

Parsons Brinckerhoff Australia Pty Limited

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Vanessa Sutcliffe
Director Utilities Commission
Utilities Commission of the Northern Territory

Dear Vanessa

Review of Power and Water Corporation - revised regulatory proposal

Parsons Brinckerhoff was engaged by the Utilities Commission of the Northern Territory (the Commission) to undertake a review of Power and Water Corporation's (Power Networks) proposed capital and operating expenditure forecasts for the 2014–19 regulatory period as outlined in Power Networks' *Initial Regulatory Proposal* (The IRP).

Following the Commission's *Draft Determination*, Power Networks submitted *2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019* (The Revised Regulatory Proposal).

The Commission has requested that Parsons Brinckerhoff undertake further analysis of the revised regulatory proposal submitted by Power and Water Corporation for the 2014-2019 regulatory period. This letter sets out the results of that further review, as follows:

- Section 1 – capex
- Section 2 – opex
- Section 3 – benchmarking.

1. Capex review

Parsons Brinckerhoff makes the following recommendations:

- Maintain original recommendations regarding the Customer Augmentation and Network Extension Program (Sub8272)
- Maintain original recommendations regarding the Customer Connection Program (Sub8275)
- Maintain original recommendations regarding the Meters/Metering Program (Sub8276)
- Maintain original recommendations regarding the deferral of construction of the Archer to Palmerston 66kV Transmission Line (PRD30402)
- Reduce the original recommended reduction of expenditure regarding the removal of excessive power transformer replacements from \$4.872m to \$2.4m

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- Maintain the original recommendations regarding the Asset Replacement and Upgrade Program (Sub8274)
- Reduce the original recommended reduction of expenditure regarding the reduction in replacement unit rates from \$8.569m to \$4.473m
- Maintain original recommendations regarding the deferral and smoothing of zone substation works
- Reduce the expenditure associated with the Feeder upgrade program (sub8262) from \$11.562m as proposed in the Revised Regulatory Proposal to \$2.240m
- Maintain original recommendations regarding Darwin: Construct East Arm Zone Substation (PRD30309) if treatment as a contingent project is unable to be legislated
- Maintain original recommendations regarding Alice Springs: Lovegrove Transformer 1&2 Upgrade (PRA30750).

The basis of these recommendations is explained in the following sections. A summary table is provided below.

Table 1 Recommendation for capex

Item	2014/15	2015/16	2016/17	2017/18	2018/19
Staged submission proposed capex	75,378	56,354	68,634	42,646	62,540
IRP submission proposed capex	83,446	76,197	57,838	48,061	56,808
Recommended user initiated capex adjustments	(1,148)	(1,416)	(1,671)	(1,934)	(2,118)
Recommended augmentation capex adjustments	(1,714)	(10,735)	(6,236)	9,724	(5,033)
Recommended replacement capex adjustments	(17,226)	(5,618)	(4,230)	(7,138)	9,299
Recommended reliability and quality of supply capex adjustments	9,109	(7,829)	(6,599)	(1,477)	(4,745)
Recommended compliance capex adjustments	-	-	-	-	-
Recommended IT and equipment communications adjustments	-	-	-	-	-
Recommended non-network plant and equipment capex adjustments	-	-	-	-	-
Recommended adjustment to IRP proposed capex	(10,979)	(25,598)	(18,737)	(825)	(2,597)
Recommended total capex	72,466	50,599	39,101	47,235	54,212
Regulatory Period	263,613				

1.1 Customer Augmentation and Network Extension Program (Sub8272), Customer Connection Program (Sub8275) and Meters/Metering Program (Sub8276)

Power Networks disagrees with Parsons Brinckerhoff's recommendations to reduce Customer Connection numbers forecast in relation to the:

- Customer Augmentation and Network Extension Program (Sub8272)¹
- Customer Connection Program (Sub8275)²
- Meters/Metering Program (Sub8276).

Power Networks has provided further information in support of the customer connections forecast in the Revised Regulatory submission, based on:

- current connection rates
- ABS re-published Australian Demographic Statistics.

Power Networks states that the actual number of new service connections made to the network during the five months from July 2013 to November 2013 is 783 connections. This figure extrapolated to 12 months is equivalent to 1,879 new service connections for the year 2013/14, effectively confirming Power Networks' estimate for this year. Power Networks also notes that the re-published Australian Demographic Statistics confirms sustained high population growth in recent years (1.7% to June 2012 and 1.8% to June 2013).

¹ Power and Water Corporation, January 2014, '2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019', Section 8.3, p.39

² Power and Water Corporation, January 2014, '2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019', Section 8.3, p.40

Table 2 Population projection 2009 - 2019

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ABS Population (medium projection)	226,027	229,778	231,292	235,200	239,675	244,150	248,625	253,100	257,350	261,600	265,850
Increase in population	6,153	3,751	1,514	3,908	4,475	4,475	4,475	4,475	4,250	4,250	4,250
Increase in population percentage	2.72%	1.63%	0.65%	1.66%	1.87%	1.83%	1.80%	1.77%	1.65%	1.62%	1.60%

Source: Australian Bureau of Statistics, December 2013, '3101.0 - Australian Demographic Statistics', Parsons Brinckerhoff analysis

Table 3 Dwelling projection 2009 - 2019

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ABS households	69,443	70,888	72,359	73,766	75,174	76,581	77,989	79,396	80,764	82,131	83,499
Increase in housing numbers	1,629	1,445	1,471	1,407	1,407	1,407	1,407	1,407	1,368	1,368	1,368
Increase in housing numbers percentage	2.35%	2.04%	2.03%	1.91%	1.87%	1.84%	1.80%	1.77%	1.69%	1.67%	1.64%

Source: Australian Bureau of Statistics, December 2013, '3101.0 - Australian Demographic Statistics', Parsons Brinckerhoff analysis

Parsons Brinckerhoff agrees with Power Networks' assessment of the new information as it relates to the current period. To make an assessment for the forecast period, Parsons Brinckerhoff examined the ABS information, which is reproduced in Table 2 and Table 3. Table 2 shows that the population growth is forecast to peak in 2013/14 and is projected to grow at a slower rate throughout the 2014-2019 regulatory control period. Further, we note that the growth in dwellings reaches a peak in 2012/13 and is projected to grow at a slower rate throughout the 2014-2019 regulatory control period, as outlined in Table 3.

