Attachment N.1

SAPN_PUBLIC Houston Kemp Depreciation Report

June 2015

SA Power Networks

HOUSTONKEMP
Economists

Analysis of Different Approaches to Calculating Remaining Lives

Report for SA Power Networks

June 2015

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Disclaimer

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1. Introduction

I have prepared this report at the request of Minter Ellison on behalf of SA Power Networks. The context of this report is that on 30 April 2015, the Australian Energy Regulator (AER) released its preliminary decision on SA Power Networks' regulatory proposal for the 2015/16 to 2019/20 regulatory control period. As part of its preliminary decision, the AER reviewed SA Power Networks' proposed method for calculating regulatory depreciation. The AER agreed with most aspects of SA Power Networks' methodology, except for SA Power Networks' proposed method for calculating the remaining life of assets forecast to exist at 1 July 2015.

Minter Ellison has requested that we:[1]

1. Review the AER's decision on regulatory depreciation
2. Identify and describe:
   - the depreciation methodology used by SA Power Networks in its regulatory proposal;
   - the depreciation methodology used by the AER in making its decision on regulatory depreciation; and
   - other suitable methodologies that could be used to calculate regulatory depreciation for the purpose of Chapter 6 of the Rules.
3. Compare and advise on the merits of the depreciation methodologies we identify.

This report is structured as follows:

- section 2 describes the project context, including SA Power Networks' proposed approach and the AER's rationale for its decision;
- section 3 sets out our assessment of a range of approaches to estimating the remaining life of existing assets including those proposed by SA Power Networks and the AER; and
- section 4 examines the results.

1.1 Statement of credentials

This report has been prepared by Brendan Quach with assistance from Martin Chow.[2]

Brendan Quach is a Senior Economist at HoustonKemp. Brendan Quach has fifteen years of experience as an economist, specialising in regulatory and financial modelling and the cost of capital for network businesses. Brendan has recently advised Grid Australia, Energy Networks Association, Sydney Water, the Queensland Competition Authority, Brisbane Airport, Actew Water and Rio Tinto Coal Australia on a range of finance and modelling issues.

Curriculum vitae of Brendan Quach is attached to this report at Appendix B.

In preparing this report, the author Brendan Quach (herein after referred to as 'I' or 'my' or 'me') confirms that I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance that I regard as relevant have, to my knowledge, been withheld from this report. I acknowledge that I have read, understood and complied with the Federal Court of Australia's Practice Note CM 7, Expert Witnesses in Proceedings in the Federal Court of Australia. I have been provided with a copy of the Federal Court of Australia's Practice Note CM 7, Expert Witnesses in Proceedings in the Federal Court of Australia, dated 4 June 2013, and my report has been prepared in accordance with those guidelines.

[1] The terms of reference for this project provided by Minter Ellison's is reproduced in Appendix A to this report.

[2] Martin Chow is an Economist in HoustonKemp's Sydney office.

2. Project Context

Regulated businesses are able to recover the cost of their investment in assets through an allowance for regulatory depreciation over the economic life of the relevant assets. Regulatory depreciation is calculated as depreciation minus the indexation of the Regulatory Asset Base (RAB).

The regulatory depreciation allowance must comply with the requirements of the National Electricity Rules, namely:

1) the schedules must depreciate using a profile that reflects the nature of the assets or category of assets over the economic life of that asset or category of assets;[3]

2) the sum of the real value of the depreciation that is attributable to any asset or category of assets over the economic life of that asset or category of assets (such real value being calculated as at the time the value of that asset or category of assets was first included in the regulatory asset base for the relevant distribution system) must be equivalent to the value at which that asset or category of assets was first included in the regulatory asset base for the relevant distribution system; and [4]

3) the economic life of the relevant assets and the depreciation methods and rates underpinning the calculation of depreciation for a given regulatory control period must be consistent with those determined for the same assets on a prospective basis in the distribution determination for that period.[5]

SA Power Networks submitted its regulatory proposal for the 2015-20 regulatory control period to the AER on 30 October 2014, which included its proposed regulatory depreciation schedules. A key element of SA Power Networks' proposed regulatory depreciation schedules was the adoption of the "average depreciation approach" to calculating the remaining asset lives of each asset group. This approach has previously been accepted by the AER for ETSA Utilities and the Queensland distributors.[6] This approach resulted in a depreciation allowance of $936.0 million ($ nominal) for the 2015-20 regulatory period.[7]

The AER rejected SA Power Networks' proposed methodology for calculating regulatory depreciation and instead determined a regulatory depreciation allowance of $533.7 million ($ nominal), a reduction of $402.3 million ($ nominal) from SA Power Networks' proposal. A portion of this reduction in the depreciation allowance was due to the AER's decision on other aspects of the regulatory proposal such as forecast capex.

Notwithstanding these changes, a substantial portion of the reduction was due to the AER's rejection of SA Power Networks' *average depreciation approach* for calculating the remaining lives of existing assets.[8] Instead, in its draft decision, the AER calculated remaining asset lives using a *weighted average remaining life* (WARL) approach.[9]

[3] NER, cl 6.5.5 (b)(1)

[4] NER, cl 6.5.5 (b)(2)

[5] NER, cl 6.5.5 (b)(3)

[6] Page 224, AER, Draft decision | Queensland | Draft distribution determination 2010-11 to 2014-15, 25 November 2009; and page 234, AER, Final decision | Queensland distribution determination 2010-11 to 2014-15, May 2010. Page 167, AER, Final decision | South Australia distribution determination 2010-11 to 2014-15, May 2010.

[7] Page 5-8, AER, Preliminary Decision | SA Power Networks determination 2015-16 to 2019-20, Attachment 5 (Regulatory depreciation), April 2015.

[8] We note that the AER accepted substantially all other aspects of SA Power Networks' calculation of the depreciation schedules namely the proposed asset categories, the use of straight-line depreciation and proposed standard asset lives for new capex (other than for light vehicles).

[9] A detailed description of this approach is set out in section 4.1 of this report.

