regulatory asset value", "regulatory asset base", "capital base" and "rate base" (a US term) are typically used interchangeably, and use these terms to mean the same thing in this this report. There are situations where a term is given a more specific meaning in a particular regulatory instrument (for example, to distinguish the value before and after making a particular adjustment), but none of these situations are relevant to the matters addressed in this report.

2 In contrast, economic principles provide much more guidance as to the updating of the regulatory asset value – once established –should be updated over time. The key conclusion is that the methods used to set the regulated charges and to update the regulatory asset value must, in combination, provide an expectation that capital expenditure will be recovered. Where the building block method is used to set

- The value the assets would have in the next best use (the opportunity cost), which is expected to be very low, and

- The value at which the prices generated encourage users to bypass the regulated infrastructure and provide (inefficient) duplicate infrastructure, which may be very high.[3]

Given these wide bounds the initial valuation is essentially a policy choice. The implication being that it is accepted that the decision that is made about the valuation of sunk assets will provide an indication of how other discretions may be exercised in the future. Recognising this, the principle that is typically applied by regulators when setting an initial regulatory asset value is to determine a value that is fair in the relevant context. This is often described as an objectively reasonable value, or as one that creates an (objectively) reasonable balance of interests between parties (meaning the regulated business and its customers). By setting a fair outcome, investors in the regulated business are more likely to expect the regulator to exercise its discretions in a manner that is fair, and so be more willing to invest.

1.2.2 Methods for setting an initial regulatory asset value

We have identified the following four methods as the principal methods that regulators have applied when seeking to derive an initial asset value that can be viewed as being objectively reasonable.

Competitive market values – replacement cost valuations

Replacement cost valuations, such as the 'Optimised Depreciated Replacement Cost' (ODRC) in Australia, or the 'Optimised Deprival Value (ODV) in New Zealand, have been a key input into many initial regulatory asset valuations. The method involves valuing the assets at the current cost of constructing an optimised network using current technology. Adjustments are made for the difference in the cost of using the 'old' assets compared to the 'new' (depreciation). The justification for applying replacement cost valuations is that they:

- Deliver a value that would be consistent with that observed in a hypothetically competitive market for the product, and that it is reasonable for the owner of regulated assets to be treated in a manner that is commensurate with what would be expected in that hypothetically competitive market.

- Imply a value for individual assets that is consistent with the value the asset would have if there was a liquid second-hand market for the assets – or, equivalently, the loss that customers would suffer if they were deprived of that asset; which is also held to be a reasonable basis for valuation, and

charges, this can be accomplished by raising the regulatory asset value by the actual capital expenditure that has been undertaken and reducing it for the return of capital that has been factored into prices and thereby returned to investors (regulatory depreciation).

[3] The reference here to "bypass" means real-world bypass of the relevant infrastructure. The price at which material real-world bypass may be encouraged can be distinguished from a TSLRIC price, which is an estimate of the price at which bypass would occur in a hypothetical perfectly contestable market. The price at which material real-world bypass may be encouraged may be substantially greater than the TSLRIC price.

- As a practical matter, a replacement cost valuation can be applied to assets (and a meaningful value thereby established) without any knowledge of the historical costs incurred, or revenue received, for the assets in question.

It is relevant to note, however, that many of the uses of replacement cost valuations have been in circumstances where existing prices could not be reliably used as a basis for setting the initial asset valuation. That is, there had been no prior regulation of the service, and in some instances dispute about the appropriateness of current prices.

'Line in the sand' valuations

The term "line in the sand" has been used to refer to methods whereby the initial regulatory asset value is established so as to preserve some aspect of current arrangements of outcomes. The term is used to imply that the transition to the building block approach is intended to formalise the calculation of charges in the future – and so improve the conditions for future investment are protections for customers – but not necessarily to cause a material change from current outcomes.

The "line in the sand" method has been applied to:

- *Preserve current asset values* – which has been applied in cases where the assets have been subject to a previous regime that used an asset value in a manner that was analogous to use under the building block approach.

- *Preserve a target level for prices or profit* – which involves back-calculating an asset value so that a target level (typically current and reasonably expected) for prices or profit would be expected to be generated under the future application of the building block approach.

  – The choice between targeting *prices* or *profit* dictates who benefits from (or bears) the consequences of changes in future cost and demand. Targeting price means that these are retained (borne) by the asset owner, and targeting profit means that these are passed through to customers.

When the "line in the sand" method has been applied to continue previous asset values, it has typically been argued that the application of the building block approach is merely the continuation of regulation, just of a different form, and thus not necessitating the reopening of past debates.

Where the "line in the sand" method has been applied to achieve a target for prices or profit, the justification has typically been that there should be a presumption that current prices are broadly appropriate, unless there are sound reasons to affect a change. As noted above, the assumption here is that the reason for applying the building block approach is to improve the rigor (and incentive properties) of future regulation, rather than to affect an immediate change in outcomes.

Unrecovered investment cost

A number of regulators have opined that a desirable basis for setting an initial regulatory asset value is one that would be expected to allow the asset owner to recover the cost of assets over the lives of those assets – meaning that the initial value should be set at the currently unrecovered cost. However, such an objective has seldom been applied in practice. The reason for not applying such a method is

that it is difficult to deduce the unrecovered cost for assets that may have been installed sometime in the past, and any such estimate is sensitive to the assumptions made.

That said, an estimate of the unrecovered cost has been applied in situations of recently constructed assets for which a cost-based price had been determined, and so where inferring the unrecovered cost has been a more practicable matter.

Transaction value

There have been a number of cases where there have been transactions around assets (such as a privatisation) and regulators have drawn an inference as to what may be reasonable in the circumstances from that transaction. However, the usefulness of a transaction value in setting the initial asset value will depend on the circumstances of the relevant transaction. For instance, if there was a view that the transaction value may have been affected by a belief that the transaction value would determine (or influence) the regulatory asset value, then a circularity would exist and it would be difficult to place weight on the transaction value.

1.2.3 Appropriate methods for setting the initial regulatory asset value for Chrous' networks

Recommended method – 'line in the sand' method applied to generate current and expected prices

It is our view that the most reasonable and practicable means of deriving the initial regulatory asset for the Chorus copper and fibre networks is to apply the 'line in the sand method'. The method should be applied to carry-over existing and expected prices to the building block regime. Our recommendation reflects the fact that a credible process has been undertaken to establish prices for both copper and fibre services. Applying the 'line in the sand' method in this manner would:

- Deliver price stability, and so avoid disruption to parties who had made sunk investments on the basis of current regulated prices
- Not be expected to cause a material change in the financial position of the asset owner, and
- Avoid reopening debates that have characterised the TSLRIC exercise in particular.

In addition, if a "line in the sand" valuation is applied, then:

- the setting of the initial regulatory asset value will be independent of assumptions about how shared costs should be allocated between the copper and fibre services, and
- there should be no need to make an explicit adjustment to the initial value to account for the government assistance with the fibre rollout (this is because it should be reasonable to assume that the prices that were set through the tender process are inherently net of the value of the subsidy provided by the Government).

We observe that it would be possible, in principle, to apply the "line in the sand" value to carry over an asset value from the current regime, which would involve commencing with the asset value that was used for the TSLRIC price calculations for copper services. However, we note that a series of adjustments would be required to make this asset value appropriate to be included in a building block regime. This would also imply extending the application of the TSLRIC asset value from just the

services provided by copper assets at present, to both copper and fibre assets, the appropriateness of which could be questioned.[4]

Other valuation methods

Replacement cost methods

It would be feasible to value the copper and fibre networks with reference to a replacement cost method, and to do so would be consistent with the approach that has been adopted in a number of regulatory decisions. However, the objection that could be made to this approach is that it would not give recognition to the processes that had gone into establishing current prices, and the expectations that were thereby created. Instead, it would be akin to the application of regulation for the first time. In addition, debates that have occurred and been settled (in relation to the copper network) would be reopened, which can be argued to be unnecessary and inappropriate. In contrast, our preference for the 'line in the sand' valuation stems from it establishing an initial regulatory asset value that maximises the degree of continuity between the pre- and post-2020 regulatory regimes.

