Report prepared for the Australian Energy Regulator

Modelling SAPN street lighting asset base and revenue - 2010-2015

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Introduction

1. We have prepared this report following instructions from the Australian Energy Regulator (AER). The AER is required to arbitrate in an access dispute between public lighting customers (PLC) and SA Power Networks (SAPN).

2. The AER's instructions were:[1]

   (a) Would you please model an estimate of the opening RAB for SAPN's public lighting assets at 1 July 2010, taking the SKM ODRC value at 1 July 1998 as the starting point and rolling it forward, assuming all assets – both, those assets existing at the time of the SKM valuation, and assets added subsequently – are rolled forward to 30 June 2005 with a 20-year asset life assumption, and then the remaining undepreciated value is rolled-forward to 30 June 2010 assuming a 28-year asset life.

   (b) Based on this opening RAB, please calculate the annual revenue requirement consistent with the approach in the PTRM for financial years 2011 to 2015. Do not include the 'elevation charge' in this calculation.

   (c) To the extent that this modelling indicates SAPN has over-recovered or under-recovered revenue over the dispute period, please provide present value estimates (in 2018/19) based on a discount rate of the regulatory WACC.

   (d) Would you please provide a report and supporting workbook for the above.

3. To estimate SAPN's annual revenue requirement (ARR) for financial years 2011 to 2015 we need to estimate both asset- and non-asset-related cost inputs. The assumptions on which these estimates were based are:

   (a) The opening RAB, estimated on the basis described in paragraph 2(a) is used to estimate the asset components of the annual revenue requirement consistent with the approach in the AER's PTRM.

   (b) Overhead and maintenance costs are based on values provided by SAPN, which they determined in accordance with their cost allocation methodology.

   (c) Tax payable is calculated based on the PTRM method, and using an opening tax asset base for 1 July 2010 that excludes contributed assets.

4. Consistent with earlier instructions from the AER, we have used the most recent versions of the PTRM and RFM models to undertake this analysis.

[1] Email correspondence, 7 November 2018.

Summary

5. Based on the assumptions and methods set out in this report, we estimate the over-recovery of public lighting revenue by SAPN in each of the years 2010/11 to 2014/15 as set out in table 1 below. Applying the nominal WACC as the discount rate, the present value in 2018/19 of the over-recovery is $13,657,998.76.

Table 1 Actual SAPN revenue and estimated building block revenues

	2010/11	2011/12	2012/13	2013/14	2014/15
SAPN revenue	$14.45m	$15.17m	$15.57m	$16.09m	$16.65m
Building block revenue	$12.55m	$13.11m	$13.83m	$15.08m	$15.08m
Over (under) recovery	$1.90m	$2.06m	$1.74m	$1.01m	$1.57m

Opening RAB

6. To determine the appropriate return on and of capital over the period 2010/11 to 2014/15, we first estimate the opening regulatory asset base (RAB) for 2010/11. The AER has instructed us to adopt the valuation prepared by Sinclair Knight Merz (SKM) as at 30 June 1998, and roll this forward using a method consistent with the most recent versions of the PTRM and RFM.

7. The SKM valuation of public street lighting assets is referred to in two earlier regulatory decisions relating to public lighting tariffs.[2] To establish an opening RAB for 1 July 2010, the 1998 RAB needs to be adjusted for capital expenditure (capex) net of capital contributions, depreciation and inflation (indexation).

8. We used data on gross capital expenditure, capital contributions and inflation from the 2009 decision of ESCOSA.[3]

9. Depreciation is calculated on a straight line basis over the remaining useful life of the assets. We have assumed that the assets were 9 years old (on average) at the time of the SKM valuation. The AER has instructed us to assume that all public lighting assets had an expected life of 20 years until 30 June 2005. On 1 July 2005, the asset life was increased to 28 years and the remaining undepreciated value at that time is depreciated accordingly.

10. The PTRM/RFM calculates the return on capital based on the opening RAB. Capex is assumed to occur mid-year, and is added to the RAB at the end of the year in which it occurs. A half year WACC allowance is added to capex to compensate for lost return on new assets, giving effect to the mid-year assumption.[4] The adjusted capital value, including the WACC allowance, is added to the closing RAB and depreciated over the useful life of the assets.

11. The half year WACC allowance in the RFM is calculated using the real vanilla WACC and actual inflation. This WACC differs from the pre-tax WACC value used by regulators over the period 1998/99 to 2009/10. The derivation of the real vanilla WACC is set out in the appendix.

12. Applying the method and assumptions outlined above, the opening RAB for 1 July 2010 is $34.60 million.

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2 ESCOSA, *ETSA Utilities' public lighting excluded service charges: fair and reasonable determination*, December 2009; SAIIR, *Public street lighting tariffs: final report*, November 2000.

3 Appendix 1, Asset Roll Forward Calculation, ESCOSA, ibid. The capital values are the same as contained in the Incenta rollforward spreadsheet (except for the correction of one minor typographical error in 2010).

4 IPART, Comparison of financial models - IPART and Australian Energy Regulator - Research — Information Paper, July 2012, section 3.2.1.