Based on the slower growth rates projected for the 2014-2019 regulatory control period, Parsons Brinckerhoff maintains its recommendations to:

- reduce the Customer Augmentation and Network Extension Program (Sub8272) by \$1.823m
- reduce the Customer Connection Program (Sub8275) by \$0.803m
- reduce the Meters/Metering Program (Sub8276) by \$0.473m.³

1.2 Darwin: Construct Archer to Palmerston 66kV Transmission Line (PRD30402)

Power Networks refutes Parsons Brinckerhoff's recommendation for deferral of the Darwin: Construct Archer to Palmerston 66kV Transmission Line (PRD30402)⁴, maintaining that its spatial demand forecast is correct. It provided a robust analysis of the cost and benefit of delivering the program in 2016/17 compared to 2019/20, utilising the Value of Customer Reliability and reduction of losses.

Parsons Brinckerhoff finds, however, that Power Networks has not provided further justification of the demand forecast. Parsons Brinckerhoff considers that the demand forecast is overstated and that use of 50% of new spot loads for Palmerston and McMinns Zone Substations is a more reasonable scenario. Hence, we maintain our original recommendations regarding the deferral of construction of the Archer to Palmerston 66kV Transmission Line.

1.3 Removal of excessive power transformer replacements

Power Networks refutes Parsons Brinckerhoff's recommendation to remove expenditure associated with excessive power transformer replacements in Replace Berrimah Zone Substation (PRD30402) and Casuarina Zone Substation 66kV Outdoor Switchyard (PRD30115) on the basis that the transformers are required to deliver the replacement at Berrimah Zone Substation.

Parsons Brinckerhoff points out that this adjustment is not specifically for the removal of the new transformers at Berrimah Zone Substation, and does not suggest that the approach to constructing Berrimah Zone Substation as a complete replacement be altered. This adjustment is intended to allow Power Networks to utilise efficient scheduling, logistics and spares (such as the power transformer proposed to be removed from McMinns Zone Substation and those already in the essential spares) to undertake the Zone Substation replacement works, without returning a large number of power transformers to the spares at the completion of the Zone Substation replacements. As no further evidence of the condition of the power

³ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 7.3.5 p.47

⁴ Power and Water Corporation, January 2014, '2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019', Section 8.4, p.42

transformers has been provided, Parsons Brinckerhoff maintains its original recommendations to reduce the number of power transformer replacements at Casuarina Zone Substation and Berrimah Zone Substation⁵.

Parsons Brinckerhoff accepts Power Networks' estimate of \$2.4m (real 2013/14) for the purchase of three 20/27MVA transformers as a reasonable purchase cost, and as such recommends a reduction in the previously recommended adjustment of \$4.8m to \$2.5m.

1.4 Asset Replacement and Upgrade Program (Sub8274)

Power Networks refutes Parsons Brinckerhoff's recommendation to smooth the program expenditure associated with the Asset Replacement and Upgrade Program (Sub8274)⁶. As no further justification has been provided for the timing of the works, Parsons Brinckerhoff maintains its original recommendations to smooth the works.⁷

1.5 Reduction in replacement unit rates

Power Networks refutes Parsons Brinckerhoff's recommendation to reduce expenditure based on the unit rates analysed for the Asset Replacement and Upgrade Programs (Sub8274), outlined in Table 4, for the following reasons:

- Parsons Brinckerhoff based this unit rate comparison on costs included in Power Networks' staged submission of Sub8274 Asset Replacement and Upgrade Program and not those costs included in Power Networks' Initial Regulatory Proposal
- unit rates are higher in the Northern Territory when compared to interstate
- a considerable portion of Power Networks' replacement capital expenditure is comprised of large zone substation related replacements, which are generally based on costs from previous contracts and period contracts, and are not of the type included in Sub8274.

Table 4 Initial recommended adjustment to IRP capex based on replacement unit rates

Cost	2014/15	2015/16	2016/17	2017/18	2018/19	Total
Replacement Zone Substations unit rate	(1,342)	(905)	(211)	(646)	(992)	(4,097)
Replacement Distribution Mains unit rate	(486)	(517)	(432)	(441)	(438)	(2,314)
Replacement Distribution substations unit rate	(185)	(165)	(206)	(286)	(326)	(1,168)
Replacement Secondary systems - Control, communications & Protection unit rate	(173)	(180)	(162)	(132)	(344)	(991)
Total	(2,186)	(1,767)	(1,011)	(1,506)	(2,100)	(8,569)

Source: Parsons Brinckerhoff analysis

⁵ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 7.5.5, p.88

⁶ Power and Water Corporation, January 2014, '2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019', Section 8.5, p.47

⁷ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 7.5.4.5, p.73 - 82

Parsons Brinckerhoff confirms that it based this unit rate comparison on costs included in Power Networks' staged submission of Sub8274 Asset Replacement and Upgrade Program. This was verified against the costs included in Power Networks' Initial Regulatory Proposal; which contained the same costs to do the same quantity of work; some of those works were moved to the last year of the 2009-2014 regulatory year, which has no impact on the extrapolated unit costs.