In addition, a number of complex issues would arise from applying a replacement cost valuation in the context of Chorus's copper and fibre networks, which stem from:

- the existence of parallel copper and fibre networks in many areas
- one of the networks (copper) having a limited service life, and
- the characteristics of the fibre network, being a recent construction with growing demand.

However, we note that if there was a desire to set an initial regulatory asset value for the fibre network that reflects the unrecovered investment cost – which requires an exogenous value to be assigned to the shared assets – then it would be appropriate to value those shared assets using a replacement cost valuation.

Unrecovered investment cost

We do not think it is feasible to attempt to set an initial regulatory asset value for the copper network that reflects an estimate of the unrecovered cost associated with this network. The information available to undertake such a calculation is unlikely to be available, it would require an attempt to separate out the contribution to the copper network from previously bundled sales and would be expected to be very sensitive to key assumptions (like the commercial discount rate).

Indeed, we conclude that there is no logic to any *a priori* assumption that a DAC value for copper assets will permit past investment costs to be recovered. In our view, the value for the initial RAB that is sufficient to permit past costs to be recovered is an empirical question, but one that cannot in practice be solved. Consequently, we think that an objective of trying to establish an opening RAB for copper assets such that past investment costs are recovered (but no more) is not a useful or appropriate objective.

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[4] For example, a regulator may be comfortable with applying a higher level of optimisation if the task is set prices for a service that employs "old" assets than would be the case where the service is provided using recently constructed assets.

In relation to fibre assets, we observe that it is more practicable to calculate the unrecovered investment cost (although complexities remain – including from the fact that many assets are shared between copper and fibre and how risks are assumed to be shared between the asset owner and customers). However, if there was an intention to set the initial RAB for the fibre assets at the unrecovered investment value in 2020, it is essential for this to be based on an empirical estimate. Accounting depreciation would be expected to provide a poor proxy for the amount of investment funds that would have been returned during the first decade for a new project like the fibre assets.

1.3 Structure of this report

This report is structured as follows:

- Chapter 2 discusses the overall objective for setting an initial regulatory asset value as well as the principal methods that have been applied by economic regulators in past decisions.
- Chapter 3 provides our analysis of the method for setting an initial asset value that is likely to be most appropriate in the context of Chorus' copper and fibre networks.

2. Regulatory approaches to setting the initial regulatory asset value

2.1 Introduction

The purpose of this chapter is to outline the methods that may be used to establish an initial regulatory asset value having regard to economic principles and regulatory precedent. We first also set out the overall objective for setting an initial asset base.

2.2 Objective for setting an initial regulatory asset base

The initial asset value that is applied for regulation under the building block approach is a matter of significance to the regulated business and its customers and as such has generated substantial debate in regulatory hearings in New Zealand and abroad. The primary complication for establishing an initial asset value when transitioning to the building block approach is that the assets in question will be part way through their lives. Economic principles, however, do not provide definitive guidance on how assets that are part way through their lives should be valued. Instead, economic principles prescribe a range, and a potentially wide range, as to what should be assessed as the value of assets to be regulated:

- The lower bound valuation is opportunity cost. This is the value the assets would have in their next best use. It represents the lower bound because if a lower value was set the business would have a financial incentive to stop providing the regulated service and transfer the assets to their alternative use. It is worth noting that the value of almost all infrastructure assets in their next best use is very low.

- The upper bound valuation is the value that would encourage users to bypass the regulated infrastructure and provide (inefficient) duplication of the infrastructure. This value for a network is often very high.

The principle that is typically applied by regulators, in the context of this potentially wide range, is to seek to determine something that is fair. This is often described as an objectively reasonable value, or as one that creates an (objectively) reasonable balance of interests between parties. A fair outcome in this context is consistent with economic efficiency. By setting a fair starting value investors are more likely to expect the regulator to exercise its discretion in a manner that is fair, and so be more willing to invest. This reflects the high importance that certainty and predictability have in promoting efficient investment given the long economic life of the assets involved in the regulated infrastructure sector.

Importantly, economic principles do provide clear guidance as to how the regulatory asset value – once established – should be updated over time. The initial value should be updated by adding actual capital expenditure that has been undertaken and reduced for the return of capital that has been factored into prices, and thereby returned to investors (regulatory depreciation). Updating the regulatory asset value in this way means that capital costs will flow through into the building block revenue requirement and so into prices, thus creating the incentive for investments. Ensuring this incentive persists, however, requires that the initial value is maintained and not offset by some adjustment at a later time. This method of establishing an initial value and then providing some certainty over its recovery is commonly referred to as the "lock-in and roll-forward" approach.

2.3 Methods for establishing the initial regulatory asset value

We have identified four approaches applied by regulators as a means of achieving an initial regulatory asset value are considered to be objective reasonable. Those approaches are:

- The outcomes of a competitive market, or replacement cost valuations
- The "line in the sand" method
- The value that will permit the actual investment cost to be recovered over the life of the asset (unrecovered investment value), and
- Transaction values or expectations created during a transaction.

In the remainder of this section we will describe each approach and the rationale for its use by regulators.

2.3.1 Outcome of a competitive market – replacement cost valuation

At its simplest, a replacement cost valuation is the cost of replacing the existing assets on a new-for-old basis. This means it involves estimating the cost of constructing the infrastructure assets at the present time. In practice its application is more complex than this. Instead, replacement cost valuation is usually undertaken taking into account available modern technologies to provide the relevant service. In addition, the approach typically sees the scaling down of the estimated optimised replacement cost of an asset to reflect the lower value of the existing (old) asset relative to a new asset.[5] This approach is referred to as the 'optimised depreciated replacement cost' or 'optimised deprival value' method.[6]

The principal justification for the use of a replacement cost valuation is that it is the estimate of the outcome if there was a (hypothetical) competitive market.[7] That is:

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5 We note that the standard approach applied by regulators has been to use either straight-line or annuity depreciation so to scale down the cost of the new asset to take account of the expired age of the asset in place.

6 The way in which the term "optimised deprival value" (ODV) is used in New Zealand is analogous to the use of the term "optimised depreciated replacement cost" (ODRC) in Australia. In New Zealand usage, ODV reduces to ODRC unless an alternative technology to the asset in question is available (in which case, an additional level of optimisation is applied), whereas the same question is typically (although not universally) built into what is described as ODRC in Australia. Confusingly, some regulatory decisions have labelled a "line in the sand" valuation focussed on the existing price as an ODV.

7 The High Court in hearing the appeal against the Commerce Commission's 2010 Input Methodology accepted the proposition that a replacement cost valuation (ODV) is the valuation consistent with generating prices that would be observed in a workably competitive market (see, Wellington International Airport Ltd & Ors v Commerce Commission [2013] NZHC [11 December 2013], para.566 and the preceding paragraphs. The Court's reasons for not requiring new replacement cost methods to be applied related to the questions of whether a new replacement cost valuation was necessary to meet the purpose statement in Part 4 of the Commerce Act and, if not, whether this was desirable.

- By valuing the collective assets at the cost that would be incurred by a hypothetical new entrant (building a new but optimised network), and depreciating to account for the difference in forward-looking cost of using the old asset compared to the new asset, you obtain the price that would be observed in a hypothetical competitive market for the service, and

- By valuing individual assets at their replacement cost (and so depreciated according to the difference in the forward-looking cost of using the old asset compared to the new asset), the value of the individual assets in a theoretical market for second hand assets is obtained. Equivalently, replacement cost values provide an estimate of the loss that would be suffered if the owner would be deprived of an asset (in cases where the asset would be replaced), which is the basis of the 'deprival value' method of valuation.

Replicating the outcomes expected in a hypothetical competitive market rests with the proposition that this is an inherently fair and reasonable thing to do. That is, it is reasonable for regulated sectors to be treated no more harshly than unregulated sectors.

A second rationale for using a replacement cost valuation – and one that is often implicit rather than stated – is that it is a valuation method that can be applied to derive a meaningful valuation for a set of physical assets without any knowledge of the historical timing or quantum of expenditures, and subsequent revenues. Rather, all that is required is information on the stock of assets in place, and their condition (that is, expected remaining life). Thus, the method has the practical advantage being implementable, and also of ensuring that every asset that is currently in service is recognised and assigned a value.