Revenue

13. The AER has asked us to estimate the annual revenue requirement for SAPN's public lighting service consistent with the PTRM to compare with the annual revenue SAPN reports it actually recovered. We have used the most recent versions of the AER's PTRM model to calculate the unsmoothed annual revenue requirement for SAPN's public lighting service; other parts of the PTRM model were not used.

14. In the AER's PTRM building block model, for any year t in regulatory period j, the annual revenue requirement (ARR) is the sum of the expected nominal return on capital (ENRC), regulatory depreciation (RegD), nominal opex (O), revenue adjustments (RA), and tax payable (Tax). This is shown in equation (1):

$$ARR_t^j = ENRC_t^j + RegD_t^j + O_t^j + RA_t^j + Tax_t^j \quad (1)$$

15. Regulatory depreciation is defined as depreciation (or the nominal return of capital) (D) less an allowance for inflation (AI), that is:

$$RegD_t^j = D_t^j - AI_t^j$$

16. At the heart of the dispute between SAPN and the PLC is the value of the opening RAB at 1 July 2010, and hence the appropriate value for the nominal return on and of capital. In the previous section, we provide the value of the opening RAB consistent with the approach used by the AER in the PTRM/RFM based on an assumed useful life of 20 years until 30 June 2005, when the useful life of the assets is assumed to have increased to 28 years.

17. In this section, we:

- derive values for the nominal return on and of capital consistent with the opening RAB at 1 July 2010
- describe our approach to estimating the other (non-asset related) building blocks required by the PTRM.

18. Table 2 summarises the results we obtain and hence the total building block revenue for SAPN's public lighting services.

Table 2 Total building block revenue, initial asset life 28 years

	2010/11	2011/12	2012/13	2013/14	2014/15
Return on asset	$3.38m	$3.45m	$3.55m	$3.64m	$3.67m
Return of asset	$1.80m	$1.94m	$2.10m	$2.26m	$2.43m
Opex	$5.53m	$6.07m	$6.88m	$7.69m	$8.06m
Debt raising costs	$0.019m	$0.020m	$0.020m	$0.021m	$0.021m
Tax payable	$1.82m	$1.63m	$1.28m	$1.46m	$0.90m
Building block revenue (ARR)	**$12.55m**	**$13.11m**	**$13.83m**	**$15.08m**	**$15.08m**

Asset-related revenue

19. Based on the opening asset values for 1 July 2010, we estimate the cost associated with the return on and of capital for the 2010/11 to 2014/15 period by using the AER PTRM model and relevant input assumptions.

20. The key assumptions are:

- The opening RAB value is $34.60 million
- The cost of capital is estimated using WACC inputs that yield a nominal vanilla WACC of 9.76%.[5] Consistent with the AER's current rate of return guidelines, we have rounded the return on equity to a single decimal place.[6]
- Gross capex and capital contributions for 2010/11 to 2014/15 were provided by the AER.[7]
- The remaining life of assets in the SKM valuation at 1 July 2010 is assumed to be 7 years, based on the implied average age of the assets at the time of the SKM valuation of approximately 9 years.

  The average remaining useful life of assets added to the RAB between 1 July 1999 and 30 June 2010 is 23.2 years. This is based on the weighted average

5 This value is consistent with Table 11.6 of "Final decision, South Australia distribution determination, 2010–11 to 2014–15, May 2010"

6 AER, *Better regulation: rate of return guideline*, December 2013, page 17.

7 *SAPN PTRM-PL 2010-2015.xls*

remaining life of those assets, where the weights are the net book value of each investment in the closing RAB as at 30 June 2010. This differs from the average depreciation approach taken by ESCOSA and mimicked by the parties.[8] The weighted average remaining life approach is used by the AER in the PTRM. The average depreciation approach has not been accepted by the AER in other instances.[9]

Operating expenditure

21. In its submissions, SAPN provides values for overheads and maintenance which it states are "the actual costs and overheads determined in accordance with the CAM [cost allocation method]."[10] We have adopted these values on the basis that they are consistent with the cost allocation method that the AER approved in February 2009.[11]

22. These figures are also consistent with the opex values contained in the spreadsheet provided by the AER, on which we based our capex.[12]

23. HoustonKemp use slightly different initial values for opex in their models. The source of these initial values, before HoustonKemp's adjustments to them, is unknown to us. As these figures are slightly higher than those provided by SAPN in its submissions, by using the SAPN figures the resulting estimate of the opex building block revenue will be conservative.

24. We do not adopt the adjustments made by HoustonKemp to the overhead allocation to public lighting. As a general principle, we consider that it is not desirable to adjust the overhead allocation to one service ex post. The allocation of these common costs to other services cannot now be altered.

Debt raising costs

25. Debt raising costs are shown separately from other opex in the spreadsheet provided by the AER.[13] Within the PTRM, debt raising costs are calculated based on the proportion of the relevant asset value that is assumed to be funded from debt, multiplied by the AER's debt raising cost benchmark of 0.091%.[14] Our estimates of

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8 ESCOSA calculated the remaining life as the closing asset value (at 30 June 2010) of new capex divided by total depreciation for the new capex as at 30 June 2010. If this method was used instead of the weighted average remaining life approach, the average remaining life of assets in the 2010/11 opening RAB would be 21.52 years.