The AER reached this decision following its assessment of whether the WARL or the average depreciation approach better reflected the:[10]

> remaining lives that better reflect the economic life of the combined assets
>
> …
>
> depreciation schedules for the asset classes that better reflect the nature of the assets over their economic lives

Ensuring that assets are depreciated in a manner that reflects their economic life safeguards against intergenerational equity issues.[11] That is, profiles that unjustifiably bring forward depreciation result in today's customers paying a greater proportion of the asset's costs than future generations. On the other hand, profiles that unjustifiably defer depreciation result in future generations of customers paying a greater proportion of the asset's costs to the benefit of today's customers. Both cases give rise to intergenerational equity issues, although the AER only alludes to concerns with the bringing forward of depreciation.

The AER states that:[12]

> The most accurate way of estimating remaining asset lives is to track every asset individually. That is, record each asset added to the RAB and track its value over time.

In its preliminary decision for SA Power Networks the AER also sets out two secondary considerations, namely:

- administrative complexity, which was highlighted by the AER as a reason to not track individual assets;[13] and
- the benefits of having a smoother depreciation profile in the long run by not tracking assets individually.[14]

We agree with the AER that individually tracking every asset would be the most accurate method for calculating the 'true' remaining asset lives,[15] thereby, avoiding any intergenerational equity issues. Further, we agree that the primary assessment of whether the depreciation schedules for a category of assets satisfy the requirements of clause 6.5.5(b)(1) of the NER is whether they reflect, with sufficient accuracy, the economic lives of the underlying assets within that category. However, in our opinion, little or no weight should be placed on the secondary considerations raised by the AER in its preliminary decision as they are not factors that the AER is permitted to have regard to under clause 6.5.5(b) of the NER.

If a DNSP proposes a more complex approach to calculating its depreciation schedules that more accurately reflects the underlying assets, it cannot be said to be overly excessive in terms of its administration from the DNSP's perspective. In terms of the administrative burden on the AER, we note that checking the accuracy of a depreciation model is a substantially less burdensome task than developing the model. This suggests that an approach proposed by a DNSP will not be overly burdensome for the regulator, even if it involves further work.

[10] Page 5-13, AER, Preliminary Decision | SA Power Networks determination 2015-16 to 2019-20, Attachment 5 (Regulatory depreciation), April 2015.

[11] Footnote 26, page 5-13, Preliminary Decision | SA Power Networks determination 2015-16 to 2019-20, Attachment 5 (Regulatory depreciation), April 2015.

[12] Page 5-12, Preliminary Decision | SA Power Networks determination 2015-16 to 2019-20, Attachment 5 (Regulatory depreciation), April 2015.

[13] Page 5-12, Preliminary Decision | SA Power Networks determination 2015-16 to 2019-20, Attachment 5 (Regulatory depreciation), April 2015.

[14] Footnote 23, page 5-12, Preliminary Decision | SA Power Networks determination 2015-16 to 2019-20, Attachment 5 (Regulatory depreciation), April 2015.

[15] That is, the remaining asset lives if assets were not aggregated into asset categories and were not recalculated at each reset.

With respect to the AER's desire to smooth depreciation schedules, in our view this objective is misplaced. The reasons for our conclusion are that:

- as a distribution network, SA Power Networks has thousands of individual assets, and so no one asset is likely to materially impact its depreciation schedules;
- most individual assets are replaced with similar assets which would offset any fall in depreciation;
- to the extent that the AER is concerned about volatility, it is volatility in revenues or prices which concern customers, not volatility in depreciation; and
- the AER's post-tax revenue model (PTRM) smooths SA Power Networks revenues over a five year period, and so minimises the extent that lumpy depreciation results in revenue volatility.

In the following section we assess four depreciation schedules to see which approach best matches the economic life of the underlying assets.

3. Different Depreciation Approaches

There are several approaches that can be used to calculate remaining lives. The ideal approach would be to calculate depreciation for each asset individually. This approach would provide a depreciation schedule that is most aligned with the underlying mix of assets because it avoids the compromises implicit with any averaging methodology.

In this section we consider four approaches that simplify the calculation of depreciation by aggregating assets into categories or groups. Based on the asset classes that have been proposed by SA Power Networks and accepted by the AER, we have examined four approaches, namely:

1. where the opening RAB and capex incurred in each individual year in the regulatory period are treated separately (baseline approach);
2. the weighted average remaining life (WARL) approach;
3. the average depreciation approach; and
4. the WARL approach, where the opening RAB and capex incurred during the regulatory period are treated separately (WARL of capex only approach).

3.1 Opening RAB and capex by type/year (baseline approach)

The baseline approach is the approach closest to calculating depreciation for each asset individually. Under the baseline approach assets in existence at 1 July 2010 are depreciated using real straight line depreciation over the remaining asset lives adopted for the 2010-15 regulatory period. Capital expenditure in each regulatory year is grouped by asset type and then separately depreciated over their standard economic lives.

In our opinion, there are a number of distinct advantages of the baseline approach including:

- the baseline approach does not combine 1 July 2010 assets with assets from subsequent regulatory control periods and reduces the compromises associated with using a single remaining asset life for assets with disparate economic lives;
- the depreciation allowance associated with all capital expenditure from 2010/11 will be equivalent to that calculated if all new assets had been individually depreciated;[16] and
- in the longer term, when 1 July 2010 assets are fully depreciated, SA Power Networks' depreciation schedules will align with the ideal approach, ie, equivalent to having all assets individually depreciated.

We note that this asset value profile was used by the AER to assess the merits of using a WARL or an average depreciation approach.

Figure 1 replicates the AER's analysis for SA Power Networks' "Distribution Lines" asset class.

[16] On the presumption that the current standard lives are accurate.