It is relevant to note also that when applying a replacement cost valuation approach that it has been common for regulators to check that it delivers outcomes that appear to be objectively reasonable. We are aware of many instances where regulators have expressed approval with a replacement cost valuation method but then applied adjustments to the value so to achieve an outcome that is considered to be objectively reasonable. This is typically with respect to a certain outcome for prices.

For instance, in Victoria adjustments were made to the values implied by the application of the ODRC method for the electricity distribution networks. The reason for this was to unwind existing cross-subsidisation between distribution regions while also facilitating a degree of equalisation of retail prices through the state post privatisation. The cross-subsidisation had emerged as a consequence of existing retail electricity prices designed to ensure uniformity of prices across rural and urban areas. It is important to recognise also that because the Victorian distribution networks were government owned at the time of the valuation that the consequences of the alternative valuation were internalised by the Government rather than imposed on private owners.

2.3.2 'Line in the sand'

After replacement cost valuation approaches the most common approach to establishing an initial asset value for regulatory purposes has been to carry-forward either an aspect of the regulatory regime, or the outcomes (and expectations) that existed prior to the transition to the building block approach. This is referred to as the 'line in the sand' approach in economic regulation. There are two subset methods for applying the 'line in the sand' approach. We set out each of these here.

The first subset of the 'line in the sand' method is relevant to situations where there has been a regulatory regime in place that endorsed and used an asset value in a manner that is consistent with

how regulatory asset values are used under the building block approach. In this case, assuming there is no reason to question the reasonableness of the outcomes under the former regime, there is no pressing need revisit asset values. Therefore, the existing value can transition from one form of regulation to another.

Transitioning a value from one regulatory approach to another is one that has been adopted in the New Zealand context by the Commerce Commission in the 2010 Input Methodologies for the regulated NZ businesses (gas pipelines, electricity networks and airports). The relevant firms had been subject to information disclosure and, in some cases, control, all of which relied upon a regulatory asset value. In addition, the asset values had been applied in a manner that was directly comparable to how values are used under the building block approach. That is, the values were used to measure actual profit, reflecting actual expenditure and sales. Similarly, the regulatory asset values for the Australian airports (which are subject to a form of information disclosure) were also based upon asset values that had been used in the previous emanation of the information disclosure regime.[8]

The second subset of the approach has been more commonly applied in economic regulation than the first. This application of the 'line in the sand' method involves commencing with an outcome prior to implementing the building block approach, and then "reverse engineering" the initial regulatory asset value to carry-over the same outcome (at least in an expected sense) under the building block approach. Most commonly the current, and/expected, level of prices is the value that is carried forward.[9] However, the method has also been applied to carry-over a measure of profit; the implications of this choice are discussed below.

The rationale for adopting the 'line in the sand' approach based on an outcome such as current prices is that normally this is an outcome that is seen as objectively reasonable. That is, where there is no strong reason to believe that current prices are too low, and nor is there a pressing case that current prices are too high. There are also cases where regulators have referred to current prices as setting a reasonable expectation about what all parties should have expected at the transition to the building block regime. The application of the approach in this way is seen as a means to improve the conditions for future investment while simultaneously reducing the scope for windfall gains or losses flowing to asset owners or customers.

We note that this subset of the "line in the sand" approach is more general in its potential application than the subset discussed earlier. That is, there is no requirement for the existing prices to be have been set transparently on the basis of an asset value, or for any asset values to have been applied in the same manner as they would under the building block approach.[10] Thus, the method caters for situations where prices had been determined using less formal techniques (as was common in the past for government owned businesses) or through some form of competitive tender process.

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8 In the case of the NZ firms and the Australian airports, the key change from moving to the new regime was to provide greater detail about how the regulatory asset value would be carried forward in the future, implementing the "lock-in and roll-forward" approach discussed above.

9 It is important to note that when applying the 'line in the sand' approach that under the standard application of the building block approach there is no guarantee that the intended outcome would result in practice. This is because actual outcomes would be affected by changes in demand, expenditure and financing costs compared to the original forecast.

10 We comment in the next chapter that an asset value under a TSLRIC regime is applied in a different manner than an asset value in a building block regime, in that the former is applied in combination with hypothetical expenditures and demand rather than actual values.

The "line in the sand" method has been applied extensively in Australia, and has been manifest either in adjustments to some form of starting asset value so that an intended price outcome is generated, or as the principal method for asset valuation. The former (adjustments) has been applied for a number of Australian energy network businesses and to Telstra, whereas the latter (principal method) has also been applied to a number of energy network businesses and to a number of regulated water businesses.

It was noted above that the "line in the sand" method could be (and has been) applied to carryover either an existing level of prices or an existing level of profit (in absolute dollar terms). The choice between the two determines who bears (or receives) the consequences of changes in future costs or demand from current levels.

- If the initial regulatory asset value is calculated to carryover existing prices, then the asset owner bears (receives) the consequences of changes in demand and costs from current levels, whereas

- If the initial regulatory asset value is calculated to carryover existing profit, then the initial value will be determined on the assumption that the asset owner passes through into prices the consequences of changes in demand or costs.

In the majority of cases we are aware of, the initial regulatory asset base has been derived on the assumption that current prices will be carried over. In the principal case where existing profit was intended to be carried over – a number of the businesses in the Victorian water sector – the regulator believed existing prices to be been held down for political purposes, and that it would be desirable for prices to increase over time as replacement capital expenditure was undertaken.

A 'line in the sand' valuation method, by its nature, necessarily provides an implicit valuation of all assets whose costs are to be recovered through the price in question. In addition, the line in the sand method will also will also only reflect the extent of benefit that flows to the asset owner from the service in question, and so would be net of the benefit from public subsidies or other contributions to the extent that those transfers are impounded into the existing price.

We note that given the 'line in the sand' approach is simply back-calculating an initial RAB that is consistent with a certain outcome (such as a price level), it could in principle be applied to derive a RAB that is consistent with any outcome for prices. If an argument can be made that a different price level would be reasonable, then a starting RAB could be determined for that alternative price level. However, the difficult task in this context is establishing what alternative price level is reasonable. Unless it is possible to benchmark the final price (which is normally difficult for infrastructure services, and has proven so for copper services in New Zealand) then the standard method for testing whether a price is reasonable is to add up the costs of the services – of which the asset value is an input.[11]

[11] The Victorian regulator (in relation to the government-owned water sector) performed the role of adviser in relation to the initial asset values (the government formally set the values). In its advice, the regulator also reported on the financial ratios that would be generated under existing prices and noted that prices would need to be increased from existing levels (and for the initial regulatory asset value to be set commensurately higher) for several businesses if the government wanted reasonable confidence that the businesses would remain financeable without a future equity injection.

2.3.3 Unrecovered investment value

It has been common for regulators to state that a desirable objective for the initial RAB is the value of the investment that has been incurred and remains unrecovered today. That is, to ask the question: given the initial cost of the asset and the net revenue that has been received to date, what residual value is required to deliver a NPV=0 for the project?

Using the unrecovered costs of the assets as the initial RAB, however, has seldom been applied as the approach to deriving an initial asset value in economic regulation. This is because applying it in practice to assets that are decades old is fraught given the information required to quantify past returns is typically not available. It requires information of the original costs incurred and past expenditures and revenue since the construction of the assets, as well as a discount rate (commercial return) assumed for the period to date, and is very sensitive to this latter parameter. In addition, if such a method were to be used to set an initial value, then it would have the effect of impounding into the starting RAB a wash-up for all previous returns – that is, if excess returns had been made historically, then the initial RAB would be set lower to claw these back, and if poor returns had been made then a higher RAB would be set to allow a top up of past returns. This outcome could be seen as implying an undesirable re-allocation of risk.