With respect to the second point, Parsons Brinckerhoff acknowledges that unit rates are higher in the Northern Territory when compared to interstate. Our unit rate comparison has utilised unit rates that would be acceptable in a similar network, duly adjusted for unit rates being higher in the NT when compared interstate.

With respect to the third point, we agree that our recommended reductions should not be applied across the whole replacement component of the capital expenditure, which may comprise elements that are derived from previous contract and period contracts. As such, we recommend that the Zone Substation replacement works, which are likely to be estimated based on previous contracts, are not subject to this reduction.

The revised recommended adjustment is limited to the replacement program exclusive of Zone Substation works and the metering program, as outlined in Table 5.

Table 5 Recommended adjustment to IRP capex based on replacement unit rates

Cost	2014/15	2015/16	2016/17	2017/18	2018/19	Total
Replacement Zone Substations unit rate	-	-	-	-	-	-
Replacement Distribution Mains unit rate	(486)	(517)	(432)	(441)	(438)	(2,314)
Replacement Distribution substations unit rate	(185)	(165)	(206)	(286)	(326)	(1,168)
Replacement Secondary systems - Control, communications & Protection unit rate	(173)	(180)	(162)	(132)	(344)	(991)
Total	(844)	(862)	(800)	(860)	(1,108)	(4,473)

Source: Parsons Brinckerhoff analysis

1.6 Deferral and smoothing of zone substation works

Power Networks refutes Parsons Brinckerhoff's recommendation to smooth the program expenditure associated with the zone substation works⁸. As no further justification has been provided for the timing of the works, Parsons Brinckerhoff maintains its original recommendations to smooth the works.⁹

1.7 Feeder upgrade program (sub8262)

Power Networks has increased the proposed expenditure¹⁰ associated with the Feeder upgrade program (sub8262) in line with its assessment of the impact of the new reliability targets set under the Standards of

⁸ Power and Water Corporation, January 2014, '2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019', Section 8.5, p.49

⁹ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 7.5.5, p.88 - 89

¹⁰ Note that the value recorded in the Revised Regulatory Proposal RIN template 6.8 is the same as that in the IRP RIN template 6.8, and does not reflect the updated Business Need Identification.

Service Code that came into effect from July 2013. Both the Feeder upgrade program (capex) and changes to the Vegetation Management program (opex) depend on these reliability standards.

The approach taken by Power Networks to forecast the required expenditures to meet the Code requirements is to determine the contribution to reliability performance of vegetation related outages and to target improvements to vegetation management in the same proportion. The remainder of the performance gap is addressed by a Feeder upgrade program. The gap in performance is based on trending current performance in vegetation related reliability and in non-vegetation related reliability.

While this approach ignores whether improvements in performance related to vegetation or non-vegetation is the most cost effective solution, Parsons Brinckerhoff notes that Power Networks has not determined the costs of either but has based proposed expenditures on a common value to consumers of reliability improvements. Hence the type of solution does not result in a difference in proposed expenditures.

Parsons Brinckerhoff firstly sought to validate the use of trends to establish current performance. We took the data points from Figure 1 of the Revised Business Need Identification Feeder Upgrade Program (Jan 2014) and reproduced the trend lines for SAIDI by feeder category. We note:

- The trend line for Urban and Short rural feeders exhibits a low correlation to the data points.
- The trend line for Long Rural exhibits a good correlation ($r^2=0.8$), but as reliability in long rural had been declining for several years and improved in 2011/12, the trend may not reflect actions taken by Power Networks to improve performance and hence may not be a valid prediction of current performance.
- Figure 1 in the BNI for Feeder upgrade appears inconsistent with the values discussed in the body of the document, i.e. table 4¹¹ says the 2012 trend for Long Rural is 3000 while the Figure indicates this is 2900. Figure 1 appears to be incorrect.

Noting the inconsistencies in Figure 1 to the discussion in the body of the document, Parsons Brinckerhoff examined the information presented in the RRP, the BNI for the Revised Feeder Upgrade Program and the BNI for Vegetation Management. Charts were provided for Overall reliability (RRP figure 11.1), Overall Reliability less Vegetation (BNI Feeder upgrade program Figure 1) and Reliability due to Vegetation (BNI Vegetation management program Figure 2). All charts appear to be adjusted to exclude events based on the ESS code. Parsons Brinckerhoff was, however, unable to correlate the charts. We found that the data for Overall less Vegetation when added to the data for Vegetation did not sum to the Overall Reliability. We were unable to determine which data was in error. Accordingly, as the information for Overall Reliability is consistent with that used to determine targets in the ESS Code, we based our analysis on Overall reliability. To obtain the split between opex and capex, we used the same split into vegetation and non-vegetation as stated by Power Networks (BNI for Feeder upgrade program Tables 2 and 3).

Using overall data for the 5-year periods 2007/08 to 2011/12 and 2008/09 to 2012/13, Parsons Brinckerhoff examined trend lines for each feeder category and generally found low correlation to the data as shown in Table 6. The low correlation indicates that the trend lines are not valid. Parsons Brinckerhoff considers that where a trend is not evident, that it would be appropriate to determine current performance as the average of historic performance.