Figure 1: Value of assets for distribution lines ($million, 2014-15)

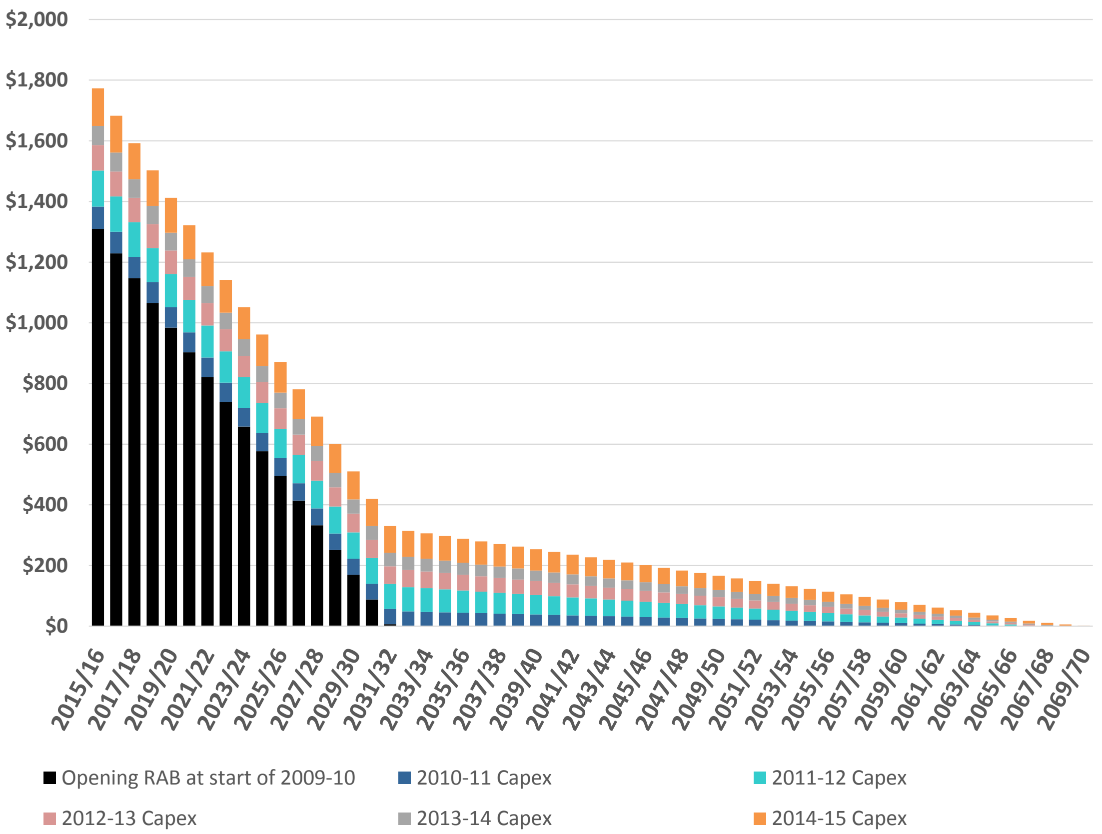


Figure 1 illustrates that a single remaining asset life (which would produce straight line reduction asset values) cannot perfectly match the economic lives of a group of assets with disparate economic lives. In other words, no single remaining asset life can correctly depreciate all of SA Power Networks' "Distribution Lines" assets that is composed of:

- new investments that occurred during the 2010-15 period, which have a remaining life at 1 July 2015 of close to 55 years; and
- assets in existence at the start of the 2010-15 regulatory period, which have a remaining life at 1 July 2015 of 16.1 years.

3.2 The WARL approach

The WARL approach involves calculating the remaining life for each asset class as at 30 June 2015 based on:

- the weighted average remaining life (by value) of assets which existed before the 2010-15 regulatory control period; and
- capex incurred during the 2010-15 regulatory period.

In practice, the remaining asset life is calculated as:

$$ARL^i = \frac{\sum RL^i \times AV^i}{\sum AV_t^i}$$

Where

ARL^i is the average remaining life of asset group *i*, at the end of the regulatory period;

RL^i is the remaining life at the end of the regulatory period of assets in group *i*, including the opening RAB; and

AV^i is the value of assets at the end of the regulatory period of assets in group *i*, including the opening RAB.

3.3 The average depreciation approach

The average depreciation approach proposed by SA Power Networks in its October 2014 regulatory proposal calculates the remaining life for each asset class as the asset value as at 30 June 2015 divided by average forecast regulatory depreciation for the 2015-20 regulatory period. In practice, the remaining life is calculated as:

$$ARL^i = \frac{\sum RAV^i}{\sum Dep_t^i \times 0.2}$$

Where

ARL^i is the average remaining life of asset group *i*, at the end of the regulatory period;

RAV^i is the real value of assets at the end of the regulatory period of assets in group *i*, including the opening RAB; and

Dep_t^i is the sum real value of depreciation over the following regulatory period, for all assets in group *i*, in existence at the end of the current regulatory period.

3.4 WARL of capex only approach

The WARL of capex only approach represents a more refined version of the WARL approach – it separates the opening RAB and capex incurred. For each asset type, the WARL of capex only approach calculates a remaining life for the opening RAB, and a remaining life for capex incurred during the regulatory period. Consequently, the outputs from this approach involve less averaging when compared to the WARL and average depreciation approach, and offer results that are more aligned with the business' underlying asset mix.

Specifically, this approach:

- retains the asset groups that existed at the start of the regulatory period - the remaining life of these asset groups is simply 5 years less than that specified in the last determination; and
- combines capex of each asset group over the 2010-15 period into a new asset category with the remaining asset lives of these groups calculated using the AER's preferred WARL approach.

In other words, under this approach the business would comply with the AER's preferred methodology for determining remaining lives. However, by separating existing assets from new capex SA Power Networks avoids combining assets with disparate economic lives. Consequently, this approach provides a deprecation allowance that more closely aligns to the underlying economic lives of assets.

We note that this approach was proposed by TransGrid and was accepted by the AER in its final decision for the regulatory control period of 2015-19.[17]

[17] Page 5-7, AER, Final Decision | TransGrid Determination 2014-15 to 2018-19, Attachment 5.