9 For example, Australian Energy Regulator, *Preliminary decision: CitiPower distribution determination 2016−20 Attachment 5 − Regulatory depreciation,* October 2015.

10 SAPN Submissions, 30 August 2017, paragraph 43(c).

11 AER, *ETSA Utilities cost allocation method: Final decision,* February 2009.

12 *SAPN PTRM-PL 2010-2015.xls*

13 *SAPN PTRM-PL 2010-2015.xls*

14 Equity raising costs are not provided for.

debt raising costs are based on the relevant asset values we have estimated, and therefore differ from those provided by SAPN.

Tax payable

26. The PTRM estimates the tax building block consistent with the cost inputs and the tax depreciation (from the tax asset base). We have used the RFM method to estimate the opening tax asset base (TAB) consistent with our view that contributed assets received when a pre-tax regulatory model was in place should not subsequently be added to the TAB when the business transitions to a post-tax model. Contributed assets received after the transition should be added to the TAB however.[15] This is the approach used by Incenta for SAPN.

27. However, our estimate of the opening TAB differs from the SAPN estimate, because we assume that depreciation of new capex begins in the year after the capex is incurred. This is consistent with the approach to depreciation in the PTRM/RFM models. Incenta has included a full year of depreciation for new capital in the year that the capex is incurred, consistent with the approach of ESCOSA.

28. Adopting the assumptions and approach outlined above, the opening tax asset base as at 1 July 2010 is $15.96 million. This assumes the tax life of the assets is 15 years. The tax book value of the pre-1999 assets is assumed to be zero as there is no information on which to base an estimate. These two assumptions are consistent with the approach of the parties to these issues.

[15] McWha, Vhari, Murray, Kieran and Tony van Zijl, *The SA public lighting access dispute: the PTRM principles*, Sapere Research Group, May 2018, paragraphs 91 to 98.

Discount rate for carry-forward

29. To the extent that SAPN has over- or under-recovered revenue over the 2010-2015 period, the AER has instructed us to use the nominal WACC as the discount rate to determine the present value in 2018/19 of the over- or under-recovery

30. The AER's approach to SAPN's distribution use-of-system, overs and unders account, provides for an adjustment for six months of interest in the year in which the over or under recovery occurs, and a full year of interest in all other years that an amount is carried forward. We have adopted the AER's assumption.

Table 3 Nominal WACC for carry-forward

	Nominal vanilla WACC
2010/11 to 2014/15	9.76%
2015/16	6.17%
2016/17	6.19%
2017/18	6.18%
2018/19	6.13%

Source: AER, Final decision: South Australia Distribution determination 2010-11 to 2014-15, May 2010, page 193; AER, SA Power Networks distribution determination - 2018-19 return on debt update – PTRM, March 2018.

31. The present value in 2018/19 of the over- recovery by SAPN of public lighting revenue based on the assumptions outlined in this report is estimated to be $13,657,998.76.

Appendix 1 Real vanilla WACC

32. Prior to 2010, the regulatory model for SAPN used a pre-tax WACC. In order to use the PTRM/RFM to determine the opening RAB, we needed to estimate a real vanilla WACC. This was used to make the half WACC adjustment to capex in the roll-forward of the RAB.

33. The inputs to calculate the real vanilla WACC are set out in the table below. These are consistent with the pre-tax WACC that pertained to SAPN's distribution services at the time and were obtained from ESCOSA decisions and submissions by ETSA Utilities to ESCOSA in relation to those decisions. Where a range was given with no point estimate, we used the mid-point of the range.

34. We have assumed that the WACC for 1998/99 and 1999/2000 was the same as that for the first regulatory period.

Table 4 WACC estimates and parameter inputs

Financial years

Parameter	1999-2005	2006-2010
Pre-tax real WACC	**8.26%**	**7.13%**
Real vanilla WACC	**6.47%**	**6.36%**
Nominal Risk Free Rate	5.55%	5.80%
Inflation Rate	2.50%	2.44%
Debt Risk Premium	1.20%	1.64%
Market Risk Premium	6.50%	6.0%
Proportion of Debt Funding	55.00%	60.00%
Equity Beta	1	0.9
Utilisation of Imputation (Franking) Credits	30.00%	50.00%
Corporate Tax Rate	36.00%	30.00%

Sources: ESCOA, *2005 - 2010 Electricity distribution price determination Part A – Statement of reasons*, April 2005; ESCOSA, 2005-2010 *Electricity distribution price determination an application by ETSA Utilities for a review pursuant to section 31 of the Essential Services Commission Act 2002 - Decision and Reasons for Decision*, 31 May 2005; NERA, *Review of ESCOSA's decision on ETSA Utilities equity beta: A Report for Johnson Winter & Slattery*, April 2005; ETSA Utilities, *ETSA Utilities' Submission re: ESCOSA Draft 2005-10 Electricity Price Determination Part A – Statement of Reason* (undated).