¹¹ Power and Water Corporation, Business Need Identification, Power Networks Feeder Upgrade Program, REVISED January 2014

Table 6 Correlation of trends to actual data

Feeder category	SAIDI Correlation (r^2 value)		SAIFI Correlation (r^2 value)	
	Data 07/08 to 11/12	Data 08/09 to 12/13	Data 07/08 to 11/12	Data 08/09 to 12/13
Rural Long	0.81	0	0.66	0.03
Rural short	0.34	0.15	0.64	0.21
Urban	0.02	0.36	0	0.06
CBD	0.62	0.02	0.74	0.34

1. An r^2 value of 1 indicates good correlation, while an r^2 value of 0 indicates no correlation

Parsons Brinckerhoff concludes that the use of trending with low correlation to the actual data to establish current performance appears to understate current performance, particularly when compared to the 2012/13 actual performance. Parsons Brinckerhoff recommends the use of averages to establish current performance. Table 7 and Table 8 show the average performance for each feeder type and the gap to the targets for SAIDI and SAIFI respectively. Table 9 shows the combination of overall forecast expenditure after accounting for the overlap in SAIDI and SAIFI.

Table 7 Recommended expenditure to improve SAIDI performance

Feeder category	SAIDI Ave 07/08 to 11/12	SAIDI Target	Performance gap	\$SAIDI	Expenditure (\$'000, 2012/13)	%veg	Veg (\$'000)	Non-veg (\$'000)
Rural Long	2,405.5	2164.9	240.6	310	74.6	31.1%	23.2	51.4
Rural short	522.4	496.3	26.1	25237	658.7	23.3%	153.5	505.2
Urban	143.2	136	7.2	121254	873.0	25.1%	219.1	653.9
CBD	19.7	18.8	0.9	6267	5.6	33.0%	1.9	3.8
Total					1612		397.7	1214.3

Table 8 Recommended expenditure to improve SAIFI performance

Feeder category	SAIFI Ave 07/08 to 11/12	SAIFI Target	Performance gap	\$SAIFI	Expenditure (\$'000, 2012/13)	%veg	Veg (\$'000)	Non-veg (\$'000)
Rural Long	39.00	35.10	3.90	19147	74.7	10.0%	7.5	67.2
Rural short	8.54	8.10	0.44	1545520	680.0	24.3%	165.2	514.8
Urban	2.66	2.50	0.16	6538717	1046.2	34.8%	364.1	682.1
CBD	0.38	0.40	0	306772	0	14.0%	0	0
Total					1800.9		536.8	1264.1

Table 9 Feeder upgrade program recommended expenditure

Item	Unit	Value
SAIDI	(\$'000, 2012/13)	1214.3
SAIFI	(\$'000, 2012/13)	1264.1
overlap (applies to SAIDI & SAIFI)		13.8%
overlap reduction	(\$'000, 2012/13)	342.0
Parsons Brinckerhoff recommended expenditure	(\$'000, 2012/13)	2136.4
Parsons Brinckerhoff recommended expenditure	(\$'000, 2013/14)	2239.8

The figures in Table 9 represent the maximum amount to be spent on reliability improvements as they are determined from the value to consumers of reliability improvements (VCR) rather than estimated costs of improvement works. It is evident that Power Networks may spend less than this amount to achieve the required improvements in reliability. PB compared the \$ per SAIDI minute saved and the \$ per SAIFI interruption avoided using its knowledge of other businesses' improvement programs and considers that the values proposed by Power Networks are not unreasonable.

In conclusion, we recommend that the capex associated with the Feeder Upgrade Program be reduced as outlined in Table 10.

Table 10 Recommended Capex adjustment - Feeder upgrade program (sub8262) (\$ real, 2013/14)

	2014/15	2015/16	2016/17	2017/18	2018/19	Total
IRP proposed Capex	1,834	1,699	1,593	1,507	1,437	8,070
Revised Regulatory Proposal Capex	2,313	2,313	2,313	2,312	2,313	11,562
Recommended Adjustment	(1,779)	(1,779)	(1,779)	(1,779)	(1,779)	(8,892)
Recommended capex	427	427	427	427	427	2,240

Source: Parsons Brinckerhoff analysis

1.8 Darwin: Construct East Arm Zone Substation (PRD30309)

Power Networks requests that Stage 2 of Construct East Arm Zone Substation (PRD30309)¹² be treated as a contingent project, and that the Northern Territory legislation is amended to allow for contingent projects with a threshold of \$15m¹³. Parsons Brinckerhoff does not consider this to be an unreasonable request; however, we would not suggest that Stage 2 of this project be included in the determination in the case that the definition of a contingent project remains at a threshold of \$30m. Power Networks has not provided any further justification that this project will be required in the 2014 – 2019 regulatory period, and as such Parsons Brinckerhoff maintains its original recommendation to defer the works at a saving of \$18.728m¹⁴.

¹² Power and Water Corporation, January 2014, '2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019', Section 8.4, p.40

¹³ The amendment of this legislation is currently sought to treat the New Mitchell St Switching Station (PRD30600).

¹⁴ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 7.4.4.1, p.51

1.9 Alice Springs: Lovegrove Transformer 1&2 Upgrade (PRA30750)

Power Networks states that Lovegrove Transformer 1&2 Upgrade (PRA30750)¹⁵ is primarily based on the retirement of generation assets which are currently being reassessed and are unlikely to occur before 2018/19, and as such this project is not likely to be required during the 2014 – 2019 regulatory period and has been removed from the proposed capital expenditure. Parsons Brinckerhoff considers this to be a prudent approach, and as such Parsons Brinckerhoff maintains its original recommendations to defer the works at a saving of \$4.162m¹⁶.

We note that Lovegrove Transformer 1&2 Upgrade (PRA30750) is not based on a forecast regional demand increase and therefore should not be subject to a deferral based on Parsons Brinckerhoff's review of Power Networks' demand forecasting.

