Opex forecasting and EBSS advice for the SP AusNet final decision

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Executive summary

Frontier Economics has prepared this report for the AER in response to SP AusNet's proposed forecast controllable and asset works opex in its Revised Revenue Proposal. In its Draft Decision, the AER applied a single base year approach to forecasting SP AusNet's controllable opex. SP AusNet proposed an upward adjustment to the AER's forecast to reflect an average of six years' asset works opex rather than expenditure in a single base year, being 2010/11.

The appropriateness, from an economic efficiency perspective, of a single base year forecasting approach to forecasting total controllable opex depends on the following three conditions being met:

- The regulated business must have incentives to minimise the total controllable opex.
- The business must not have incentives to 'game' the regulatory process, such as by shifting expenditure within a regulatory control period (RCP) to benefit from a higher expenditure forecast or efficiency benefit.
- Total controllable opex needs to be broadly recurrent, in that past actual expenditure can provide (with the aid of transparent adjustments) a reasonable reflection of future efficient expenditure.

Where an opex efficiency benefit sharing scheme (EBSS) applies, the AER's single base year forecast approach meets the first two of these conditions. On the third condition, controllable opex tends be fairly stable or 'recurrent', both on a year-by-year basis and even more so when comparing total spending across successive regulatory control periods (RCPs). This contrasts with capex, which tends to be extremely 'lumpy'. It is only if opex followed similar long (multi-year or multi-decade) cycles as does capex that a single base year forecasting approach in the presence of an EBSS may provide an inadequate return to the Transmission Network Service Provider (TNSP).

The AER provided us data on SP AusNet's actual controllable opex from 2003/04 to 2012/13. The data show that controllable opex follows fairly regular patterns and does not appear to be experiencing secular shifts or long waves. This supports the view that the AER's use of a single base year opex forecasting approach in its Draft Decision is appropriate. We consider that it would be inappropriate for the AER to review each component of controllable opex individually to see whether it conformed to the same pattern as overall controllable opex. Such 'cherry-picking' would likely result in aggregate controllable opex being systematically and inefficiently over-forecast. Nevertheless, the data show that while SP AusNet's asset works expenditure has been somewhat more variable year by year than the broader category of controllable opex, asset works opex does not appear to be following some secular

or long wave-like shift: Asset works opex in 2011/12 was the lowest since 2002/03.

Under the regulatory conditions pertaining to SP AusNet, the use of SP AusNet's proposed multi-base year forecasting approach would lead to systematic over-forecasting of efficient expenditure.

Finally, we do not consider the SP AusNet's opex benchmarking analysis as presented in its revised revenue proposal (RRP) is very informative for assessing the appropriateness of SP AusNet's forecast opex.

In conclusion, there appears to be no reasonable basis for the AER to move away from a single base year forecasting approach for SP AusNet's controllable opex in general and for asset works opex in particular.

1 Introduction

Frontier Economics (Frontier) has prepared this report for the Australia Energy Regulator (AER) in response to the submissions contained in SP AusNet's revised revenue proposal, dated 11 October 2013 (RRP),[1] in respect of SP AusNet's 2014-2017 regulatory control period (RCP). The RRP was submitted in response to the AER's draft decision, dated August 2013 (Draft Decision).[2]

In the RRP, SP AusNet contended that the AER's decision to use a single base year approach to forecasting controllable operating expenditure (opex) in the Draft Decision was inappropriate for a number of reasons. In particular, SP AusNet objected to the AER's use of a single base year approach to setting an allowance for future 'asset works' opex. SP AusNet had three key objections to the asset works opex forecasting approach adopted by the AER in its Draft Decision:[3]

- The AER's substitute forecast inappropriately used 2011/12 as a single base year. However, the opex in that year:
  - Was not subjected to the opex criteria in the National Electricity Rules (NER) to ensure it was sufficient for 2010/11 to act as an appropriate base year
  - Is not representative of SP AusNet's future asset works needs and
  - By itself fails to reflect the 'lumpiness' of historical asset works opex
- The AER failed to take account of relevant information including:
  - SP AusNet's 'bottom-up' forecast of asset works opex and supporting information
  - The recommendations of the AER's consultant, EMCa
- The AER's substitute forecast was not made in accordance with the NER.

In light of these objections, SP AusNet proposed an upward adjustment to the base year controllable opex which formed the basis of the AER's forecast. The adjustment resulted in the base year controllable opex reflecting an average of six years' asset works expenditure rather than the asset works expenditure in a single base year.

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1 SP AusNet Pty Ltd, *Electricity Transmission Revised Revenue Proposal 2014-15 – 2016-17*, 11 October 2013.

2 AER, *Draft decision, SP AusNet Transmission determination 2014-15 to 2016-17*, August 2013.

3 RRP, p.63.

This report considers the appropriateness, from an economic efficiency perspective, of the AER's single base year approach to forecasting allowed asset works opex. Economic efficiency is a key component of the National Electricity Objective (NEO) contained in section 7 of the National Electricity Law.[4]

Given the timing of the regulatory processes for SP AusNet's next RCP, we have been instructed to base our advice on version 52 of the NER and the relevant regulatory arrangements and incentive schemes applicable in respect of that version. Importantly, version 52 of the NER applied prior to the Australian Energy Market Commission's (AEMC's) final determination on the economic regulation of network service providers Rule change.[5]

The full terms of reference for this report are contained in Appendix A.

1.1 Structure of this report

This report is structured as follows:

- Section 2 briefly describes the role of incentive regulation in the Australian National Electricity Market (NEM)
- Section 3 discusses expenditure forecasting using the AER's single base year approach in the presence of the opex efficiency benefit-sharing scheme
- Section 4 reviews the evidence on SP AusNet's controllable and asset works opex
- Section 5 briefly responds to SP AusNet's opex benchmarking analysis
- Section 6 draws together our conclusions
- Appendix A sets out the terms of reference to which this report has responded.

4 *National Electricity (South Australia) Act 1996, Schedule – National Electricity Law* (version 1.1.2010).

5 AEMC, *Rule Determination, National Electricity Amendment (Economic Regulation of Network Service Providers) Rule 2012, National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, 29 November 2012.