4. Assessment of different approaches

In this section we assess the four identified depreciation approaches, namely:

1. where the opening RAB and capex incurred in each individual year in the regulatory period are treated separately (baseline approach);
2. the weighted average remaining life (WARL) approach;
3. the average depreciation approach; and
4. the WARL approach, where the opening RAB and capex incurred during the regulatory period are treated separately (WARL of capex only approach).

The remaining lives for key asset types under the different approaches are shown in Table 1.

Table 1: Standard life and remaining asset life (as at 1 July 2015) for key asset classes

Asset type	Standard Life	WARL approach	Average depreciation approach	WARL of capex only approach	
				Assets held at 30 June 2010	Assets acquired post 30 June 2010
Sub-Transmission Lines	55.0	49.9	50.0	44.9	52.4
Distribution Lines	55.0	25.7	20.6	16.1	53.1
Substations	45.0	30.4	23.4	13.3	43.0
Distribution Transformers	45.0	18.6	14.7	13.0	42.8
LVS	55.0	33.4	17.4	9.7	53.1
Communications	15.0	9.5	8.1	3.0	14.1
Contributions	40.2	33.6	33.7	30.3	38.0
Land	0.0	0.0	0.0	0.0	0.0
Substation land	0.0	0.0	0.0	0.0	0.0
Easements	0.0	0.0	0.0	0.0	0.0
Buildings	40.0	27.4	24.1	18.4	38.0
Vehicles – 15 years	20.0	15.2	12.1	2.1	18.3
Vehicles – 10 years	10.0	0.0	0.0	0.0	0.0
Light vehicles	5.0	3.5	4.9	2.1	3.5
IT Assets	5.0	3.9	4.9	0.0	3.9
Plant & Tools/Office Furniture	10.0	7.3	7.4	2.2	8.0
WIP	n/a	n/a	n/a	n/a	n/a
Equity raising costs	52.3	48.3	47.4	45.0	48.3

Source: HoustonKemp analysis
Note: Please note that these results were prepared for comparison between the different approaches, and may differ slightly from SA Power Networks' Revised Proposal.

Further note: This table does not tabulate the remaining asset lives calculated under the baseline approach. However, the remaining asset lives associated with the baseline approach are depicted in Figure 2.

We have assessed each of these depreciation approaches by:

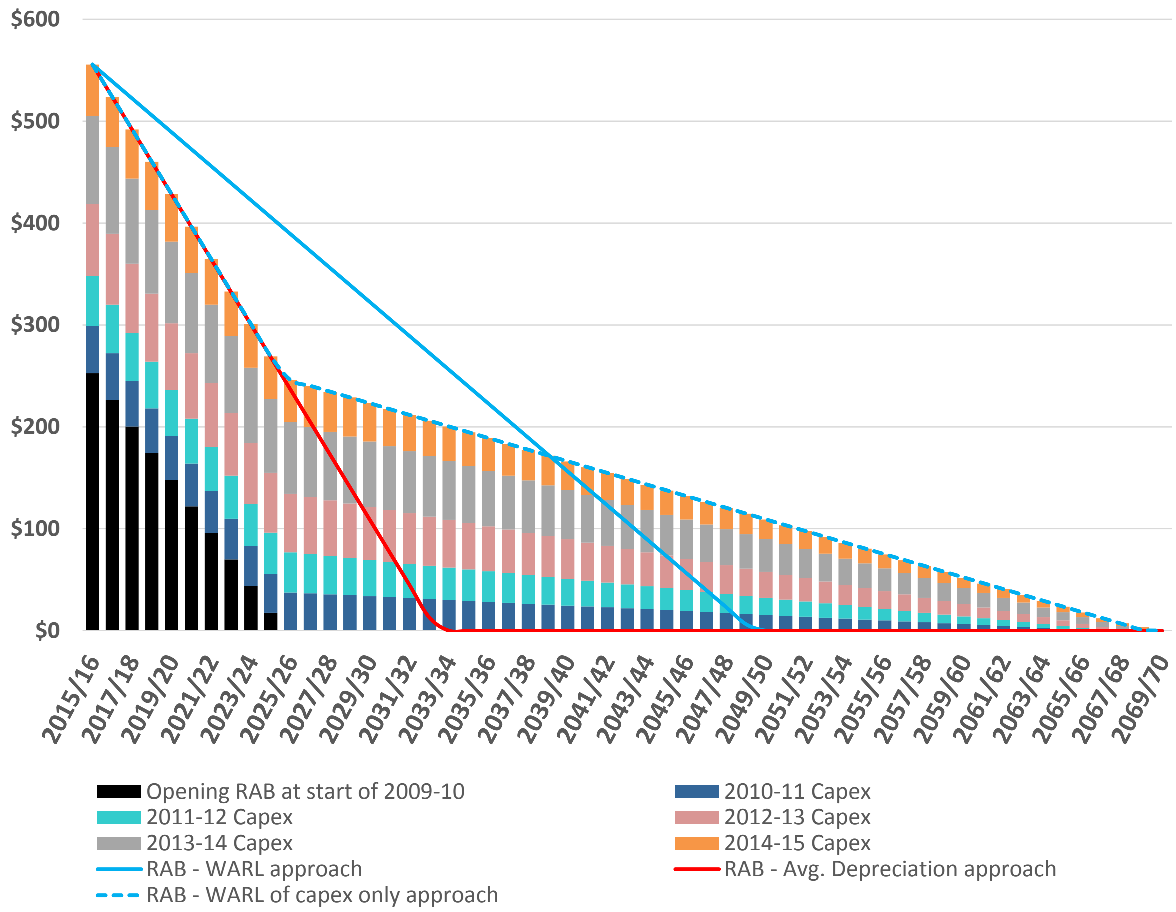
- replicating the analysis undertaken by the AER in its preliminary determination and assessed the impact of the various depreciation approaches on the asset values of illustrative asset categories; and
- determining the total depreciation allowance of SA Power Networks.