2. Opex review

Parsons Brinckerhoff makes the following recommendations:

- Remove the previous recommendation to reduce Strategy and Planning opex and Service Delivery opex by \$1.15m pa
- Maintain original recommendations regarding Regulatory Costs opex
- Reduce the expenditure for GSL Payments proposed in the RRP of \$3.55m to \$3.080m
- Reduce the Vegetation Management opex proposed in the RRP of \$28.925m to \$25.802m.

The basis of these recommendations is explained in the following sections. A summary table is provided below.

¹⁵ Power and Water Corporation, January 2014, '2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019', Section 8.4, p.41

¹⁶ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 7.4.5, p.57

Table 11 Recommendation for opex

Item	2014/15	2015/16	2016/17	2017/18	2018/19
Staged submission proposed opex and maintenance	106,982	103,944	102,336	102,352	101,194
IRP submission proposed opex and maintenance	107,124	104,457	105,261	103,385	102,158
Recommended Corporate and shared overhead adjustments	-	-	-	-	-
Recommended Service Delivery adjustments	(1,600)	(1,600)	(1,600)	(1,600)	(1,600)
Recommended Strategy and Planning adjustments	-	-	-	-	-
Recommended System Operations adjustments	(48)	(48)	(48)	(48)	(48)
Recommended Metering adjustments	(216)	(216)	(216)	(216)	(216)
Recommended Network management adjustments	-	-	-	-	-
Recommended GSL Costs adjustments	(616)	(616)	(616)	(616)	(616)
Recommended Regulatory Costs adjustments	(136)	(136)	(136)	(136)	(136)
Recommended Full Retail Contestability related costs adjustments	-	-	-	-	-
Recommended Other adjustments (section 8.10)	-	-	-	-	-
Recommended Preventative Maintenance adjustments	800	885	885	170	255
Recommended Planned Maintenance adjustments	(821)	(1,009)	(671)	(786)	(871)
Recommended Unplanned Maintenance adjustments	-	8	43	43	43
Recommended Vegetation Management adjustments	(2,705)	(1,638)	(1,638)	(1,638)	(1,638)
Recommended Specific Maintenance adjustments	-	-	-	(335)	-
Recommended adjustment to IRP proposed opex	(5,342)	(4,370)	(3,997)	(5,161)	(4,827)
Recommended total opex	101,782	100,087	101,264	98,223	97,331
Regulatory Period	498,687				

2.1 Strategy and planning and service delivery opex

Power Networks queried the basis for Parsons Brinckerhoff's recommended annual reduction of \$1.15m corresponding to the 'Other - Remainder' category, indicating that the amount should be \$0.57m.

As stated in Section 8.4.2 of Parsons Brinckerhoff's initial review of the IRP, Power Networks had not developed or provided the forecast expenditure to the level of detail that showed the forecast expenditure for the 'Other – Remainder' category. Parsons Brinckerhoff calculated an approximation of the expenditure (Table 8.11)¹⁷ by category based on the *average* contribution of each category in the current regulatory period in real 2013-14 dollars and based on the assumption that the expenditure would be composed of a similar mix of items and costs in the 2014-19 regulatory period. Whereas the amount of \$0.57m mentioned by Power Networks in its revised proposal¹⁸ appears to be the *nominal 2013-14 amount* for the 'Other –

¹⁷ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 8.4.2, p.124

¹⁸ Power and Water Corporation, January 2014, '2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019', Section 10.4, p.58

Remainder' category. It is apparent in Power Networks' Opex Category Justification document¹⁹ that the forecast expenditure is based on the 2013-14 expenditure rather than the average as assumed by Parsons Brinckerhoff. We accept this approach.

In its initial review, Parsons Brinckerhoff found that Power Networks had not provided evidence that the 'Remainder' line item in the 'Other' costs build up is a prudent and efficient cost. We note that in its revised proposal Power Networks has provided high level information on the types of expenditure included in the 'Other – Remainder' category. However, Parsons Brinckerhoff finds that Power Networks has not provided sufficient evidence to demonstrate that this expenditure is efficient. Nevertheless, Parsons Brinckerhoff accepts that some expenditure is required for the items identified by Power Networks. Given that the amount identified is relatively small at \$0.57m per year, we recommend inclusion of this amount in opex.

2.2 Regulatory costs opex

Power Networks disagrees with Parsons Brinckerhoff's recommended reduction of \$0.136m per annum in the Regulatory Costs to establish new roles for a Regulatory Compliance Manager and a Regulatory Reporting Officer. Power Networks considers the magnitude of additional regulatory reporting burden and compliance obligations to be well beyond the capability of a single officer as recommended by Parsons Brinckerhoff.²⁰

Parsons Brinckerhoff finds that Power Networks has again shown that there will be an increase in workload over the 2014-19 period to address new regulatory requirements; however, it has not made the case that two Full Time Employees (FTE) are required and that the work cannot be managed by one FTE. Therefore, Parsons Brinckerhoff maintains its original recommendation.

2.3 GSL costs

In its Revised Regulatory Proposal, Power Networks has reduced its original GSL Payments opex estimate of \$6.63m to \$3.55m over the 2014-19 period, or \$0.7m per annum. Power Networks has agreed²¹ with Parsons Brinckerhoff's recommended reduction²² in its original GSL Payments opex estimate by 37% to account for an over-estimation due to basing its estimate on reliability performance in a single year rather than the use of a five year average.

Power Networks disagrees with the application of a further 30% reduction applied by Parsons Brinckerhoff to address its concerns that not all customers on a feeder experience an interruption for every network outage event. Power Networks notes that there are a negligible number of fused spur lines in the network. Parsons Brinckerhoff accepts this explanation.