2 Role of incentive regulation

2.1 Need for regulation of electricity networks

The structural reforms to the electricity supply industry over the last two decades have involved the separation of the network components of the electricity supply chain from the generation and retailing components. While generation and retailing activities were also horizontally separated and could be opened to competition from new entrants, transmission and distribution activities are not as amenable to the introduction of competition. This is because of the 'natural monopoly' characteristics of electricity networks, particularly the large economies of scale and the 'lumpiness' of network investment. These characteristics make electricity networks uneconomical to duplicate and activities for which some form of economic regulation is necessary.

2.2 Available forms of regulation of electricity networks

Various forms of economic regulation of electricity networks are available. These include:[6]

- ***Cost of service regulation*** (as commonly applied in the United States) – which involves setting prices or revenues in nominal terms, not for any pre-determined period, and subsequently adjusting them on the basis of the sufficiency of returns and the prudence of investment in assets.
- ***Incentive regulation*** – which involves setting a network business's prices or revenues for a fixed period and allowing the business to keep the benefit of any underspend (and bear the cost of any overspend) for a period of time. Incentive regulation is often described as 'CPI-X' regulation, with the 'X' reflecting the negative rate of change in real prices or revenues. One way of applying incentive regulation is based on a building block approach. The basis of the building block approach is the establishment of forward looking estimates of the costs of providing the relevant service. Each cost category – operating expenditure, return on capital, deprecation and tax – is combined to derive a forward looking estimate of the revenue required to operate the network business on an efficient basis during the regulatory period. The building block approach to determining revenue or price controls for regulated infrastructure services has widespread application throughout Australia and other countries. However, incentive regulation can be applied

6 AEMC, *Review of the Electricity Transmission Revenue and Pricing Rules, Consultation Program, Revenue Requirements: Issues Paper*, October 2005, pp.23-27.

in other ways, such as through the use of benchmarks and rates of adjustment to determine how prices or revenues ought to be fixed for the relevant regulatory control period.

- ***Price monitoring*** – commonly involves businesses seeking approval from the regulator for a proposed price, rather than the regulator setting the price directly. The legislative or regulatory framework for a price monitoring regime typically includes qualitative guidance on the principles to be applied in determining or negotiating prices for services. It is generally accompanied by a formal requirement for price and/or cost information to be reported by service providers, and for this to be collated and presented for publication by a regulatory or administrative body. Airport services in both Australia and New Zealand are or have been subject to a price monitoring regime.

2.3 Merits of CPI-X building block regulation

The key problem faced by most regulators is the information asymmetry between the regulator and the regulated business. The business typically has much better information than the regulator about:

- the business's potential future efficient costs
- the cost-quality trade-offs involved in delaying expenditure and
- the trade-offs available between capital and operating expenditure.

CPI-X incentive regulation is intended to overcome some of the difficulties arising from regulated firms having superior information about their businesses than the regulator. CPI-X building block incentive regulation is typically designed to:[7]

- Encourage expenditure minimisation, subject to service quality standards and incentives, by allowing the NSP to keep the difference between allowed and actual opex for a defined period of time
- Encourage revelation of efficient expenditure levels to help guide the setting of future allowed expenditure
- Share the benefits of efficiency savings with consumers by gradually reducing prices in line with actual revealed cost savings, often with the aid of some form of efficiency benefit-sharing scheme to help provide consistent efficiency incentives over the course of a RCP

7 See, for example, AEMC, *Rule Determination, National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006, No.18*, 16 November 2006 (2006 Revenue Rule Determination), chapter 6, pp.92-107.

- Maintain or promote improved service performance through the use of service incentive schemes to prevent opex and capex being reduced to levels that compromise service quality.

In its 2006 Revenue Rule determination, the AEMC described the fundamental feature of building block incentive regulation as follows:[8]

> While cost-of-service regulation is based on remunerating TNSPs in respect of their *actual* costs, incentive regulation is based on remunerating TNSPs in respect of their *forecast* costs over the regulatory control period (which is typically three to five years). Because TNSPs are able to capture a proportion of the benefits of any unanticipated cost reductions (and must absorb unanticipated cost increases) that occur during a regulatory control period, they are encouraged to make cost savings. At the end of the period, the actual costs in this period may be used as a *basis* for establishing the reasonableness of the cost estimates provided by the TNSP in the subsequent regulatory period. In this way consumers share the benefits of the efficiency gains secured by the TNSP, just as in a competitive market costs savings are ultimately passed to customers as lower prices. [Emphasis in original]

As discussed in the subsequent sections, these well-known benefits of incentive regulation are relevant to:

- the merits of the AER's use of a single base year operating expenditure to forecasting future operating expenditure and
- the complementarities between a single base year forecasting approach and the efficiency benefit sharing-scheme for opex applicable to SP AusNet.

8 AEMC, 2006 Revenue Rule Determination, p.93.

3 Expenditure forecasting using base year costs

3.1 SP AusNet's key opex forecast contentions

As noted above, SP AusNet objected to the AER's substitute forecast for opex – and asset works opex in particular – on a number of grounds. These included that the AER's substitute forecast was not representative of SP AusNet's likely future asset works costs and that the AER failed to take account of SP AusNet's 'bottom-up' opex forecast and the recommendations of the AER's technical consultant, EMCa.

In its RRP, SP AusNet accepted that a base-step-trend approach could be used to forecast asset works opex.[9] But rather than using a single base year, as the AER had done, SP AusNet proposed an upward adjustment to reflect a level of base expenditure equal to the average of the actual (or budgeted) asset works opex in all the years of the 2007/8-2013/14 RCP. SP AusNet submitted that this would yield the most appropriate base from which to derive a forecast. SP AusNet also said that it was the most appropriate way to prepare a forecast for an opex category for which historical expenditure had fluctuated significantly year-to-year and that SP AusNet had previously classified as non-recurrent.[10]

SP AusNet also submitted in its RRP that it had undertaken benchmarking analysis to verify that its asset works forecast was prudent and efficient. This analysis purported to show that:

- SP AusNet's forecast asset works expenditure for 2014/15 to 2016/17 (inclusive) was well below that of ElectraNet and Powerlink as measured in dollars of expenditure per million dollars of regulated asset base (RAB).[11]
- SP AusNet's actual and forecast opex for 2003/04 to 2016/17 (inclusive) was below that of other TNSPs in the NEM as measured in thousands of dollars of expenditure per GWh of energy transmitted.[12]

3.2 The AER's forecasting approach

Under a building block approach to CPI-X incentive regulation, it is common for regulators to use regulated businesses' actual revealed operating costs, rather than

9 RRP, p.68.

10 RRP, pp.68-69.

11 RRP, pp.69-70., especially Figure 4.7

12 RRP, p.95., especially Figure 4.14.

bottom-up cost forecasts, as a basis for forecasting future (controllable) opex allowances. As noted in the previous section, the AEMC envisaged this would occur when it made the original chapter 6A of the NER in 2006.