4.1 Assessment of illustrative SA Power Networks asset classes

As noted above, the AER in its preliminary determination assessed the WARL and average depreciation approaches against the baseline approach. This is because the baseline approach produces results that are most refined, and so most reflective of the nature of assets owned by SA Power Networks.

We note that the AER assessed the asset values of the 'Low Voltage System' assets in its preliminary decision. We have replicated this analysis in Figure 2 below.

Figure 2: Value of 'Low Voltage System' asset class ($million, 2014-15)



Note: the bar chart in the figure represents the outcomes under the baseline approach

In addition to projecting asset values through time we have also calculated the annual capital costs (depreciation and return on capital)[18] under different depreciation approaches. Figure 3 shows the difference between annual capital costs under the baseline approach and those associated with:

- the WARL depreciation approach;
- the average depreciation approach; and
- the WARL of capex depreciation approach.

Figure 3: Difference between the capital revenues under the baseline approach and other depreciation approaches – 'Low Voltage System' asset class ($million, 2014-15)

Figure 2 again illustrates that a single remaining asset life (which would produce a straight line reduction in asset values) cannot perfectly match the economic lives of a group of assets with disparate economic lives. In other words, no single remaining asset life can correctly depreciate all of SA Power Networks' "Distribution Lines" assets that is composed of:

- new investments that occurred during the 2010-15 period, which have a remaining life at 1 July 2015 of close to 55 years; and
- assets in existence at the start of the 2010-15 regulatory period, which have a remaining life at 1 July 2015 of 16.1 years.

[18] A pre-tax real WACC of 3.48 per cent as reported in SA Power Networks' preliminary determination PTRM 2015-20.

Further we also note that the AER in its preliminary determination had the following observations:[19]

- the 'true' economic lives of LVS assets in existence at 30 June 2015 are anticipated to be fully depreciated by 2070/71 (ie, in 55 years, at the end of the economic life of Low Voltage System (LVS) assets acquired in 2014/15);
- under the WARL approach, the asset value starts above the value when the assets are tracked individually, but drops below it in later years and will fully depreciate the assets after 34 years; and
- the average depreciation approach appears to match the 'true' depreciation of assets over the first 8 years. However, from then it significantly increases above the required level before falling significantly below, with the result being that all assets are fully depreciated within 18 years.

The AER concludes from these observations that:[20]

> We consider the WARL approach best deals with this issue, producing a more balanced outcome in the long run. In the example, the period when the asset value is higher than if assets where tracked individually (years 1–23) is matched by the period when the asset value is lower than if the assets were tracked individually (years 24–54).
>
> The average depreciation approach does not involve any balancing of the kind that occurs under the WARL approach, and it leads to an inappropriate outcome. It does not recognise that existing assets (the black columns) expire after 9.7 years (noted by the kink in the columns of the individually tracked assets). So, it continues to depreciate this asset class as if the old assets still existed, and it results in accelerated depreciation of all assets.

In our opinion, these conclusions are not supported by the observed projection of the asset value of 'Low Voltage System' assets. Rather as illustrated by Figure 3, the difference between the capital revenues under the baseline approach and those:

- under the WARL approach results in SA Power Networks:
  - substantially under recovering capital revenues from customers over the first nine years;
  - substantially over recovering capital revenues from customers over the years 10 to 33; and
  - from years 34 to 54 substantially under recovering capital revenues from customers;
- under the average depreciation approach results in SA Power Networks:
  - correctly recovers capital revenues from customers over the first eight years;
  - over the years 9 to 18 substantially over recovering capital revenues from customers; and
  - from years 19 to 54 substantially under recovering capital revenues from customers;
- under the WARL of capex approach results in SA Power Networks generally recovering the correct amount of capital revenues.

In other words, **both** the WARL and average depreciation approaches will give rise to substantial intergenerational equity issues, with customers over time either paying substantially more or less than what would be warranted if assets were more accurately depreciated. Consequently, neither approach is obviously better than the other in terms of minimising intergenerational equity issues.

In contrast, a DNSP that adopted either the baseline approach or the WARL of capex depreciation approach does not give rise to any intergenerational equity issues.

[19] Page 5-16, Preliminary Decision | SA Power Networks determination 2015-16 to 2019-20, Attachment 5 (Regulatory depreciation), April 2015.

[20] Pages 5-16 and 5-17, Preliminary Decision | SA Power Networks determination 2015-16 to 2019-20, Attachment 5 (Regulatory depreciation), April 2015.

4.2 Total depreciation allowance

We have also considered the impact of different depreciation approaches on SA Power Networks' total depreciation allowance. Table 2 sets out the regulatory depreciation allowance under each approach for the 2015-20 regulatory period, based on the numbers contained in SA Power Networks' revised proposal.

Table 2: Regulatory depreciation under the different depreciation approaches ($m, nominal)

Depreciation Approach	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Baseline approach	**$133.9**	**$205.9**	**$218.1**	**$233.3**	**$249.8**	**$1,041.0**
WARL approach	$106.7	$129.0	$153.2	$172.0	$162.3	$723.1
Avg. depreciation approach	$156.8	$181.1	$207.5	$232.9	$258.0	$1,036.2
WARL of capex only approach	$130.5	$204.1	$224.3	$241.7	$220.4	$1,021.0

Note: Please note that these results were prepared for comparison between the different approaches, and may differ slightly from SA Power Networks' Revised Proposal.

The results are generally consistent with the conclusions arising from the analysis above of the depreciation of individual asset categories. Notably, the WARL approach materially underestimates the SA Power Networks' depreciation allowance over the 2015-20 regulatory period by $318 million, by providing a total depreciation allowance of $723 million, compared to the more accurate estimate of $1,041 million under the baseline approach. The WARL approach underestimates the depreciation allowance because of the substantial difference (as shown in Table 1) in the economic lives of a number of important asset categories as at 1 July 2015 including:

- Distribution Lines – where the remaining life of pre-1 July 2010 is 16.1 years, compared to the remaining life for new capex of 53.1 years;
- Substations – where the remaining life of pre-1 July 2010 is 13.3 years, compared to the remaining life for new capex of 43.0 years;
- Distribution Transformers – where the remaining life of pre-1 July 2010 is 13.0 years, compared to the remaining life for new capex of 42.8 years; and
- Low Voltage System – where the remaining life of pre-1 July 2010 is 9.7 years, compared to the remaining life for new capex of 53.1 years.