We note that at times it has been asserted that accounting book value (depreciated, unindexed historical cost) is a proxy, or indeed a measure, of the unrecovered investment value. It is our view that there are very good arguments as to why this is not the case. When the price for infrastructure assets are set sensibly the return of capital is naturally back-ended, and even more so if demand is growing.[12] This means that it is very plausible for the unrecovered investment value to be multiples of the accounting book value part way through the asset's life. Therefore, applying this method without proper regard for this back-ending of returns, such as through the capitalisation of the unrecovered amount, would mean that the asset value used would not in fact represent the unrecovered investment value but instead would be potentially significantly less than the required amount.

The ACCC's initial asset value for Telstra in 2011 is perhaps the closest example of which we are aware of a regulator relying on an accounting book value to establish the initial asset value. Having said that, however, the ACCC increased the value of certain assets from the accounting values in order to achieve a target price outcome (namely, price stability) for a key service (the unbundled local loop), and so to that extent it provides a precedent for a "line in the sand" valuation. In relation to the assets that were valued at their book values, we find it difficult to deduce the ACCC's reasons, and there are contradictory statements in the decision as to whether the ACCC considered the book value to represent the unrecovered investment cost. We observe, however, that the position of Telstra in Australia is quite unique: while Telstra is the owner of the legacy infrastructure, a different entity (NBN Co.) is constructing the National Broadband Network. It is plausible that the ACCC thought that there was less risk that the character of its decision may affect future fixed line

[12] This is the same as saying that infrastructure assets will typically make low accounting returns (and often losses) in the early years of their lives. The unrecovered investment value can be expressed as the sum of the accounting book value and the difference between the historical return earned and a commercial return, carried forward to the current time using the commercial return as the discount rate.

telecommunications investment than would ordinarily be the case. This is a very different context to that in New Zealand.[13]

There are a number of cases where building block regulation has been applied to assets that were built reasonably recently (generally in the preceding decade) and where an estimate of the unrecovered cost (via an explicit calculation) has been used. However, in the two cases of which we are aware where an explicit calculation has been applied, the case for applying an estimate of the unrecovered cost was made stronger from the fact that prices had been set on the basis of cost, and there was some degree of government oversight of the initial prices. This made the process of estimating the unrecovered value more objective and also meant that the valuation method in that case had an element of "line in the sand" logic to it. That is, rather than giving continuity to a current price, the effect of the method was to give continuity to a tariff model.

2.3.4 Transaction values or expectation created during a transaction

Where assets have been recently privatised there are cases where regulators have set the initial RAB based on recent transaction prices (the case for many of the UK assets), or based on representations made during the privatisation process (the case of a major gas pipeline in Western Australia). However, these cases are now somewhat old and outdated (the UK precedents were late 1980s / early 1990s) or were very specific to the behaviour of a government during a transaction.[14]

There is a circularity to basing the regulatory asset value on the expected profitability of the business (and so its value in a transaction). That is, if the purchaser believes that the sale price will influence the regulated asset price – and thereby its future revenue stream – then this will influence how much it is willing to pay for the assets. Therefore, it is generally not considered appropriate to rely on these values for establishing the initial asset value. However, the usefulness of information from a transaction will depend upon the circumstances of the transaction.

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13 A second contextual difference between Australia and New Zealand is that Telstra in Australia is vertically integrated (in relation to legacy infrastructure), and is the largest user of the regulated fixed line assets. This vertical integration provides a greater incentive for Telstra to invest in the access service than would be the case where there was vertical separation, and it is also plausible that the ACCC took account of this additional incentive for investment when setting the initial RAB. Again, this contextual factor is different to that in New Zealand.

14 The case of the Dampier to Bunbury pipeline is a stand-out in the context of setting an initial asset value in Australia. In this case, while the transaction value of the business was not relied upon to set the initial RAB (the Supreme Court directed the regulator to consider this value – but also to pass judgement on whether it was reckless – and the regulator concluded that the price was reckless), the regulator found that the expectations of the business were infected by statements by the Western Australian Government during the sale. The result was that the regulator set an opening RAB value that exceeded the ODRC value (by approximately 25 per cent), although this was still substantially lower than the purchase price.

3. Approaches to the initial asset value for Chorus

3.1 Introduction

This chapter applies the previous discussion on regulatory approaches to establishing an initial asset value to the Chorus fibre and copper networks. The objective being to identify which approach, or approaches, might deliver an objectively reasonable initial RAB. This means an initial RAB that balances the interests of Chorus as well as its customers.

3.2 Relevant context for Chorus

It is important that the consideration of appropriate approaches to setting an initial asset value is placed in the appropriate context for Chorus and its current operating environment. Context that we consider is relevant to this matter includes:

- It provides both copper and fibre services, with some assets dedicated to each (cables, equipment) and some assets that are shared (ducts and buildings)
- The copper and shared assets were typically installed some time ago, although there has been substantial investment in shared assets (such as restoring ducts and building new ones) and high rates of investment in some parts of the copper network continue (i.e., to meet the growth in demand for fixed line data)
- The fibre assets are all recently constructed (construction would have been over the 10 years to 2020), which has taken place under a contract with Crown Fibre Holdings. A consequence of this contract is that a price is determined and there is a government provided subsidy
- There is a regulated price for the copper services, and the first TSLRIC price has recently been determined. The TSLRIC price was calculated on the assumption that there is a single fibre network serving all of New Zealand and that that network has all of the fixed line customers. This assumption is hypothetical; in reality:
  - In areas where the fibre networks are being constructed, customers will have the option to remain on the copper network, and so Chorus may be required to keep parallel networks in service for an extended period, with the networks sharing the customers (Chorus will be the owner of both networks in about 50 per cent in cases where there are parallel networks)
  - About 30 per cent of connections will remain on the copper network.

3.3 Recommended valuation method – 'line in the sand' applied to prices

In our view, the most reasonable and practicable means of deriving the initial regulatory asset value for Chorus's copper and fibre networks is to apply the 'line in the sand' method focussed on carrying-over existing and expected prices to the building block regime.

It is our view that there is currently no readily usable asset value for copper or fibre assets that could be carried-over from the current period (this is elaborated upon below). However, the 'line in the sand' method allows for acknowledgement that credible frameworks or methods have been applied to

develop current prices and that there is no reason to consider that these prices are unreasonable. Further, applying the approach across both the copper and fibre networks means the initial regulatory asset value is independent of any decision on how the shared assets should be allocated between the copper and fibre services.

Our views on applying the method to both the copper and fibre networks are set out below. However, we note upfront that an important practical issue with applying the 'line in the sand' method is the choice of depreciation method. This is important because the return of capital (regulatory depreciation) needs to be consistent with the revenue that is associated with the target level of prices for the "line in the sand" calculation. Applying a different depreciation method when setting the initial RAB (and then subsequently when setting prices) would result in future prices departing materially from the target.

3.3.1 Application to the copper network

A regulated price already exists for copper services. The regulated price was established by the Commerce Commission having regard to the objective for the regime and involved considerable stakeholder involvement in setting prices. As such, a change in regulation does not automatically invalidates the prices for copper services.[15] Instead, setting an asset value that is founded on current regulated prices would:

- deliver price stability, which is beneficial for other parties that have made sunk investments on the basis of current regulated prices
- maintain the current market value of the assets to the asset owner once the building block approach is applied, and
- avoid the appearance of regulatory opportunism that would arise if there was a substantial change in price merely due to a change in the method used to calculate regulated prices.

It is our view also that our recommended approach would be consistent with past practice by the Commerce Commission. For the electricity and gas networks, as well as for airports, the Commerce Commission chose to use an asset value that had been developed and applied as part of a previous robust process rather than to update the value at the time that there was a change to the approach to regulation. Effectively what was done was to draw a 'line in the sand' at the time that asset values were previously determined and to update the values based on actual expenditure that had occurred in the interim.

3.3.2 Application to the fibre network

It is apparent that a robust approach was also taken to establishing fibre network prices. The price was established through a competitive market tender process conducted by the Government for the roll-out of the fibre network. The implication being that the outcomes from deriving the initial asset value

[15] We note, however, that this does not also imply that the approach used for setting those prices should continue into the future. It is our view, and apparently the view of the MBIE, that there are good reasons for moving from the TSLRIC approach to the building block approach. Not least that the increased certainty of the building block approach is more likely to promote efficient ongoing investment into the future.

based on these prices would be objectively reasonable. We consider, as is the case for the copper network, that deriving the initial asset value on the basis of current prices would deliver price stability and also maintain the market value to the asset owner.