In its Draft Decision, the AER forecast SP AusNet's future controllable opex allowance through the use of SP AusNet's actual controllable opex in a single base year, being 2011/12. This year was proposed by SP AusNet for controllable opex that was not forecast on a bottom up approach and the AER accepted that base year. It was also the most recent year for which controllable opex data were available at the time of the draft decision review.

It is less common to adopt a base year forecasting approach when setting capex allowances and a base year approach has not previously been applied to capex under the NER.

3.3 Conditions for appropriateness

The appropriateness, from an economic efficiency perspective, of a single base year forecasting approach – as opposed to a bottom-up forecasting approach or SP AusNet's proposed multi-base year approach – to forecasting total controllable opex depends on the following three conditions being met:

- The regulated business must have incentives to minimise total controllable opex, subject to meeting its stipulated objectives and providing levels of service performance valued by consumers.
- The business must not have incentives to 'game' the regulatory process. Such gaming could take the form of shifting expenditure within a RCP to or from the single base year in order to, for example, secure a higher forecast allowance or a higher future efficiency benefit.
- Total controllable opex needs to be broadly recurrent, in that past actual expenditure can provide (with the aid of transparent adjustments) a reasonable reflection of future efficient expenditure.

If these conditions are met, it is reasonable for regulators to apply a single base year forecasting approach and to avoid using bottom-up forecasts or an adjustment to the base year to reflect a multi-base year approach as SP AusNet has suggested.

These conditions are discussed in more detail below.

3.4 Incentives to minimise expenditure

Businesses operating under incentive regulation generally have incentives to minimise their controllable expenditures. To the extent that a business spends less than its allowed forecast expenditure, the business can retain the difference for at least a period of time. Under the design of the regulatory arrangements

applying under version 52 of the NER, these efficiency incentives applied to both capital and operating expenditures.

3.4.1 Capex saving incentives

For capital expenditures, TNSPs could retain the return 'on' and 'of' (ie depreciation) the difference between forecast and actual capex arising in each year of a RCP until the end of that RCP. For example, if:

- A TNSP's forecast capex was $100 in each of the five years of the RCP and
- The TNSP's actual capex was $90 in the second year of the RCP and $100 in each other year
- The TNSP would be able to retain a return on and of $10 in years 2, 3, 4 and 5 of the RCP
- At the end of the RCP, the TNSP's actual capex would be rolled into its regulated asset base (RAB) and the benefits to the TNSP from the $10 capex saving it made in year 2 would cease.

These incentive arrangements for capex imply that TNSPs have stronger incentives to make savings in the early years of a RCP than in the later years, other things being equal.

3.4.2 Opex saving incentives

For operating expenditures, TNSPs could retain the difference between forecast and actual opex arising in each year of a RCP. This means that if a TNSP's forecast opex was $100 in each of the five years of the RCP and the TNSP made a:

- Temporary saving – for example:
  - The TNSP's actual opex was $90 in the second year of the RCP and $100 in each other year
  - The TNSP would be able to retain the $10 difference in year 2 of the RCP
- Permanent saving – for example:
  - The TNSP's actual opex was $100 in the first year of the RCP and $90 in each subsequent year
  - The TNSP would be able to retain the $10 difference in years 2 to 5 of the RCP.

By themselves, these arrangements would mean that TNSPs have much stronger incentives to make opex savings – especially permanent opex saving – in the early

years of a RCP than in the later years, other things being equal.[13] However, the incentives to make opex savings early in a RCP are mitigated under the NER by the operation of the opex efficiency-benefit-sharing scheme (EBSS).

Role of the opex EBSS

The key purpose of the opex EBSS is to provide TNSPs with a constant incentive to make opex savings in each year of a RCP. 'Constant incentive' in this context refers to an entitlement to a fixed share of the net present value of the expenditure saving, regardless of the year in the RCP in which the saving is made. This is designed to encourage TNSPs to make savings when it is cheapest and most beneficial to do so rather than necessarily at the start of a RCP.

In the absence of the opex EBSS, a TNSP making a permanent annual saving in the first year of a RCP would retain a much larger share of the overall present value benefit of the saving than if it made the same saving in a later year of the RCP. This is because without an EBSS, a TNSP making a permanent saving early in a RCP would be able to retain the benefit of that saving for more years than if it made the saving late in a RCP. For example, assuming a 6% discount rate, a permanent saving of $1 per annum would yield a total present value benefit of $17.7. If the TNSP made this permanent $1 annual saving in the first year of a RCP, it would retain $4.46 of the $17.7 saving (approximately 25%). Conversely, if the TNSP made this saving in the penultimate year of a RCP (which was used to set forecast allowed opex in the subsequent RCP), the TNSP would only retain $1.94 of the $17.7 saving (approximately 11%).

The EBSS operates by providing TNSPs that make opex savings with a 'carryover benefit' that extends into the next RCP. With a 6% discount rate, the combination of a single base year opex forecasting approach and the EBSS leads to TNSPs retaining about 30% of the present value of opex savings. The remaining 70% flows to the TNSP's customers. This means that even if actual opex is unusually high or low in the single base year (or in any other year), the TNSP still gains by making opex savings in any year. This feature is important to evaluating SP AusNet's claim that a single base year approach is inappropriate because of unusually low opex in the 2011/12 base year and that accordingly, an upward adjustment to reflect a multi-base year forecasting approach ought to be adopted.

A characteristic of the opex EBSS is that if it is combined with a multi-base year forecasting approach, as suggested by SP AusNet, it would lead to a systematically excessive overall allowance.(see Box 1).

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13 Note that to the extent they have a positive real cost of capital, NSPs have incentives to make expenditure savings as early as possible.

Box 1: EBSS combined with multi-base year forecast

Consider an example in which a TNSP's:

- Forecast allowed opex was $100 in each year of a five-year RCP
- Actual opex was:
  - $100 in years 1, 2 and 5 of the RCP
  - $120 in year 3 of the RCP and
  - $80 in year 4 of the RCP.