¹⁹ Power and Water Corporation, July 2013, "Opex Category Justification, Power Networks, Revised Opex Category: Strategy and Planning", Section 7.1, p.9

²⁰ Power and Water Corporation, January 2014, '2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019', Section 10.6, p.60-63

²¹ Power and Water Corporation, January 2014, "Opex Category Justification, Power Networks, Opex Category: GSL Costs", Section 3.1, p.5

²² Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 8.8.2, p.134

However, Power Networks acknowledges that GSL Payments over the regulatory period will reduce with the introduction of an Integrated Distribution Management System (IDMS). Power Networks estimates this reduction to be about 15%. Parsons Brinckerhoff accepts Power Networks' further reduction of 15% due to the IDMS impact.

Parsons Brinckerhoff considers that \$3.55m is a reasonable estimate of the GSL Payments opex, a reduction of \$3.080m from that proposed in the IRP.

2.4 Vegetation management

Power Networks has revised its forecast²³ and used the Electrical Standards of Service Code (the ESS Code) as the service standard to base its targeted reliability performance on. Power Networks has proposed an annual opex of \$5.785m, \$0.785m above the actual average annual budget for vegetation management (\$5m) that was spent in the current regulatory period and is required to maintain the current reliability performance. Power Networks states that \$0.785m per annum is needed for additional vegetation management to improve the reliability performance of the rural short feeder category to the ESS target level.

Parsons Brinckerhoff examined the trending on which the proposed expenditures are based (refer to section 1.7) and found that this trend is based on a trend line fit to few data points and with a low correlation coefficient. The low correlation indicates that the fitted trend line is not valid. Parsons Brinckerhoff considers that where a trend is not evident, that it would be appropriate to utilise the average of performance.

Table 7 and Table 8 show the average performance for each feeder type and the gap to the targets for SAIDI and SAIFI respectively. Table 12 shows the combination of overall forecast expenditure after accounting for the overlap in SAIDI and SAIFI.

Table 12 Vegetation management program recommended expenditure

Item	Unit	Value
SAIDI	(\$'000, 2012/13)	397.7
SAIFI	(\$'000, 2012/13)	536.8
overlap (applies to SAIDI & SAIFI)		31.6%
overlap reduction	(\$'000, 2012/13)	169.6
Parsons Brinckerhoff recommended expenditure	(\$'000, 2012/13)	764.8
Parsons Brinckerhoff recommended expenditure	(\$'000, 2013/14)	801.8

In conclusion, we recommend that the capex associated with the Vegetation management program be reduced as outlined in Table 13.

²³ Power and Water Corporation, January 2014, "Material Project/Program Justification, Power Networks Repairs and Maintenance, Vegetation Management Program", p.2

Table 13 Recommended Capex adjustment - Vegetation management (\$ real, 2013/14)

	2014/15	2015/16	2016/17	2017/18	2018/19	Total
IRP proposed Capex	7,865	6,798	6,798	6,798	6,798	35,055
Revised Regulatory Proposal Capex	5,785	5,785	5,785	5,785	5,785	28,925
Recommended Adjustment	(625)	(625)	(625)	(625)	(625)	(3,123)
Recommended capex	5,160	5,160	5,160	5,160	5,160	25,802

Source: Parsons Brinckerhoff analysis

3. Efficiency adjustment and benchmarking

In its draft determination, the Commission considered the opex benchmarking provided by Parsons Brinckerhoff and other information provided by Power Networks to form a view about the relative efficiency of Power Networks. The Commission decided that a 27% reduction in opex was appropriate to provide Power Networks with an efficient level of opex.

Power Networks disputed the use of benchmarking as the basis for a non-specific efficiency adjustment to reduce Power Network's opex²⁴. Power Networks engaged Huegin Consulting Group (Huegin) to review the benchmarking analysis. Huegin was of the view that the benchmarking analysis was neither robust nor sufficiently accurate to justify the adjustment and that benchmarking on partial productivity indices has well documented limitations²⁵.

To support its view, Huegin commented on:

- the limitations of benchmarking and, in particular, the use of regression analysis
- the apparent lack of comparability of Power Networks with other DNSPs/TNSPs in Australia
- the importance of sample choice, and the exclusion/inclusion of data
- use of partial productivity measures and capital substitution effects.

These points are discussed in detail in Attachment A.

The key issue raised by Power Networks is whether the benchmarking can be relied upon by the Commission to inform its decision about the efficient level of opex required. In Parsons Brinckerhoff's view, it can, noting the following:

- Power Networks does have suitable benchmarking peers in Australia, but the differences in the benchmarking group, such as customer density, CBD areas, network size and regional differences, cost structure depending on type and number of assets (whether they be transmission, sub-transmission or distribution) need to be considered and were considered by Parsons Brinckerhoff when conducting its benchmarking analysis and interpreting the outcomes of the analysis.
- The benchmarking data was sourced mainly from public sources rather than against defined requirements, requiring careful selection and display to draw valid results. Parsons Brinckerhoff has

²⁴ Power and Water Corporation, January 2014, '2014 Network Price Determination Revised Regulatory Proposal 1 July 2014 to 30 June 2019', Section 10.2, p.56-57

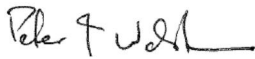
²⁵ Huegin Consulting, Review of Benchmarking Methods Applied, January 2014, p.3

sought to ensure that only comparable businesses were included in the benchmark group and that comparisons were compared on a like for like basis, which required the exclusion of some businesses from specific areas of the benchmarking, where data was unavailable or considered to be unreliable or where a factor exists that makes the company's data not comparable to the benchmarked group and this has been made transparent in the reviews.