In addition, it should be reasonable to assume that the prices that were set through the tender process are inherently net of the value of the subsidy provided by the Government. That is, as the outcome of the tender was the price that Chorus would receive, it should be reasonable to assume that the benefits of the subsidy would have been passed through to customers as a consequence of the competitive process. This means that if the 'line in the sand' method is applied, there should be no need to adjust for any deemed value associated with the subsidy.

3.3.3 Advantages of applying the 'line in the sand' approach to both copper and fibre networks

As suggested above, we consider that there is a benefit from applying the 'line in the sand' approach to both the copper and fibre networks. The main advantage is that it avoids the need to address issues of allocation between copper and fibre. There are assets that are shared between the copper and fibre networks, as well as assets that are used exclusively by each network. Under alternative methods it would be necessary to split out the shared assets and ascribe a value to these so that they can be properly apportioned to the fibre and copper networks. Conversely, this apportioning is already inherent in current prices such that if the 'line in the sand' method is applied to both the copper and fibre networks the joint revenues can be assumed to cover both dedicated copper and fibre assets and the shared assets. The combined initial RABs will be unaffected by any assumed allocation.

3.3.4 Justification for using prices rather than a different value when applying the 'line in the sand' approach

It is important to be clear that our recommended approach is that the 'line in the sand' method be applied to carryover existing and expected prices, rather than to carryover an existing asset value or measure of profit. Our reasons for the focus on prices are as follows.

- Not applied to asset values – there is no immediately useable asset value from the current TSLRIC regime for copper, and no asset value for the fibre services. In relation to the copper services, while the estimation of TSLRIC prices required the estimation of a current cost of a replacement network, this asset value was combined with a series of hypothetical inputs to generate the price (i.e., the calculation used hypothetical expenditure and demand rather than actual values). This means that to attempt to use the implied asset value under the TSLRIC approach would require a series of complex adjustments to account for the differences between hypothetical and actual values.[16] While it is therefore possible to use this approach, applying the

[16] In submissions to the MBIE discussion paper on the approach to telecommunications regulation, such as from Economic Insights, it was said that if the 'line in the sand' asset valuation method is applied based on the TSLRIC outcomes then it would be inconsistent to apply actual capital and operating expenditure forecasts when using the building block approach to set prices in the future (as there would be a need to use expenditure forecasts that are consistent with the new and 'optimised' asset). While we agree with the potential for inconsistency that was raised, we think that the more appropriate response to this inconsistency (in the context of the building block approach) is to adjust the initial RAB so that

'line in the sand' method on the basis of prices, rather than asset values, addresses any concerns associated with applying the method together with forecasts of actual expenditure and demand.[17]

- Not applied to profit – the effect of continuing the TSLRIC regime to the copper network is that Chorus would have borne the loss of value of its copper network as utilisation declined, and the same consequence is carried over by applying the line in the sand regime to prices. In relation to the fibre network, we note that the competitive tendering process was focussed on the *price*, and it is reasonable to assume from this that a bidder into that process would have expected to make low levels of profit (or losses) in the early years (when connections and so revenue were low), but for this to be offset in later years as connections (and so revenue) grew. Again, this outcome would replicated by setting an initial regulatory asset base that is intended to carryover the existing price rather than existing profit.

3.4 Consideration of alternative valuation methods

In this section we set our views on the appropriateness of valuation methods that have been put forward as alternatives for deriving the initial asset value for the Chorus copper and fibre networks.

3.4.1 "Competitive market" valuation methods

As discussed above, the main alternative to the "line in the sand" method that has been applied by regulators is a valuation that seeks to replicate the outcome that would be seen in a hypothetical competitive market. To reiterate, a competitive market valuation method would see the assets required to deliver the relevant services revalued at replacement cost with depreciation then applied to account for the difference in the forward-looking costs of using the old asset compared to the new asset.

The principal argument for applying a replacement cost is it is consistent with much of the precedent on the establishment of an initial asset value for other regulated industries. This weight of precedent, in turn, stems in part from the proposition that it is inherently fair to treat asset owners in regulated industries commensurate with how the same firm would be treated in a market that was subject to workable competition. Also, applying a competitive market valuation method is a pragmatic option for establishing an initial valuation where there is an absence of complete information on original costs or the capital that has been recovered to date.

However, we note that there are also arguments that could be raised against the application of a replacement cost valuation.

Most importantly, in most of the cases where a new replacement cost value has been applied it has been one where formal cost-based regulation has been applied for the first time, and there was a concern about the appropriateness of pre-existing prices. In the case of Chorus, however, regulated

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it is appropriate to pair this with actual operating and capital expenditure in the future. These are the adjustments we refer to here.

[17] As a further matter, if the "line in the sand" method was to be applied to asset values, then it is assumed that the starting point would be the asset value that was used to set the TSLRIC prices for the copper services. However, the effect of this would be to extend the TSLRIC asset value to both copper and fibre assets (whereas to date it has only applied to copper). Whether this is reasonable would need to be tested – for example, it is plausible that the Commerce Commission applied a higher standard of optimisation when setting the TSLRIC prices than it would have if it thought that the implications of its decision would extend beyond the legacy assets.

prices have been determined for the services of both the copper and fibre network, the former through a detailed consultation by the Commerce Commission against a TSLRIC standard and the latter through a competitive tendering process undertaken by the Government. Consequently, the transition to the building block regime from 2020 (assuming this occurs) may better be interpreted as merely a change in the form of regulation. Accordingly, one objection of applying a replacement cost valuation is that this would imply unnecessarily and inappropriately reopening debates that have occurred and been settled (in relation to the copper network). A "line in the sand" valuation, in contrast, would result in the initial regulatory asset value being established in a manner that maximises the degree of continuity between the pre- and post-2020 regulatory regimes.

In addition, applying a "competitive market" valuation method in the context of Chorus's networks raises a number of difficult conceptual issues that extend beyond those that have been experienced in other industries.

- First, the establishment of the "optimised" network raises the question of whether it should be assumed that there are two networks operating in parallel (and with the costs of each therefore counted), or that an assumption is made that only one network could be built today (i.e., fibre) to provide the services of each.

- Secondly, in relation to the copper network, an implicit assumption behind the concept of ODV is that the market served by the assets continues in perpetuity. This assumption means that the value of the current assets can be determined solely with reference to forward-looking costs. However, with the construction of the fibre networks, it is expected that the copper assets will not be replaced and may well be decommissioned well before they reach the end of their technical lives. An issue arises, therefore, as to how this shortened life should be addressed when setting an initial regulatory value.

Both of these issues were addressed during the Commission's determination of the TSLRIC price for Chorus' copper services. As the Commission assumed a single fibre network and assumed that it served the whole market, the TSLRIC price therefore assumed a single network and assumed that that network would continue providing service in perpetuity. However, those positions were adopted in the narrow context of applying a standard TSLRIC calculation for telecommunications services. A more standard application of the competitive market valuation method would have regard to the regulatory requirement for Chorus to own and maintain two separate networks (at the current time at least), and factor this into the assumption made in this valuation about the optimal network.

In addition, there is also a prospect that applying a replacement cost valuation method to the fibre network could result in the investor suffering a windfall loss, although this depends on the extent of increase in replacement costs over the period in question. This prospect arises because, where the installation of new infrastructure involves the majority of the cost being incurred upfront but utilisation only growing over time, it would be expected that a full commercial return would not be possible in the early years (let alone a return of capital being achieved). Thus, in order for the project to recover its costs (i.e., achieve NPV=0), there would be a requirement for these early losses to be capitalised and recovered in the future. This, in turn, can mean that the unrecovered cost of a new asset is materially higher than the replacement cost in the early years of the asset's operation. A standard replacement cost valuation would focus only on the current costs required to serve projected demand, and thus ignore the possibility that substantial losses may have been made (and unavoidable) up until to that point in time.