Under the AER's single base year approach, this pattern of expenditure would result in a combined allowance (forecast opex plus EBSS efficiency benefit) of $100 per annum in the subsequent RCP (ignoring the timing benefits and costs inherent in the pattern of historical opex). This is appropriate as it reflects the average expenditure in the initial RCP.

Table 1: AER Single base year approach

Year	1	2	3	4	5	6	7	8	9	10
Forecast opex	100	100	100	100	100	80	80	80	80	80
Historical opex	100	100	120	80	100					
Efficiency carryover benefit	-	-	-	-	-	20	20	20	40	-
Total						100	100	100	120	80

Now consider the implications of adopting a multi-base year forecasting approach. This is illustrated in Table 2. Under this approach, the forecast opex for the next RCP becomes $100 per annum, this being the simple average of the TNSP's actual historical expenditure across the initial RCP. When combined with the EBSS carryover benefit payments, the combined allowance averages $120 per annum (again ignoring timing issues), well above the TNSP's required revenue allowance to meet its efficient costs of $100 per annum.

Table 2: SP AusNet multi-base year approach

Year	1	2	3	4	5	6	7	8	9	10
Forecast opex	100	100	100	100	100	100	100	100	100	100
Historical opex	100	100	120	80	100					
Efficiency carryover	-	-	-	-	-	20	20	20	40	-

Expenditure forecasting using base year costs

benefit										
Total						120	120	120	140	100

In its distribution EBSS decision, the AER showed that a multi-base year approach achieved the same outcomes as would occur under a single base year forecasting approach combined with an EBSS.[14] This is illustrated in the AER's Table B.17 (which *does* take account of timing issues), reproduced in Figure 1 below.

Figure 1: SP AusNet multi-base year approach

Table B.17: Impact of an ongoing opex reduction initiated in regulatory year 2 with weighted average forecasts ($million, regulatory year 1 dollars)

Regulatory year	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Forecast (F)	100	100	100	100	100	100	94.4	94.4	94.4	94.4	94.4
Actual (A)	100	100	90	90	90	90	90	90	90	90	90
Cumulative saving (F – A)	0	0	10	10	10	10	4.35	4.35	4.35	4.35	4.35
Discount factor	1.12	1.06	1	0.94	0.89	0.84	0.79	0.75	0.70	0.67	0.63
Net present value											52.1

Source: AER distribution EBSS Final Decision, p.33.

In this example, forecast opex for each year of the second RCP ($94.4 million) is derived from the average of the actual opex across the five years of first RCP (accounting for timing). Note that the present value of the benefit accruing to the NSP under this approach is $52.1, which is approximately 30% of the total NPV saving ($177 million), just as under a single base year approach combined with an EBSS. If, in addition to adopting a multi-base year forecasting approach, a TNSP were entitled to carryover benefits under an EBSS arising due to its actual spending in the first and second RCP ($90 million from the second year onwards) being lower than its forecast spending ($100 million in the first RCP and $94.4 million in the second RCP), the TNSP would gain a larger share of the total NPV benefits of the saving.

Therefore, in the presence of an EBSS, adopting a multi-base year forecasting approach for asset works opex would lead to the systematic over-rewarding of TNSPs required revenues and thereby resulting in network tariffs higher than efficient costs.

The question of whether TNSPs have incentives to shift expenditures between different years within a RCP is discussed in the following section.

14 AER distribution EBSS, example B.8, pp.33-35.

3.5 Incentives to shift expenditures within a RCP

3.5.1 Capex shifting incentives

The nature of the incentives applying to capex means that TNSPs have incentives to delay capex through a RCP. If a base year forecasting approach applied for capex in the absence of some form of capex EBSS, TNSPs would have incentives to shift capex into the base year in order to boost their forecast capex allowances for the next RCP. This undermines the case for using a base year forecasting approach for capex without a capex EBSS.

3.5.2 Opex shifting incentives

By itself, use of base year forecasting approach for opex would give TNSPs similar incentives for opex as they would for capex under a base year approach. That is, TNSPs would have incentives to shift opex into the base year in order to boost their forecast opex allowance for the next RCP.

Interaction of base year opex forecasting and EBSS

Combining a single base year forecasting approach with an opex EBSS means that TNSPs do not have incentives to shift opex from other years within a RCP into the base year to boost their forecast opex.

This is because:

- To the extent that the base year opex is boosted due to opex deferrals from previous years in a RCP, the TNSP would incur a carryover penalty under the EBSS that would offset the gain from a higher forecast opex allowance for the subsequent RCP.
- Similarly, the TNSP would not have incentives to drain opex out of the base year in order to boost its EBSS carryover benefit because such benefit would be offset by the lower forecast opex allowance that would follow from the low base year spending.

These qualities are demonstrated in example B.7 in the AER's distribution EBSS decision (reproduced in Figure 2 below).[15] In this example, the NSP's forecast opex is $100 in each year of its five year RCP. However, the NSP's actual expenditure is $100 in years 1 and 2, $0 in years 3 and 5 and $300 in year 4. That is, the NSP has shifted its year 3 and 5 spending into year 4 to boost its allowed forecast opex for the next RCP. The modelling of this example shows that the NPV benefit to the NSP of shifting expenditure in this way is immaterial ($0.1).

15 AER, *Final decision, Electricity distribution network service providers, Efficiency benefit sharing scheme*, June 2008, (AER (2008), Appendix B.

Accordingly, TNSPs have very little to gain by shifting opex under the incentive arrangements applying to opex under the NER.

Figure 2: Futility of shifting opex under base year forecasting and an EBSS

Table B.14: Impact of shifting opex into the forecast base year with an EBSS ($million, regulatory year 1 dollars)

Regulatory year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
Forecast (F)	100	100	100	100	100	300	300	300	300	300	100	100	100	100	100
Actual (A)	100	100	0	300	0	100	100	100	100	100	100	100	100	100	100
Incremental saving (E)	0	0	100	-300	0	-100	0	0	0	0	0	0	0	0	0
Carryover of gains made in															
1		0	0	0	0	0									
2			0	0	0	0	0								
3				100	100	100	100	100							
4					-300	-300	-300	-300	-300						
5						0	0	0	0	0					
6							-100	-100	-100	-100	-100				
7								0	0	0	0	0			
8									0	0	0	0	0		
9										0	0	0	0	0	
10											0	0	0	0	0
Carryover amount						-200	-200	-200	-300	0	-100	0	0	0	0
Effective target	100	100	100	100	100	100	100	100	0	300	0	100	100	100	100
Discount factor	1	0.94	0.89	0.84	0.79	0.75	0.70	0.67	0.63	0.59	0.56	0.53	0.50	0.47	0.44
Net present value															0.1

Source: AER (2008), p.32.

