Huegin: Base year opex efficiency assessment

Appendix 6



Tasmanian Networks Pty Ltd



Transend Networks Pty Ltd



Transend Base Year Operating Expenditure Efficiency

A review by Huegin Consulting Group of the adequacy of the 2012/13 year as the regulatory base year

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FY Conversion

Huegin has converted historical expenditure to financial year 2012/13 (FY13) dollars. The conversion factors used are based on historical changes in the June to June consumer price index

(CPI) for Australia. CPI data source: <u>http://</u> www.rateinflation.com/consumer-price-index/australiahistorical-cpi

Version Control

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Executive Summary

Under the National Electricity Rules (NER), the Australian Energy Regulator (AER) is responsible for the evaluation of a Transmission Network Service Provider's (TNSP) capital and operating expenditure forecast to assess the prudence and efficiency of the proposed expenditure. After recent rule changes, the AER has developed a benchmarking approach and expenditure forecast framework to assist it in the conduct of this evaluation. For operating expenditure (opex), the AER adopts a revealed costs approach whereby historical expenditure is used as a guide for assessing forecast expenditure in a base-step-trend construct (the base year level of spend, escalated by forecast trend, adjusted by anticipated step changes in expenditure due to forecast changes in circumstances).

The base year is important in this context as it represents the starting point for the forward forecast of opex. Under the revealed cost approach, Transend must select a historical year that it deems to represent an efficient level of expenditure and forecast forward from that point. Transend has selected the 2012/13 financial year for the base year on the basis that:

- 1. It is the most recent year of audited, actual opex;
- 2. It most closely represents the costs required to operate the business in the near future; and
- 3. It represents an efficient level of expenditure.

This report is the outcome of a study by Huegin Consulting Group on the suitability of the 2012/13 financial year as the base year upon which to commence the forecast of future operating expenditure. Huegin found that:

- 1. The opex in 2012/13 is the lowest in the current period;
- 2. It is lower than the long term trend;
- 3. It is lower than the estimated level of efficient expenditure that was forecast for 2012/13 in the previous determination; and
- 4. It includes significant reductions in opex in many of the individual expenditure lines reported in the regulatory accounts several of which are at the lowest level since 2004/5.

Whilst the AER does not publish definitive criteria for the acceptance of a base year, recent determinations¹ have highlighted the AER's preference for a base year that compares favourably to the period average - on that basis, Transend's 2012/13 opex is the logical preference as a base year. So, whilst the points above do not constitute adherence to specific criteria on acceptance of a proposed base year, they do in the least represent reasons not to reject the proposed base year of Transend's opex. Based on the observations of Transend's 2012/13 opex expenditure and the recent consideration of suitability of base year opex by the AER, Huegin recommends that the 2012/13 year opex is appropriate and suitable as the base year for forecasting of efficient levels of future opex for Transend.

^{1.} See in particular "Final decision, ElectraNet Transmission determination 2013-14 to 2017-18", Australian Energy Regulator, April 2013.



Base Year Operating Expenditure in Context

A revised approach

The new regulatory approach to expenditure assessment

In conducting an evaluation of the efficiency of proposed expenditure for a Transmission Network Service Provider (TNSP), the Australian Energy Regulator (AER) has regard to a number of factors. It also uses several assessment techniques, described under its recently released Expenditure Forecast Assessment Guideline. This new guideline sets out the framework and tools to be utilised in conducting an evaluation of the proposed level of expenditure for a TNSP; there is a particular focus on economic benchmarking.

- 1. Tornqvist Multilateral Total Factor Productivity (MTFP): a technique that uses revenue and cost shares as weights on input and output variables to create a common, comparable index thus overcoming the challenge of comparing multi-input, multi-output businesses.
- Data Envelopment Analysis: a linear programming technique that looks at all inputs used and all outputs produced and seeks a weighting on the variables that maximises the ratio of output/input for each firm in the study.
- 3. Econometric Analysis: statistical modelling of economic systems using assumed relationships between quantities of certain variables. This technique requires the development of formulae that describe the dependency of output variables on input variables, so that changes in the latter can be used to predict changes in the former.
- 4. **Category Benchmarking:** the simple comparison of costs for specific categories of expenditure, often expressed as the ratio of costs to a specific, individual input variable.