There are, however, limited circumstances where we would recommend applying a replacement cost valuation method. This is in relation to assets that are shared between the copper and fibre services, if the regulatory value for the copper network was derived using the "line in the sand" method, but a regulatory value of the fibre network was derived on the basis of the unrecovered investment cost of the assets in question. We discuss this possibility in the next section, and note that attempting to estimate the unrecovered cost for the fibre network is more practicable than for the copper network (albeit with some difficulties still remaining). We also note in the next section that, in order for this combination of methods to be applied, an explicit valuation of the shared assets and an allocation of these costs between the two networks is required.[18] In relation to these assets, the conceptual difficulties with applying a replacement cost asset valuation to telecommunications networks would not arise because:

- the assets do not embody duplication, but rather would be required for either copper or fibre services, and
- The assets will continue to be used – and be replaced at the end of their service lives – and so there is no complication associated with the assets having a limited remaining life.

Given that an exogenous valuation would be required for the shared assets in this circumstance, we think that it would be reasonable to value those assets at the value that they would have in a competitive market (or, equivalently, in a liquid second hand market).

3.4.2 Unrecovered investment value

As discussed in the previous chapter, an objective for setting the initial regulatory asset value for existing assets that may appear reasonable at first sight is to derive a value that would be expected to allow the asset owner to recover its original investment cost over the life of the asset. However, the information required to estimate such a value – and the sensitivity of the resulting value to the assumptions that are required – means that such a method is infeasible except in situations where the investment in question has been recent. In this section, we discuss the challenges with estimating an unrecovered investment value for the copper and fibre networks in turn.

The discussion in this section assumes that if the unrecovered investment value was to be applied to set the initial regulatory asset value for either or both the copper and fibre networks, then the value derived would be estimated from an analysis of past expenditures and revenue. The alternative that has been advocated by some is to merely assume that the accounting value of the network would provide an accurate measure of the unrecovered portion of past investments. In our view, there is no sound basis for assuming that accounting values would provide an unbiased proxy for the unrecovered investment cost, indeed, in our view, there are sound reasons to believe that such values would typically materially understate the unrecovered cost of past investments. We explain this further in the following section.

[18] We would envisage that an allocation of this shared cost over the period to 2020 would be applied when estimating the past returns from the fibre services, and an allocation of this cost over the period from 2020 would be factored into costs being recovered under the target price for copper services that is applied in the "line in the sand" valuation.

Challenges with determining the extent of past recovery

The issue with relying on the cost that was originally incurred for the assets is that it will only solve part of the problem of finding the unrecovered investment cost. The unrecovered cost necessarily is the difference between the costs that were incurred, and the extent to which those costs have been recovered (or possibly not recovered, particularly if values are considered in nominal dollar terms) over the time since that investment was undertaken. As indicated above, it is our view that there is no clear justification for claims that accounting methods of depreciation should be assumed to reflect how costs had actually been recovered. Instead, we consider that there are sound reasons to believe that accounting depreciation would overstate (and possibly overstate substantially) the recovery of capital for infrastructure assets that had been priced historically in an efficient manner.

The propensity for accounting depreciation to overstate the extent of capital recovery where assets have been efficiently priced is illustrated with the following stylised example. The example is based on the following assumptions:

- a single asset with an original cost of 1000 and a life of 30 years, and
- a WACC of 10 per cent (in pre tax nominal terms for simplicity) and CPI inflation of 2 per cent per annum.

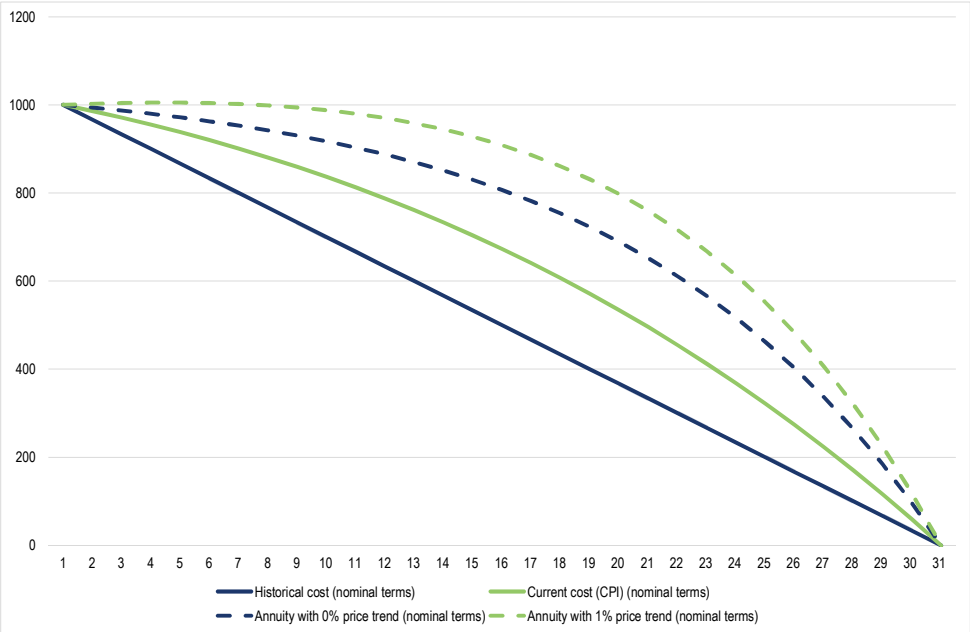
The two solid lines show the asset value over time under two different accounting approaches, being:

- HCA (standing for "historical cost accounting") – in which the value of the asset is depreciated on a straight line basis in historical cost terms, which is equivalent to the "DAC value" that EI and submitters advocate.
- CCA (standing for "current cost accounting") – in which the asset is depreciated on a straight line basis in real (or constant price) terms. This is standard form of regulatory depreciation applied for energy utilities in New Zealand and Australia.

The two broken lines then show the unrecovered investment value for the same asset under the assumption that prices had been set using the standard approach that has been used for setting TSLRIC prices in telecommunications for more than two decades, namely:

- using a constant annuity (i.e., zero price trend), being the blue dashed line, and
- using a tilted annuity with a 1 per cent (upward) price trend.

Figure 3 – Opening asset value (nominal dollars) – different recoveries of past investment



At the half way point of the asset's life (the start of year 16):

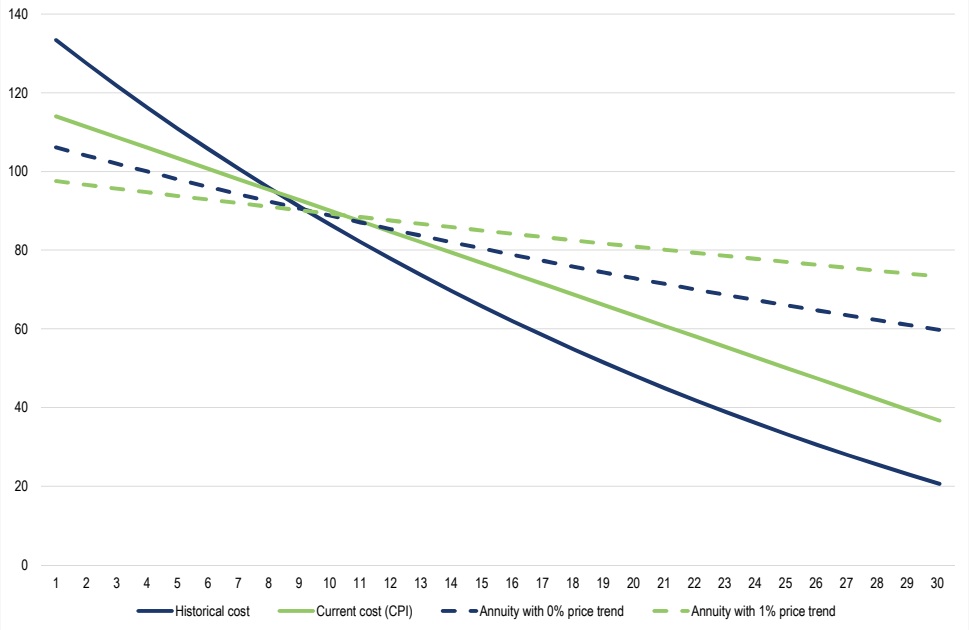
- The application of historical cost straight line depreciation (implicit in a DAC value) implies assuming that 50 per cent of the original cost of the asset had been recovered
- The application of current cost (inflation indexed) depreciation implies assuming that 33 per cent of the original cost had been recovered, whereas
- If prices had been set with reference to an annuity calculation:
  - 19 per cent of the original cost would have been recovered under a constant annuity, and
  - 9 per cent of the original cost would have been recovered under a tilted annuity with a 1 per cent price trend.