- Substitution possibilities between capex and opex are important when examining benchmarking outcomes, but Parsons Brinckerhoff has no information to suggest that significant levels of opex is being substituted for capex.

Parsons Brinckerhoff acknowledges that benchmarking contains inherent uncertainties and should not be the sole basis for determining the efficient level of opex. A solid understanding of the business context and the factors driving opex is also important.

Yours sincerely



Peter Walshe
Principal Consultant

ATTACHMENT A – Benchmarking

This attachment sets out responses to the specific issues raised by Huegin Consulting in their paper, Review of Benchmarking Methods Applied, January 2014.

Benchmarking not the sole basis for Parsons Brinckerhoff's recommendations to reduce opex

In Parsons Brinckerhoff's initial review of the IRP, it conducted a detailed (bottom-up) analysis of Power Networks forecast opex to evaluate the prudence and efficiency of the proposed expenditures. Parsons Brinckerhoff specifically identified areas where the level of proposed expenditure was found not to be prudent and efficient and recommended reductions in expenditure in those specific areas²⁶. This came to a total reduction of \$32.088m (6%) from the levels proposed by Power Networks.

Also in its initial review, Parsons Brinckerhoff conducted a high level benchmarking study, although the findings were not relied upon in the detailed (bottom-up) analysis. In its report, Parsons Brinckerhoff described the limitations of benchmarking, including many of the points also made by Huegin and made the following comment: "the benchmarking analysis should only be viewed in context of the wider review of the business and an understanding of the business' characteristics, and decisions that affect the determination of the regulatory allowance should not be based solely on the outcomes of the benchmarking."

Parsons Brinckerhoff summarised the findings of its benchmarking as follows: "The analysis of total opex has found that Power Networks appears to require a high level of opex compared to its peers on a per unit basis, approximately three times the cost of the DNSPs with similar customer densities."²⁷ "The sensitivity analysis showed that regional uplift and economies of scale may account for a significant portion of the deviation from the trend line. While the adjusted value remains above the trend line, it lies within the range of peer businesses in the benchmarking sensitivity test, and therefore we do not recommend any global adjustments be made to the opex based on potential inefficiency identified through benchmarking."²⁸

Parsons Brinckerhoff responded to a request from the Commission to refine its benchmarking to provide information about the relative efficiency of Power Networks' proposed opex. In its second benchmark analysis²⁹ Parsons Brinckerhoff calculated the reduction in opex to move Power Networks to the trend line of the benchmarked group. The outcome of the second benchmark analysis was that Power Networks forecast opex was 27% above the average of the benchmarked group when compared on the basis of Opex/km normalised for scale by RAB/km, after adjustments for regional uplift and economies of scale.

Parsons Brinckerhoff notes that Huegin has not disputed the assertion that Power Networks' opex is high. The 6% reduction recommended by Parsons Brinckerhoff provides a minimum reduction based on the specific items assessed. Benchmarking provides further information about the level of efficiency that might be achieved. Parsons Brinckerhoff believes that this approach is not unreasonable to consider the efficiency of Power Networks with respect to opex.

²⁶ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 8.17, p.161

²⁷ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 4.4, p.27

²⁸ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 8.17, p.116

²⁹ Parsons Brinckerhoff, 4 December 2013, 'Review of Power and Water Corporation - further analysis of benchmarking', p.5

Limitations of benchmarking and regression analysis

Parsons Brinckerhoff acknowledges as with all benchmarking, the results is not without its limitations. In this case, this is because the data used in the benchmarking was largely taken from publically available sources rather than being prepared against a consistent set of definitions.

Additionally, the inherent limitations of using regression analysis on small sample sizes highlights the importance of considering a range of variables and relationships and of interpreting the outcomes of benchmarking in a qualitative way rather than quantitative, as well as supporting the benchmarking analysis with a solid understanding of the business context.

Choice of suitable benchmarking peers and consideration of differences in the benchmarking group

Contrary to Huegin's view, Parsons Brinckerhoff is of the view that Power Networks does have suitable benchmarking peers in Australia, but that each company in the benchmarking group is different and that the differences need to be considered carefully when conducting the benchmarking analysis and interpreting the outcomes.

We discussed some of these differences in our initial review of the IRP³⁰. We noted that:

- With respect to customer density, Power Networks' customers tend to be grouped into three areas (Darwin, Katherine and Alice Springs) whereas the other DNSPs customers tend to be more widely dispersed. We noted that three other DNSPs in the benchmark group have similar customer densities.
- With respect to companies with CBD areas that were excluded/included, in our second benchmarking analysis³¹ we excluded company J as it has a large CBD area in proportion to its total area, whereas other companies with CBD areas also have substantial urban areas, hence more similar to Power Networks.

Parsons Brinckerhoff considers Huegin's statement that Opex per km for transmission companies is double that for distribution companies and that Power Networks' opex should therefore be higher³², to be a simplistic view. Transmission companies typically own comparatively less assets than distribution companies and have comparatively higher fixed operating costs. As such, they have a different cost structure than Distribution companies and it is likely that it is this cost structure that leads to a higher opex per km. For example:

- We note that Power Networks cost structure is based on sharing corporate costs with PWC's water and sewerage divisions. This reduces the fixed operating costs associated with the Power Networks business.
- Most distribution companies' networks contain a substantial sub-transmission layer, which in Power Networks' network is largely replaced by lines operating at transmission voltage levels. Thus the asset base is more similar to a distribution business than to a transmission business.

As a result, it is Parsons Brinckerhoff's view that the cost structure of Power Networks should be not dissimilar to Australian DNSPs, except for the relatively smaller network size and regional differences.