Another implication of the interaction of single base year opex forecasting and the EBSS is that naturally-occurring year-to-year volatility in opex does not compromise the adequacy of the remuneration available to the TNSP for recovering its efficient costs. Variables that cause random changes in controllable opex between different years within a RCP do not impose significant costs on the TNSP, for the same reason that TNSPs do not have incentives to themselves shift spending between different years within a RCP. Therefore, the fact that controllable opex might vary greatly between the base year and other years within a RCP is no reason for inferring that where an EBSS applies, a single base year forecasting approach would provide the TNSP with insufficient revenue under the NER.

3.6 Need for expenditures to be 'recurrent'

One of the key reasons why a single base year approach is commonly applied for opex forecasting but not for capex forecasting is the different nature of expenditures that tend to be associated with each type of spending. As a generalisation:

- Controllable opex tends be fairly stable or 'recurrent', both on a year-by-year basis and even more so when comparing total spending across successive RCPs; whereas
- Capex tends to be undertaken in large bursts that may last several years or longer before receding to lower for many years.

The relative stability of opex makes it more likely that past spending – if subject to efficiency incentives – is a good indicator of efficient future spending. This favours the use of a base year forecasting approach for opex under incentive regulation where an EBSS applies.

The reason for the greater stability (or 'recurrence') of opex compared to capex arises from the underlying nature of network opex and capex. In particular:

- Network capex is 'lumpy', meaning that it comes in discrete increments, and capex exhibits strong economies of scale (average cost declines as network capacity increases).[16] In fact, the 'natural monopoly' characteristics of electricity networks and the fundamental reason they are subject to economic regulation derives from the nature of network capex; together, the economies of scale and lumpiness exhibited by capex mean that:
  - it can be efficient to 'overbuild' a network relative to current needs and
  - sustained periods of high capex are often followed by sustained periods of low capex to allow demand to 'catch up' to the overbuild.
- By comparison, controllable opex is much more continuous and exhibits few economies of scale. Although controllable opex bears some relationship to the scale of the network, network scale is not a variable that rises and falls between successive RCPs.

For the purposes of economic regulation and the appropriateness of a single base year forecasting approach, the importance of expenditure stability or recurrence turns on a very specific meaning of 'recurrence'. In particular, what is important from an expenditure forecasting perspective is not so much whether opex is volatile from one year to another *within a RCP*, but whether opex is strongly variable *as between RCPs*:

- If opex is variable from year to year within a RCP, then – as shown above – a single base year forecasting approach will still, where an EBSS applies, promote expenditure savings and provide the TNSP with a reasonable opportunity to recover its efficient expenditures.

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16 See, for example, Perez-Arriaga, I.J and F.J Rubio, "Marginal Pricing of Transmission Services: An analysis of Cost Recovery", *IEEE Transactions on Power Systems*, Vol. 10, No. 1, February 1995, pp.546-553, especially, pp.547-548.

Expenditure forecasting using base year costs

- Conversely, if opex follows similar long (multi-year or multi-decade) cycles as does capex, then even where an EBSS applies, a single base year forecasting approach may provide an inadequate allowance to the TNSP. For example, if actual controllable opex averaged $80 per annum in one RCP, $120 per annum in the next and $160 per annum in the third, then if a base year approach with an EBBS was continuously used, it would provide the TNSP with a systematically inadequate allowance. Likewise, if opex was in a long downward cycle, continuously applying a base year forecasting plus EBSS approach would provide the TNSP with systematically excessive revenue. Having said that, if such trends or cycles are occurring, using a multi-base year forecasting approach, as SP AusNet suggested, would also not ensure that the TNSP would receive an allowance sufficient to meet its efficient requirements. This is because a multi-base year forecasting approach would not capture the direction or magnitude of the trend, which would only be apparent by having regard to the path of spending over longer time periods.

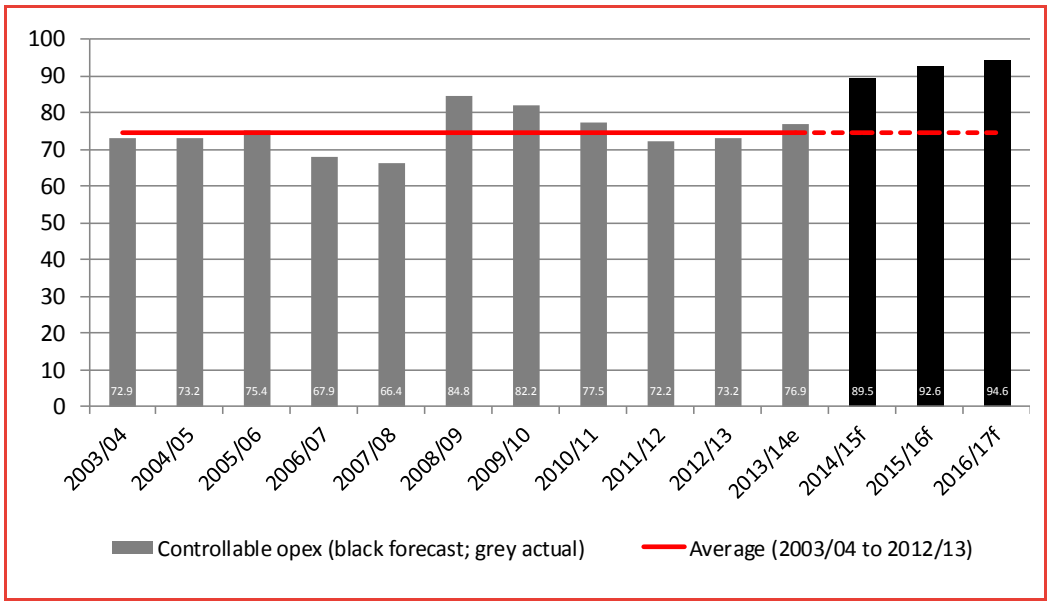
The next step is to examine the nature of SP AusNet's controllable and asset works opex to see whether it better resembles the stylised character of opex or capex.