As illustrated by Figure 1, where there is a substantial disparity between the remaining asset lives and standard lives, together with a substantial pre-1 July 2010 asset value, then the WARL approach will materially underestimate the depreciation allowance of the combined asset group over the 2015-20 regulatory control period.

We also note that there is no material difference between the total depreciation allowances provided by the WARL of capex only approach and the baseline approach.

Finally the average depreciation approach will closely match SA Power Networks' correct total depreciation allowance over the 2015-20 regulatory control period, although we note that the depreciation allowance would diverge materially in subsequent years.

4.3 Conclusion

Our analysis clearly shows that a single remaining asset life cannot generate a depreciation allowance that accurately reflects a group of assets with disparate economic lives. Consequently, depreciation schedules that are generated by combining existing assets (with short remaining lives) and new capital expenditure will result in substantial intergenerational equity issues.

Consequently, we recommend that SA Power Networks adopts either:

- the baseline approach, which results in the depreciation for all post 1 July 2010 capital expenditure being precisely calculated, while assets in existence at 1 July 2010 are depreciated over the remaining asset lives determined in SA Power Networks 2010 final decision; or
- the WARL of capex only approach, which separately calculates for each asset category the economic lives of existing assets and new capex over each regulatory period thereby avoiding the distortions associated with combining assets with disparate economic lives.

Furthermore, we disagree with the AER's conclusion that the WARL approach results in a balanced outcome in the long run. As shown in Figure 3 the WARL approach will result in substantial intergenerational equity issues, with customers periodically either underpaying or overpaying the capital related costs of each asset group. In addition, we show in Table 2 that the WARL approach will underestimate SA Power Networks' total depreciation allowance by $318 million over the 2015-20 regulatory period.

A1. Terms of Reference

Houston Kemp: Terms of Reference

We refer you to the AER's Preliminary Determination for SA Power Networks for the 2015/16–2019/20 regulatory control period, and in particular the AER's decision on regulatory depreciation and its reasons in Attachment 5 to the Preliminary Determination (the **Depreciation Decision**).

You are asked to:

1. Review the Depreciation Decision.
2. Identify and describe:
   (a) the depreciation methodology used by SA Power Networks in its regulatory proposal;
   (b) the depreciation methodology used by the AER in making the Depreciation Decision; and
   (c) other suitable methodologies that could be used to calculate regulatory depreciation for the purpose of Chapter 6 of the Rules.
3. Compare and advise on the merits of the depreciation methodologies described in your report.

Please note that the Federal Court of Australia has guidelines for expert witnesses, a copy of which can be found at: http://www.fedcourt.gov.au/law-and-practice/practice-documents/practice-notes/cm7. In preparing your report, please:

(a) read the guidelines (paying particular attention to those relating to an expert's duty to the court in section 1); and

(b) ensure that you satisfy the requirements set out in section 2 (where applicable).

A2. Curriculum Vitae

Brendan Quach

Senior Economist

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Website: houstonkemp.com

A2.1 Overview

Brendan has worked a consulting economist, specialising in network economics and finance in Australia, New Zealand and Asia Pacific region. Over the last 13 years Brendan has advised clients on the application of regulatory principles to airports, ports, telecommunications electricity transmission and distribution networks, water networks and gas pipelines. He has provided advice on application of the building block approach, incentive mechanisms, operating and capital allowances, financing and asset valuation to businesses, a regulators and governments.

Brendan is a specialist in the cost of capital for use in regulatory price reviews and contract arbitrations. He has authored reports on all aspects of the cost of capital including equity estimation techniques, the impact of tax imputation credits, and estimating benchmark debt costs.

A2.2 Qualifications

1991-1995	**Australian National University** Bachelor of Economics (High Second Class Honours)
1991-1997	**Australian National University** Bachelor of Laws

A2.3 Career Details

2014 -	**HoustonKemp** Economist, Sydney
2001-2014	**NERA Economic Consulting** Economist, Sydney
1998-1999	**Australian Chamber of Commerce and Industry**

A2.4 Finance

2015	Sydney Water Estimates of the equity beta for a benchmark water utility Provided an expert report to be submitted to the NSW economic regulator (IPART) on empirical evidence of the equity beta for a water utility in the UK and North America.
2014-15	Sale of the Port of Melbourne Cost of capital and financial modelling Provided strategic advice to Victorian Department of Treasury and Finance on the financial implications of different regulatory regimes. Provided a indicative cost of capital estimate for the port.
2014-15	TransGrid Cost of Capital Co-authored two expert reports submitted by TransGrid in support of its 2014-18 revenue proposal. The expert report covered all aspects of the new cost of capital framework, including return on equity estimates generated by the CAPM, Black CAPM, the Fama-French three-factor model, and DGMs, and the approach method of transitioning to a trailing average cost of debt.
2013	Sydney Water Corporation Cost of capital estimation Preparation of two expert reports for submission to the Independent Pricing and Regulatory Tribunal (IPART) on the framework for determining the weighted average cost of capital for infrastructure service providers.
2013	**Queensland Competition Authority** **Price review** Undertook an independent quality assurance assessment of the models used to calculate regulated revenues for Queensland water utilities. The review considered: the formulation of the WACC; the intra year timing of cash flows; and the structural, computational and economic integrity of the models.
2012-13	**Gilbert + Tobin/Rio Tinto Coal Australia** **Assistance in drafting expert report on port prices** Analysis and expert reports prepared in the context of an arbitration concerning the price to be charged for use of the coal loading facilities at Abbott Point Coal Terminal. Issues addressed included asset valuation, cost of capital, forecast operation and maintenance costs and the economic interpretation of building block regulation.
2012-13	**Ashurst/Brisbane Airport Corporation** **Draft access undertaking** Advice, analysis and expert report on the weighted average cost of capital (WACC) in the context of the preparation of a draft access undertaking specifying the basis for determining a ten year price path for landing charges necessary to finance a new parallel runway at Brisbane airport.