³⁰ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Section 4.1.4, p.19

³¹ Parsons Brinckerhoff, 4 December 2013, 'Review of Power and Water Corporation - further analysis of benchmarking', p.2

³² Huegin Consulting, Review of Benchmarking Methods Applied, January 2014, p.9

Importance of sample choice, exclusion/inclusion of data and use of a regression line

Huegin has suggested that Parsons Brinckerhoff excluded companies from the benchmarking to drive a stronger regression line³³. Parsons Brinckerhoff believes that Huegin has misunderstood the benchmarking approach undertaken, which is generally as follow:

- Select relevant businesses, considering similar business structure and availability of robust data
- Produce a range of benchmarks
- Test the benchmarks for appropriateness including identifying data issues and outliers
- Exclude from the benchmark a business that is found to be not comparable.

Parsons Brinckerhoff sought to ensure that only comparable businesses were included in the benchmark group and that comparisons were compared on a like for like basis. This required the exclusion of some businesses from specific areas of the benchmarking, where data was unavailable or considered to be unreliable. The data was mostly taken from publically available sources rather than being data requested against specific definitions. Hence, outliers in the data can be a sign of data that has not been prepared against the same definitions and should not be compared.

In Parsons Brinckerhoff's benchmarking analysis, companies have been excluded from a particular benchmarking category where a factor exists (that we know of or can define with reasonable accuracy) that makes the company's data not comparable to the benchmarked group and this has been made transparent in the reviews. An example of where this was done, which was also queried by Huegin, is the exclusion of company J with a predominately CBD area and not other DNSPs with CBD areas in Figure 1³⁴ of Parsons Brinckerhoff's second benchmarking analysis. As mentioned above, Power Networks' customers are widely distributed, but concentrated in three built-up centres. Company J was excluded as it has a large CBD area in proportion to its total area, whereas other companies with CBD areas were included because they also have substantial urban areas, which is considered to be more similar to the Power Networks situation.

It should be noted that as part of Parsons Brinckerhoff's approach to benchmarking, significantly high correlation as indicated by R^2 values are also rigorously tested to avoid assumptions that high R^2 is the key driver of the exercise. Sometimes population size or samples' fit for purpose are tested again to ensure that by chance they too are not inadvertently driving the benchmark outcome.

Use of partial productivity measures and capital substitution effects

In its report, Huegin states that the use of partial productivity measures such as opex per km are misleading, because these are often impacted by capital substitution effects³⁵. Further, Huegin expresses an opinion that partial productivity measures cannot be used to sum up efficiency savings, and that a better comparison would be opex and capex substitution with scale. Parsons Brinckerhoff acknowledges that substitution possibilities between capex and opex are important when examining benchmarking outcomes. While Parsons Brinckerhoff's initial review did not specifically address these in relation to benchmarking, the examination of substitution possibilities was considered.

³³ Ibid, p.6

³⁴ Parsons Brinckerhoff, 4 December 2013, 'Review of Power and Water Corporation - further analysis of benchmarking', p.2

³⁵ Huegin Consulting, Review of Benchmarking Methods Applied, January 2014, p.7-8

To demonstrate the difficulties in using partial productivity measures, Huegin presents a graph of capex per km of line for several Australian businesses against customer density. It suggests that applying the same logic that Parsons Brinckerhoff applies to opex (adjusting for scale and regional uplift) would lead to a conclusion that Power Networks' capex is 30% below the average of its peers – reflecting the skew of the opex/capex ratio of small scale businesses. Huegin also noted that Figure 4.1³⁶ in Parsons Brinckerhoff's initial review of the IRP indicates that total network expenditure is shown to be broadly in line with industry average.

Huegin's assumptions about the ability of Power Networks to substitute opex for capex are not supported by the information provided to Parsons Brinckerhoff. Historic spends indicate that Power Networks underspent on capex prior to 2009 and have now adjusted their asset replacement practices to levels that are more consistent with other network service providers. While regional uplifts will affect the amount of capex required per unit of work, loss of economies of scale are not likely to be a significant factor given that major capex projects are typically sourced from external service providers. We have no information to suggest that Power Networks should or does carry a lower level of capital investment and a higher level of opex when compared to other businesses and hence this was not a focus of our review.

Huegin's statement that Figure 4.1 in Parsons Brinckerhoff's initial review of the IRP indicates that total network expenditure is shown to be broadly in line with industry average and that this supports the potential for capital substitution effects is not supported by the information provided to Parsons Brinckerhoff. Our review shows that Power Networks' total capex is lower than its peers. This is consistent with the larger amount of capex spent in the current period, as a result of the catastrophic failure at Casuarina Zone Substation in 2008, being readjusted for the forecast period. It does not lead to a conclusion that opex is being substituted for capex.

Choice of variables, scale adjustments and reporting periods increase subjectivity

Huegin³⁷ makes the points:

- different combinations of variables used in benchmarking analysis may vary Power Networks' position relative to the industry average
- any inaccuracy in the choice of the value for adjustments for economies of scale and regional uplifts will vary the opex adjustment calculated for Power Networks
- staggered periods of regulatory determinations among the benchmarking group will mean a mix of actual and forecast data.

Parsons Brinckerhoff acknowledges the limitations of benchmarking presented by Huegin and reiterates the importance of considering a range of variables and relationships and of interpreting the outcomes of benchmarking in a qualitative way rather than quantitative, as well as supporting the benchmarking analysis with a solid understanding of the business context.

³⁶ Parsons Brinckerhoff, 18 December 2013, '2014-2019 Network Price Determination: Review of Power and Water Corporation's regulatory proposal for the 2014-2019 regulatory period', Figure 4.1, p.21

³⁷ Huegin Consulting, Review of Benchmarking Methods Applied, January 2014, p.11-12