4 Evidence on controllable and asset works opex

4.1 Controllable operating expenditure

The AER has provided us data on SP AusNet's actual controllable opex from 2003/04 to 2012/13. The chart also shows the 2013/14 estimate and SP AusNet's proposed forecast for each year of the next RCP (2014/15–16/17).

Figure 3: SP AusNet total controllable opex ($m, 2013/14)



Source: AER

The data show that controllable opex follows fairly regular patterns and does not appear to be experiencing secular shifts or long waves. For example, real controllable opex in 2012/13 was the same as in 2004/05. If some account is taken of growth in network scale, it is likely that real controllable opex has barely increased over the last decade. If anything, the data are consistent with SP AusNet deferring opex to maximise its EBSS carryover payment and then re-proposing the deferred opex by way of an increased forecast to boost its next RCP's opex allowance. Such a strategy may have been pursued if SP AusNet considered that it could persuade the AER to not adopt a strict single base year forecasting approach to opex.

The pattern of SP AusNet's historical controllable opex supports the view that the AER's use of a single base year forecasting approach for controllable opex in its Draft Decision is appropriate.

4.2 Asset works opex

Having established the appropriateness of a single base year forecasting approach for SP AusNet's controllable opex, we consider that it would be inappropriate for the AER to review each component of controllable opex individually to see whether it conformed to the same pattern as overall controllable opex.

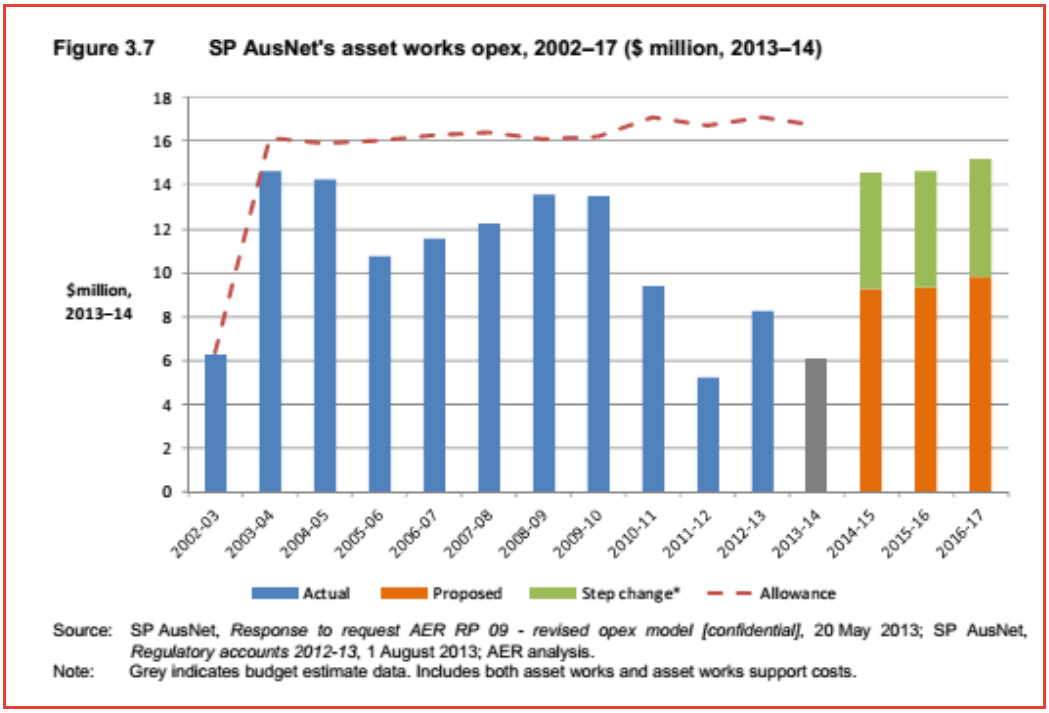
The risk with engaging in such an individual component analysis process is that it could lead to pressures for:

- Those components of controllable opex that exhibited or were expected to follow a secular or long-cyclical rising trend to be 'carved out' from the single base year approach and instead forecast using a bottom-up approach and
- The remaining components of controllable opex that did not exhibit a rising trend to be forecast using a single base year approach.

In our view, such 'cherry-picking' would likely result in aggregate controllable opex being systematically and inefficiently over-forecast. This is because with overall controllable opex fairly stable over time, the exclusion of components forecast to rise from the single base year forecasting approach would imply that the remaining components of controllable opex – those subject to the single base year approach – would exhibit a falling trend. However, as a premise of the single base year approach is that future expenditure should mimic past expenditure, using such an approach to forecast expenditure components known to be in a falling trend would tend to result in the forecasts for these components being too high. Therefore, combining a bottom-up approach for rising trend components of opex with a single base year approach for falling trend components of opex would tend to result in an overall controllable opex forecast that systematically exceeded the efficient level of expenditure.

With this caveat in mind, we have examined the asset works opex data reproduced in SP AusNet's RRP. These data show that asset works expenditure has been somewhat more variable year by year than the broader category of controllable opex. However, asset works opex does not appear to be following some secular or long wave-like shift: Asset works opex in 2011/12 was the lowest since 2002/03, suggesting that it is not on a secular or long-cyclical rising trend.