2012	**APA GasNet** **Assistance in drafting cost of capital submission** Provided drafting assistance and strategic advice to APA on GasNet's cost of capital submission to the AER for the Victorian principal gas transmission network.
2012	**APA Brisbane to Roma Pipeline** **Assistance in drafting cost of capital submission** Provided drafting assistance and strategic advice to APA on the Brisbane to Roma Pipeline cost of capital submission to the AER.
2012	**Energy Networks Association** **Rate of return framework guideline** Co-authored a number of expert reports submitted to the Australian Energy Regulator on the rate of return framework guideline. These report considered a range of financial issues including: the applicability of various financial models to the estimation of the cost of equity; the estimates of the cost of equity from the Black CAPM; estimates of the historic market, size and value premiums; and the payout ratio of created imputation credits.
2012	**Energy Networks Association** **Advice on the new rate of return framework** Advice to the Energy Networks Association on the appropriate the implications of the new allowed rate of return framework to apply to electricity and gas transmission and distribution businesses. This report considered a range of financial models and other information that the regulator should have regard to when setting the regulated return on equity.
2012	**Victorian Gas Networks** **Black Capital Asset Pricing Model** Brendan co-authored a report that examined whether a version of the Black CAPM is better able than an empirical version of the Sharpe-Lintner (SL) CAPM to produce an estimate of the cost of equity that meets the requirements of Rule 87 (1) of the National Gas Rules (NGR). Following an examination of Australian financial data we concluded that an empirical version of the Black CAPM is better able than an empirical version the SL CAPM.
2011-12	**Energy Networks Association** **Review of Economic Regulation of Network Service Providers** Advice and expert reports submitted to the Australian Energy Market Commission on the new allowed rate of return framework to apply to electricity and gas transmission and distribution businesses, as proposed by the Australian Energy Regulator and the Energy Users Rule Change Committee.

2011-12	**Energy Networks Association** **Review of Economic Regulation of Network Service Providers** Advice and expert reports submitted to the Australian Energy Market Commission on the expenditure and incentive frameworks to apply to electricity transmission and distribution businesses, as proposed by the Australian Energy Regulator.
2011	**Multinet Gas and SP AusNet - Gas Distribution** **Report on the market risk premium** Co-authored a report that examined a number of issues arising from the draft decision on Envestra's access proposal for the SA gas network. The report considered whether: the historical evidence supported the use of a long term average of 6 per cent; there is any evidence to warrant a MRP at it long term average; and the evidence relied on by the AER to justify its return to a MRP of 6 per cent.
2011	**Dampier to Bunbury Natural Gas Pipeline - Gas Transmission** **Cost of equity of a regulated natural gas pipeline** Co-authored two reports that updated the cost of equity for a gas transmission business and responded to issues raised by the regulator in its draft decision. The report re-estimated the cost of equity of a gas distribution business using the Sharpe Lintner CAPM, Black CAPM, Fama-French three-factor model and a zero beta version of the Fama-French three-factor model.
2010-11	**Queensland Competition Authority** **Weighted Average Cost of Capital (WACC) for SunWater** Retained to provide two expert reports on the WACC for SunWater a Queensland rural infrastructure business. The first report considered issues pertaining to whether a single or multiple rates of return can be applied across SunWater's network segments. The second report focuses market evidence on the appropriate rate of return for SunWater.
2011	**Mallesons Stephens Jaques/ActewAGL Distribution** **Determining the averaging period** Assisted in the development of an expert report that considered the economic and financial matters arising from the Australian Energy Regulator's decision to reject ActewAGL's proposed risk free rate averaging period.
2010	**Industry Funds Management/Queensland Investment Corporation** **Due diligence, Port of Brisbane** Brendan was retained to advise on various regulatory and competition matters likely to affect the future financial and business performance of the Port of Brisbane, in the context of its sale by the Queensland government.

2010	**Dampier to Bunbury Natural Gas Pipeline (DBNGP) - Gas Transmission** **Cost of equity of a regulated natural gas pipeline** Co-authored a report that examined four well accepted financial models to estimate the cost of equity for a gas transmission business. The report of estimating the cost of equity of a gas distribution business using the Sharpe Lintner CAPM, Black CAPM, Fama-French three-factor model and a zero beta version of the Fama-French three-factor model.
2009-10	**Jemena - Gas Distribution** **Cost of equity of a regulated natural gas distribution network** Co-authored two reports on the use of the Fama-French three-factor model to estimate the cost of equity for regulated gas distribution business. The report examined whether the Fama-French three-factor model met the dual requirements of the National Gas Code to provide an accurate estimate of the cost of equity and be a well accepted financial model. Using Australian financial data the report also provided a current estimate of the cost of equity for Jemena.
2009	**WA Gas Networks** **Cost of equity of a regulated natural gas distribution network** Co-authored a report that examined a range of financial models that could be used to estimate the cost of equity for a gas distribution business. The report of estimating the cost of equity of a gas distribution business using the Sharpe Lintner CAPM, Black CAPM, Fama-French three-factor model and Fama-French two-factor model. The report examined both the domestic and international data.
2009	**Jemena and ActewAGL** **Cost of equity of a regulated natural gas distribution network** Co-authored a report on alternative financial models for estimating the cost of equity. The report examined the implication of estimating the cost of equity of a gas distribution business using the Sharpe Lintner CAPM, Black CAPM and Fama-French models. The report examined both the domestic and international data.
2009	**Prime Infrastructure** **Sale of Dalrymple Bay Coal Terminal (DBCT)** Brendan provided regulatory advice to a number of potential bidders for the assets of DBCT. Advice included an assessment of the rate of return parameters, depreciation, regulatory modelling and the regulatory arrangements in Queensland.
2008	**Joint Industry Associations - APIA, ENA and Grid Australia** **Weighted Average Cost of Capital for a regulated energy network** Assisted in the drafting of the Joint Industry Associations submission to the Australian Energy Regulator's weighted average cost of capital review. The submission examined the current market evidence of the cost of capital for Australian regulated electricity transmission and distribution businesses.