Stated alternatively, the residual value if prices had been set using TSLRIC with a 1 per cent price trend would be 1.82-times (182 per cent of) the DAC value. This highlights the point that merely getting accurate information on actual historical capital expenditure (like the "audited" figures that go into annual financial accounts) is not sufficient to determine the extent of past investment costs that have been unrecovered. In fact, getting accurate information on actual past expenditures does not eliminate what is arguably the most material source of error in the determination of the unrecovered investment cost.

The relevant question then becomes: if an arbitrary assumption is to be made about the pattern of past capital recovery, which is the patterns shown above is it more reasonable to assume took place? In turn, to test the reasonableness of the possible patterns of past capital recovery, it is necessary to examine what each implies about the time profile of pricing.

Figure 4 shows the time path of the price that is implied by each of the above patterns of past capital recovery. These prices are expressed in real (inflation-adjusted terms) in order to focus on prices on terms of a constant purchasing power.

Figure 4 – time path of prices implied by different patterns of capital recovery (real terms)



In all of the cases, prices would be assumed to be falling in real terms (the tilted annuity generates a 1 per cent annual price increase, whereas CPI inflation is assumed to be 2 per cent). However, it is clear from examining the figure that the time path of prices that is assumed by historical cost depreciation would be unusual and extreme – by year 16, the price in inflation-adjusted terms would be less than half (46 per cent) of the initial price. A time path of prices that starts at a very high level and then declines sharply would not be expected to be consistent with the efficient use of the asset, nor with a fair spreading of the cost of the asset over different generations of users. In contrast, the annuity-based pricing schemes – which would generate a reasonably flat time path in pricing in real terms – would be more consistent with an efficient and fair spreading of cost over time.

Thus, to the extent that there is a desire to make an arbitrary assumption about the extent of past investments that have been recovered, then the stylised examples provided above suggest that there is no reasonable basis for assuming that past investments had been recovered as assumed by historical cost depreciation. Out of the alternatives summarised above, that would be the least reasonable of the assumptions that could be adopted.

Indeed, the proposition that accounting depreciation need not provide a good proxy for how costs are actually recovered should not be surprising. The guidance that is provided for the choice of depreciation for financial accounting purposes focusses on how the "economic benefits" of the asset and are "consumed" by the entity:[19]

[19] NZ IAS 16, paras.61, 62. This is also consistent with expert accounting advice obtained by Telstra during the ACCC's 2011 setting of its initial RAB: Porter, B (Partner, Deloitte Touche Tohmatsu),

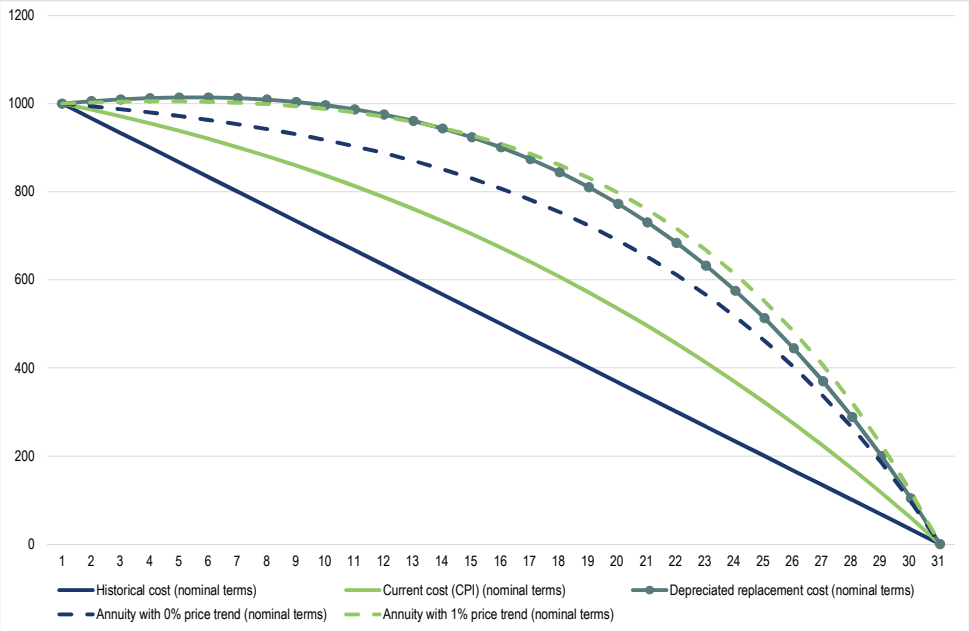
> ***The depreciation method used shall reflect the pattern in which the asset's future economic benefits are expected to be consumed by the entity.***
>
> *…*
>
> *A variety of depreciation methods can be used to allocate the depreciable amount of an asset on a systematic basis over its useful life. These methods include the straight-line method, the diminishing balance method and the units of production method. Straight-line depreciation results in a constant charge over the useful life if the asset's residual value does not change. The diminishing balance method results in a decreasing charge over the useful life. The units of production method results in a charge based on the expected use or output. The entity selects the method that most closely reflects the expected pattern of consumption of the future economic benefits embodied in the asset. That method is applied consistently from period to period unless there is a change in the expected pattern of consumption of those future economic benefits.*

If an asset is used to provide a constant rate of output, this guidance would provide strong pressure for adopting straight line depreciation. There is nothing in the guidance that asks whether it is possible to recover costs in this manner from customers, or whether it would be appropriate to attempt to do so.

Figure 5 repeats Figure 3 from above, but includes one further function, which is the opening asset value on the assumption that the asset is indexed to the construction cost of a new asset, and therefore is the depreciated replacement cost. It is assumed here that the construction cost of the asset had increased over the period annually by 4 per cent (approximately 2 per cent in real terms).

2011, Use of written down accounting value for fixed network assets, 21 October (available at: https://www.accc.gov.au/regulated-infrastructure/communications/fixed-line-services/access-pricing-principles-for-fixed-line-services-review/draft-report (schedule 2 of the Telstra submission).

Figure 5 – Opening asset value (nominal dollars) – different recoveries of past investment (including depreciated replacement cost)



As shown in the figure above, if it was thought that the most reasonable assumption about past pricing was that this reflected an annuity pricing method, then of the arbitrary accounting-type asset values, a depreciated replacement cost would provide a much closer estimate (under the assumptions of this stylised example) of the unrecovered cost.

However, we acknowledge that any analysis that is based on stylised example such as that provided above will reflect highly simplified assumptions. Thus, if there was an intention to set the initial RAB for Chorus's assets at a value that reflects the unrecovered extent of cost, then this should be based upon a proper empirical analysis of past recoveries. However, as discussed further below, in our view, such an exercise is not practicable in relation to the copper assets, and would not necessarily even be straightforward in relation to the fibre assets.

Calculating the unrecovered investment cost for Chorus' copper assets

In principle, if there were complete information about the past revenue from the supply of regulated services and all costs incurred, then the unrecovered amount of the past investment could be recovered from a simple present value calculation. That is, the unrecovered investment cost today would be the value required to make the project have a net present value of zero over its life, given revenue and costs (including capital) to date.

However, it is clear that such a calculation faces substantial challenges in relation to Chorus' copper assets (and challenges also in relation to fibre – this is discussed separately below).

- First, it is understood that there is incomplete information about Chorus' past costs, which should not be surprising given the age of some of its assets and the fact that many assets were constructed whilst part of government.

- Secondly, Chorus' fixed line services have only recently been provided on a structurally separate basis. Any disaggregation of revenue prior to separation into the "retail" and "regulated" function would be arbitrary.

- Thirdly, a key input into the present value calculation is the discount rate (commercial return) that is assumed. Given the period over which the calculation would need to be undertaken, the results would be expected to be to very sensitive to this assumption.