Figure 4: SP AusNet asset works opex

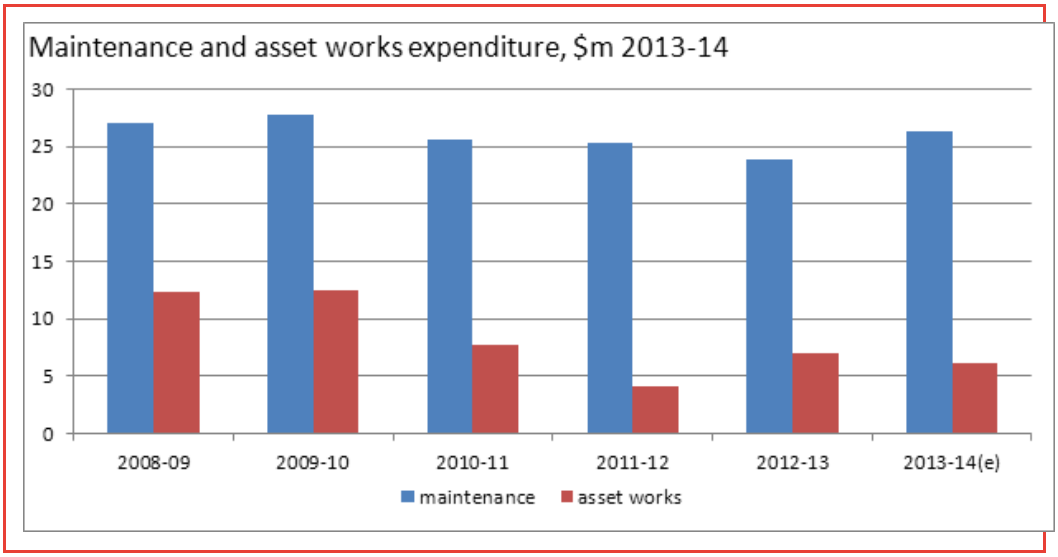


Source: AER Draft Decision, p. 102, reproduced in SP AusNet RRP, Fig. 4.4, p.61.

The short-cyclical pattern of asset works opex confirms that it remains appropriate for the AER to apply a single base year forecasting approach to this category of controllable operating expenditure as well as to controllable opex as a whole.

A comparison of SP AusNet's actual and forecast expenditures in the current RCP on asset works (excluding support) and overall maintenance highlights how different expenditure components can move in different directions. According to data provided to us by the AER, asset works (excluding support) expenditure fell steeply from 2009/10 ($12.4 million) to 2010/11 ($7.8 million) and then again in 2011/12 ($4.2 million) (all in 2013/14 $). This represents falls of $4.6 million in 2010/11 and $3.6 million in 2011/12. By contrast, overall maintenance expenditure fell only $2.2 million in 2010/11 and $0.2 million in 2011/12. In the most recent financial year (2012/13), asset works expenditure rose by $2.8 million while overall maintenance expenditure fell by $1.5 million. This implies that there must be other components of SP AusNet's maintenance expenditure that are moving in different directions to its asset works expenditure. In particular, some elements of maintenance expenditure must be rising as asset works expenditure falls and vice versa. Therefore, forecasting some components of controllable opex using a single base year approach and others using a different methodology is likely to result in inefficiently biased forecasts.

Figure 5: SP AusNet asset works and total maintenance expenditures ($m, 2013/14)



Source: AER

4.3 Conclusion on the evidence

The data on historical controllable opex and asset works opex show that both categories of expenditure tend to be broadly recurrent in nature. Neither overall controllable opex nor the narrower component of asset works opex appear to exhibit a secular or long-cyclical rising trend, such as would indicate that a base year forecasting approach was inappropriate. Accordingly, the evidence provides no justification for diverging from a base year forecasting approach for controllable opex.

5 Brief comments on benchmarking analysis

Having confirmed the appropriateness of the AER's single base year forecasting approach for SP AusNet's controllable opex, it is worth making some brief comments on SP AusNet's opex benchmarking analysis as presented in its RRP.

As noted in section 3.1 above, SP AusNet's analysis purported to show that:

- SP AusNet's forecast asset works expenditure for 2014/15 to 2016/17 (inclusive) was well below that of ElectraNet and Powerlink as measured in dollars of expenditure per million dollars of regulated asset base (RAB).[17]
- SP AusNet's actual and forecast opex for 2003/04 to 2016/17 (inclusive) was below that of other TNSPs in the NEM as measured in thousands of dollars of expenditure per gigawatt hour (GWh) of energy transmitted.[18]

In short, we do not consider that either of these propositions is very informative for assessing the appropriateness of SP AusNet's forecast opex in general or its forecast asset works opex in particular.

5.1 Forecast asset works expenditure

We do not consider the fact that SP AusNet's forecast asset works opex per million dollars of RAB is less than the forecast expenditure of ElectraNet and Powerlink to be particularly informative about the appropriateness of SP AusNet's forecast expenditure in its RRP.

Specifically, this information fails to:

- Include comparisons across all TNSPs in the NEM – only figures from ElectraNet and Powerlink were included
- Compare historical levels of asset works opex across TNSPs – no historical comparison data were provided
- Demonstrate the significance of asset works expenditure per million dollars of RAB – it may be that different TNSPs have differently configured networks that inherently require more or less asset works opex per dollar of RAB.

17 RRP, pp.69-70., especially Figure 4.7

18 RRP, p.95., especially Figure 4.14.

5.2 Actual and forecast opex

We do not consider the fact that SP AusNet's actual and forecast opex per GWh of energy transmitted to be particularly informative about the appropriateness of SP AusNet's forecast expenditure in its RRP.

Specifically, this information fails to take account of the different density, configuration and topography of SP AusNet's transmission network as compared to the networks of other TNSPs. Other TNSPs – residing in larger and less densely-population jurisdictions than Victoria – are likely to have networks that are much more spread out than SP AusNet and require more opex per GWh of energy transmitted.

6 Conclusion

A single base year forecasting approach is appropriate for forms of TNSP expenditure that satisfy the following conditions:

- The TNSP has incentives to minimise the relevant class of expenditures, subject to meeting its stipulated objectives and providing levels of service performance valued by consumers.
- The business must not have incentives to 'game' the regulatory process by shifting expenditure within a RCP to or from the base year in order to secure a higher forecast allowance.
- The relevant class of expenditure is broadly recurrent, in that past actual expenditure can provide (with the aid of transparent adjustments) a reasonable reflection of future efficient expenditure.

Given:

- the ongoing presence of an EBSS applicable to SP AusNet's opex and
- the nature of opex in general (as opposed to capex) and
- the available data on SP AusNet's historical controllable opex and asset works opex,

there appears to be no reasonable basis for moving away from a single base year forecasting approach for SP AusNet's controllable opex in general and asset works opex in particular. If a multi-base year approach were adopted, as suggested by SP AusNet, or if a capex-style (bottom-up) forecasting approach were used, it would likely result in customers being made to pay tariffs well in excess of efficient costs. This would be contrary to the National Electricity Objective.