2008	**Joint Industry Associations - APIA, ENA and Grid Australia** **Weighted Average Cost of Capital for a regulated energy network** Expert report for the Joint Industry Associations on the value of imputation credits. The expert report was attached to their submission to the Australian Energy Regulator's weighted average cost of capital review. The report examined the current evidence of the market value of imputation credits (gamma) created by Australian regulated electricity transmission and distribution businesses.

A2.5 Regulation

2015	**Ergon Energy** **Review of regulatory depreciation** Provided Ergon with an internal strategy paper assessing different methods for calculating the remaining lives of asset or groups of assets.
2014	**Ausgrid** **Application of the AER's efficiency benefit sharing scheme** Brendan provided expert advice to Ausgrid on the estimation of the efficiency carry-forward to be applied in the 2014-19 period. This advice extended to strategic advice on the implications of the AER's Better Regulation new EBSS.
2014	**Johnson Winter & Slattery/ATCO GAS** **Application of depreciation options under the new gas rules** Assisted in the drafting of an expert report on depreciation options consistent with the new gas rules for ATCO Gas for submission to the Economic Regulation Authority of Western Australia.
2013	**Energy Networks Association** **Submission to the AER's Proposed Efficiency Incentive Schemes** Brendan led a team that undertook to quantitatively investigate the incentive properties of the Australian Energy Regulator's (AER's) proposed efficiency schemes. The output of this assignment was an expert report to the AER's Better Regulation issues paper and internal advice to the ENS on the implications on aspects of the draft determination.
2013	**Actew Corporation** **Interpretation of economic terms** Advice on economic aspects of the draft and final decisions of the Independent Competition and Regulatory Commission in relation to the price controls applying to Actew.

2012-13	**Gilbert + Tobin/Rio Tinto Coal Australia** **Assistance in drafting expert report on port prices** Analysis and expert reports prepared in the context of an arbitration concerning the price to be charged for use of the coal loading facilities at Abbott Point Coal Terminal. Issues addressed included asset valuation, cost of capital, forecast operation and maintenance costs and the economic interpretation of building block regulation.
2012	**ACTEW Water** **Review of regulatory models** Brendan provided strategic and analytical advice to ACTEW on its regulatory models. The analysis included analysis of the risks and challenges of adopting a post-tax revenue model and the application of expenditure incentive mechanisms.
2012	**Queensland Competition Authority** **Review of the retail water regulatory models** Brendan undertook an independent quality assurance assessment of the financial models relied on by the QCA to set the regulated revenues of SunWater. The review considered: SunWater's Financial model, a model used by SunWater to calculate future electricity prices, an renewals annuity model, as well as the QCA's regulatory model. These models established a set of recommended prices for each of the 30 irrigation schemes operated by SunWater for the period 2014 to 2019.
2011	**Queensland Competition Authority** **Review of the retail water regulatory models** Undertook an independent quality assurance assessment of the models used to calculate regulated revenues for Queensland Urban Utilities, Allconnex Water, and Unitywater. The review considered: the formulation of the WACC; the intra year timing of cashflows; and the structural, computational and economic integrity of the models.
2011	**Queensland Competition Authority** **Review of the wholesale water regulatory models** Undertook an independent quality assurance assessment of the models used to calculate regulated revenues for LinkWater, Seqwater; and WaterSecure. The review considered: the formulation of the WACC; the intra year timing of cashflows; and the structural, computational and economic integrity of the models.
2010-2011	**Minter Ellison /UNELCO** **Review of regulatory decision by the Vanuatu regulator** Assisted in the development of an expert report on a range of matters arising from the Vanuatu regulator's decision to reset electricity prices under four concession contracts held by UNELCO. The matters considered included the methodology employed to calculate the new base price, the appropriateness of the rate of return, the decision by the regulator to reset future prices having regard to past gains/losses.

2010	**Orion Energy, New Zealand** **Information disclosure regime** Provided advice and assistance in preparing submissions by Orion to the New Zealand Commerce Commission, in relation to the Commission's proposed weighted average cost of capital for an electricity lines businesses. Issues addressed included the financial model used to calculate the required return on equity, the appropriate term for the risk free rate and the WACC parameter values proposed by the Commission.
2010	**Grid Australia** **Amendments to the AER's transmission revenue and asset value models** Developed and drafted a submission to the AER on the proposed amendments to the AER's post-tax revenue model (PTRM) and roll forward model (RFM). The proposal focused on a number of suggestions to simplify and increase the usability of the existing models.
2009	**CitiPower and Powercor – Victorian Electricity Distribution Network Reliability Incentive Mechanism (S-factor)** Brendan was engaged by CitiPower and Powercor to provide advice on the proposed changes to the operation of the reliability incentive mechanism and was subsequently engaged to analysis the final version of the new arrangements. The advice considered the effects of the proposed changes to the operation of the two distribution network service providers. Specifically, how the 'S-factors' would be changed and implications this has to the revenue streams of the two businesses. A comparison was also made with the current ESC arrangements to highlight the changes to the mechanism.
2007	**Electricity Transmission Network Owners Forum (ETNOF)** **Amendments to the AER's transmission revenue and asset value models** Developed and drafted a submission to the AER on the proposed post-tax revenue model (PTRM) and roll forward model (RFM) that would apply to all electricity transmission network service providers (TNSPs). The proposal focused ensuring that the regulatory models gave effect to the AER's regulatory decisions and insures that TNSPs have a reasonable opportunity to recover their efficient costs.

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