In addition, other issues of principle could be raised with such a calculation.

- First, the effect of the calculation would be to classify any "excess returns" that are deemed to have been earned in the past as "additional capital return", with this deducted from the opening RAB. Thus, the calculation arguably would have a retrospective effect.

- Secondly, similarly, the calculation would carry-forward any past under-recovery and add it to the opening RAB (within interest accumulated), irrespective of the cause of the under-recovery. Calculating the under-recovery in this manner could be inconsistent with the intended past allocation of risks between the asset owner and customers.

In our view, these difficulties mean that it would be impracticable to attempt an empirical calculation of the unrecovered investment cost. Indeed, we consider that the value for the initial RAB that is sufficient to permit past costs to be recovered is an empirical question, but one that cannot in practice be solved. Consequently, we do not think that an objective of trying to.

It is observed that others have recognised the difficulty of trying to undertake an empirical calculation of the unrecovered investment cost. In one of the first decisions under the new gas regulatory regime in Australia,[20] the Victorian regulator commented as follows:[21]

> *The main argument in favour of a DAC valuation is that if tariffs were set on a cost of service basis in the past, then the book value of the assets - the DAC valuation - would be consistent with all parties' expectations of the value of the assets at that point in time. It also follows that any valuation in excess of DAC would lead to an unexpected windfall to the pipeline owner.*
>
> *The difficulty with old and previously integrated systems, however, is in determining how tariffs for the market as a whole were set in the past and the extent to which those tariffs have already recovered the capital costs from past users. The Office has attempted to estimate the historical returns to the former Gas and Fuel Corporation (GFC) to test whether the conditions for the DAC valuation hold. This is discussed below (in the context of the discussion of section 8.10(f) of the Code).*

[20] As discussed above, under the Australian gas access regulatory regime, the regulator was required to take account of the DAC value alongside the DORC value and any other well recognised asset valuation method.

[21] Office of the Regulator-General, 1998, Final Decision – Access Arrangements for Gas Distribution, October, p.59.

After discussing the assumptions made and issues of contention, the regulator concluded as follows:[22]

> *Thus, the Office has considered the "the basis on which Tariffs have been (or appear to have been) set in the past, the economic depreciation of the Covered Pipeline, and the historical returns to the Service Provider from the Covered Pipeline" as required by the Code. However, for the reasons given above, the Office does not consider that this provides a sound basis for making inferences about the appropriateness of the proposed initial Capital Bases.*

Similar comments were made about the practicality of "unpicking" past returns by the New Zealand High Court when hearing the series of appeals flowing from the Commerce Commission's 2010 input methodologies determination. One of the arguments advanced by Air New Zealand (a user of regulated airport services) was that the Commission ought to have tested whether "revaluation gains" had been offset against income in the period between 2002 and 2010 (the 2002 valuations were those the Commission used in its earlier Airports Inquiry).[23] After initially suggesting that such an exercise could be undertaken, the Commission concluded that such an exercise was impracticable. The High Court accepted the Commission's views (albeit not without some criticism) as follows:[24]

> *[994] The Commission argues that it would be "… to a very significant extent impractical …" and "…a very involved exercise" to, in respect of each Airport:*
>
> *(a) first, unravel which revaluations had been treated as income and which had not;*
>
> *(b) secondly, determine whether the treatment was correct taking into account the occasions when it may have been appropriate for the Airport not to treat the difference between expected and actual revaluation gains as income; and*
>
> *(c) thirdly, determine the actual allocation of risk between each Airport and its customers from time to time, and then carry forward the 2002 figures into a meaningful initial RAB.*
>
> *[995] There may be some hyperbole in the Commission's oral submissions, given the apparent equanimity with which it viewed the prospect of that exercise in the June 2009 IMs Discussion Paper. On the other hand, the Commission had noted in its December 2009 Emerging Views Paper that submissions had raised such issues. But it is clear from the asymmetry in the Commission's and Airports' respective knowledge and understanding of the industry and its history, together with the not uncommon negative regulator/regulated relationship, that it would, no doubt, be a time-consuming and costly exercise.*

Relevantly, however, the argument from Air New Zealand was that the Commission consideration related only to assessing the recovery of capital between 2002 and 2010. During submissions before the appeal, Air New Zealand also suggested that the same exercise should be extended back into the

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22 Office of the Regulator-General, 1998, Final Decision – Access Arrangements for Gas Distribution, October, p.62.

23 The objective of this testing is to establish the unrecovered investment value, but approached from the other direction. Under Air New Zealand's logic, if a revaluation gain (being the difference between the claimed asset value and a DAC value) had been offset against income in the past, then it is fair to recover that higher asset value. This is the same as asking whether the DAC value fairly reflects how prices had been set in the past.

24 WELLINGTON INTERNATIONAL AIRPORT LTD & ORS v COMMERCE COMMISSION [2013] NZHC [11 December 2013], paras.994-995.

more distant past (the date at which the assets vested in the relevant airport authorities, being the late 1980s or early 1990s). Air New Zealand's suggestion was described by the court as "flirting with a more radical proposal",[25] but the proposal was withdrawn during the hearing and so not considered further by the Court.

Empirical estimate of the unrecovered investment cost for the fibre business

In relation to the fibre network, we note that many of the difficulties associated with trying to estimate the unrecovered investment value for the copper assets are resolved for the fibre investment, in that information will be available on the revenue associated with the sale of fibre services, and similarly clear information on the incremental cost associated with the fibre services likewise will be available.

Having said that, two issues would still remain.

- First, the fibre services use a combination of the incremental assets that are dedicated to fibre and assets that are shared with copper. Accordingly, it will be necessary to make an allowance for the cost associated with the shared assets.[26]

- Secondly, I would also expect there to be some controversy as to how risks should be allocated and captured when undertaking this calculation. For example, an issue will arise as to how to treat differences between anticipated and actual costs and fibre uptake, as well as the commercial rate of return that is appropriate for the assumed allocation of risks.

It is noted that, in relation to the first of these issues, we think that a practicable approach would be to adopt a value for existing shared assets (we said above that it would be appropriate for this value to be based on current day replacement cost) and apply a share (allocation) of that value when estimating the unrecovered investment cost for the fibre services. However, as noted above, we would expect that such a calculation would not be free of controversy. It is partly to avoid this controversy that we favour the application of the "line in the sand" method in relation to both the copper and fibre assets.

Lastly, we note that if the initial RAB associated with the fibre assets was to be set at the best estimate of the unrecovered investment cost, it would be very important for this to be based on an empirical estimate and not to simply adopt an accounting book value for the assets. It would be very unusual in our experience for new infrastructure where demand is initially low but growing – like that providing the fibre services – in its early years to earn a full commercial return on capital, let alone to commence obtaining a return of the investment (i.e., depreciation). Our expectation is that such a

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25 WELLINGTON INTERNATIONAL AIRPORT LTD & ORS v COMMERCE COMMISSION [2013] NZHC [11 December 2013], para.400.

26 That is, in our view it would be inappropriate not to include an allowance for the use of the shared assets if an estimation of the unrecovered fibre investment value was undertaken. While these assets are shared between copper and fibre services, the structure of the Commission's TSLRIC calculation for copper – whereby the price was derived by dividing the cost by the whole of the fixed line services demand (whereas copper is a fraction of this) – means that only a portion of these shared costs will be recovered from copper services.

calculation would show that the unrecovered cost associated with the fibre services would exceed materially the original cost of the relevant infrastructure.[27]

3.4.3 Transaction values

Given Chorus is the product of a divestment it could be argued that the market value of the entity at that date reflected investors' reasonable expectations about the value of the existing copper network. However, it is often the case that such transactions are difficult to interpret and so unpick to derive an asset value that is objectively reasonable for the purpose of economic regulation. Indeed, it is typical for regulators to seek to avoid the use of transaction values for this reason and also because of the circularity associated with using such values.

[27] We note that in the case of the NBN in Australia that a separate account has been created to transparently allocate this unrecovered amount during the early years of the network. The expectation being that this account will grow for an initial period of time and then once demand increases the network owner will be able to have this capitalised amount returned to it.