Appendix A – Terms of reference

A Introduction

1 The Australian Energy Regulator (AER), in accordance with its responsibilities under the National Electricity Rules (NER), must make a revenue determination to be applied to SP AusNet's prescribed transmission services from 1 April 2014 to 31 March 2017 (2014–17 regulatory control period). SP AusNet's revenue proposal, submissions, consultancy reports and the AER's draft decision are available at http://www.aer.gov.au/node/19819.

2 SP AusNet submitted its transmission revenue proposal for 1 April 2014 to 31 March 2017 on 28 February 2013. The AER published its draft decision on SP AusNet's transmission revenue proposal for 2014-17 on 30 August 2013. SP AusNet must submit its revised revenue proposal by 11 October 2013. The AER must make its final decision by 31 January 2014.

3 In its draft decision, the AER did not approve SP AusNet's opex forecast. SP AusNet used a base-step-trend method to forecast most of its controllable opex, but also used a combination of a bottom-up approach and 'step changes' to forecast its asset works category of opex. In this respect it used a 'hybrid' approach to developing its total controllable opex forecast. The AER rejected this approach, and applied a base–step–trend approach to all controllable opex.

4 The AER engaged EMCa to review the opex proposal from an engineering perspective. EMCa considered SP's opex proposal was more than reasonably required.

5 The AER did not use EMCa's forecast as our substitute forecast (it was lower than SP AusNet's proposal but higher than our revealed costs forecast), because the AER's draft decision considered broader economic perspectives and the incentive framework.

6 The AER used a top-down (revealed costs) approach to develop a base–step–trend forecast, which was used to test the opex proposal. Ultimately the AER used the base-step-trend approach to develop the substitute opex forecast. The AER applied this method to all controllable opex (including asset works). The AER preferred this 'revealed costs' approach because it considered that it produced the best forecast of controllable opex for the next regulatory period to give effect to the opex criteria required by the Rules. It also maintains the incentives under the regulatory framework, and provides for the EBSS to work as intended.

7 The AER's reasoning on this matter is set out in more detail in our draft decision at: http://www.aer.gov.au/node/19819.

8 It is expected that SP AusNet will respond on this matter. The AER therefore intends to engage a consultant to critically assess the economic arguments raised by SP AusNet in its revised revenue proposal to operating expenditure forecasting and the incentive framework.

B Services required

General pre–lodgement work

9 Prior to 11 October 2013, the consultant must conduct preparatory work, including a review of material relevant to expenditure forecast with particular focus on opex; including the AER's draft decision, SP AusNet's revenue proposal and supporting information, the AER's 'Better regulation' guidelines, and the incentive framework and efficiency benefit sharing scheme (EBSS).

Post lodgement – Critique of SP AusNet's revised revenue proposal

10 Once SP AusNet's revised revenue proposal has been submitted to the AER, the consultant must critically assess SP AusNet's revised revenue proposal relating to its operating expenditure forecast. The consultant is only to provide a critical assessment of SP AusNet's revised revenue proposal and supporting information, not a 'standalone' advice on opex forecasting or incentives.

11 Given the uncertainty around the issues that will be raised by SP AusNet in its revised revenue proposal, the specific issues the consultant will address in its report are to be agreed with AER staff at the 'initial advice' stage (see section C: Key deliverables). However, broadly, the consultant must critique the key economic arguments (where relevant) that underpin SP AusNet's opex forecast and underlying opex forecast methodology. In particular, we require a critique of any arguments raised by SP AusNet (or its consultants) in respect of:

a. the incentive based regulatory framework established under the NEL and NER

b. the efficiency benefit sharing scheme (EBSS)

c. interaction of actual opex and forecast opex with the regulatory framework and EBSS.

12 The consultant must also consider the relevant provisions of the National Electricity Law (NEL) and National Electricity Rules (NER) in its advice. In particular, the consultant should consider ss7 (National Electricity Objective) and 7A (Revenue and pricing principles) of the NEL, and cl. 6A.6.5 (EBSS) and 6A.6.6 (Operating expenditure) of the NER. Note – the relevant version of the NER for SP AusNet's 2014–17 determination is version 52.

13 The critique must include a discussion of the conclusions drawn in SP AusNet's revised revenue proposal and supporting information.

14 Regulatory determinations made by the AER under the NEL and NER are subject to merits review by the Australian Competition Tribunal and judicial review by the Federal Court of Australia. Accordingly, the Consultant's services and report must be of a high professional standard that is robust, transparent, well-reasoned and defendable. As this matter may ultimately be litigated, the Federal Court guidelines for expert witnesses should be consulted. The guidelines can be found at http://www.fedcourt.gov.au/law-and-practice/practice-documents/practice-notes/cm7.

C Key deliverables and timelines

15 The key deliverable is a written report addressing the matters set out in section B. The consultant may also be required to participate in a forum with stakeholders, and a briefing to the AER Board. The timelines for these deliverables are set out below.

Deliverable	Date
Initial advice on identified issues (verbal briefing and an accompanying dot point summary)	24 October
Draft final advice	1 November
AER staff comments on draft report provided to consultant	8 November
Final advice (after considering comments by AER staff)	15 November
Potential stakeholder engagement with SP AusNet, the AER and user groups	First week of December
Potential briefing with the AER Board	First week of December

Scope of critique

This was the scope of work specified during the 'initial advice' stage of the assignment.

Frontier work will assist in assessing efficiency addressing the NEO and revenue/pricing principles.

Frontier will critique SP's RRP from an economic efficiency perspective, and respond to issues raised in the RRP on the following:

- Why the revealed cost method is as good (or better) than any other method to forecast efficient opex, given the incentive framework.
- Importance of getting the ex-ante forecast right, and as robust as possible, in context of efficiency benefit carryovers and an incentive framework.

- The implication of SP proposing a 'bottom up' forecast and the underspending of such forecasting, and then re proposing the same 'double funding' problem again, albeit with a different forecast method.
- The use of an average of 6 years to develop the efficient ' base year' alongside the application of the AER's current EBSS in the context of one actual year.
- If the AER must make an adjustment in opex (for whatever reason) because of the risk-situation, we need to make an appropriate adjustment in the EBSS so that there is no "double dipping" because of the deferred works.
- Interaction of "at least efficient costs" (in forecast opex) for a fixed regulatory period (6/3 years) and the application of 'incentives' in the context of incentives intended to drive efficiencies over time (NEL *Revenue and pricing principles*).

Appendix A – Terms of reference

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