The manner in which these techniques are to be used in assessing TNSP total, capital and operating expenditure is shown in the table to the right. Whilst the AER has stated that it will use the full complement of techniques to assess efficiency, the econometric analysis is particularly relevant for the base year efficiency evaluation. Whilst the other techniques compare expenditure to industry peers, econometric analysis can be used to predict the expected expenditure of an individual business - and the AER has stated their intention to use such a model to predict the expenditure that should have been incurred in the base year.

Category	Technique	Outcomes Sought	
Total Expenditure	MTFP	 Overall efficiency and rate of change in efficiency 	
		 Growth of inputs and outputs 	
		 Forecast future totex 	
	DEA	Cross check of MTFP results	
Capital	Category Benchmarking	Adjust, as required:	
Expenditure		 Augmentation capex 	
		 Replacement capex 	
		 Non-network capex 	
		Customer initiated capex	
Operating Expenditure	MTFP	High level indication of opex efficiency	
	Econometric Analysis	 Base year efficiency evaluation 	
		 Annual rate of change 	
	Category Benchmarking	Adjust, as required:	
		 Routine and non-routine maintenance opex 	
		 Vegetation management opex 	
		Overheads	

The Efficient Base Year

The regulatory approach

The extent to which the regulator uses the methods available to it under the framework, and the exact specification of the models is not yet fully known. What is clear is that an important factor in the AER's assessment of operating expenditure is the efficient base year. The base year is the historical year that the forecast future expenditure is commenced from using escalation via trends and growth factors and inclusion of any step changes deemed necessary and appropriate in magnitude.

In a revealed cost approach, the assumption is that the actual costs in a recent year reflect the appropriate cost of operating the business. As such, so long as there were no anomalous factors operating on the business then the largely recurrent nature of operating expenditure makes the base year an appropriate origin for trend forecasting. Where the regulator deems the base year efficient it assesses the forecast expenditure relative to that year. If the regulator determines that events in the base year included those that invoked non-recurrent costs or did not represent an efficient level of expenditure, it adjusts forecast expenditure accordingly.

The Expenditure Forecast Assessment Guideline for Electricity Transmission, released in November 2013, states:

"When we rely on past actual expenditure as an indication of required forecast expenditure, we assume that the past expenditure incurred by the TNSP was sufficient for it to achieve the expenditure objectives. That is, the TNSP's past expenditure was the amount required to manage and operate its network at that time, in a manner that achieved the expenditure objectives."

Transend has chosen the 2012/13 year as its base year for forecasting purposes. As shown to the right, the 2012/13 year represents the lowest level of actual operating expenditure in this current regulatory period.

2012/13 represents the lowest level of OPEX for the current period

Transend Controllable Opex



Data Source: Transend Regulatory Accounts All data translated into 2012/13 dollar figures.

Econometric Analysis

Indications and limitations for TNSPs

As shown earlier, the AER have indicated they will use an industry opex cost model as a counterfactual to compare the efficiency of an NSPs base year opex and also future changes in opex. This approach involves modelling an industry opex cost function that can be used to observe an individual NSPs opex compared to the industry. Whilst the other stated benchmarking methods will also be applied to *compare* expenditure levels between businesses, econometric analysis allows the regulator to *predict* expenditure of an individual business. As such, it is a key element of the AER's ability to quantitatively model an expected level of opex in a given year.

Once the AER have a model they believe accurately reflects the industry as a whole they can then put individual NSP information (such as output 1, output 2, capital input quantities and environmental characteristics) into the model and observe the average level of opex that should occur. This number can then be compared with an NSPs actual opex to see if it is above or below the modelled opex. If an NSPs opex is above what is modelled then this would be an indication that the NSP is inefficient compared to the industry average.

The difficulty in inferring opex efficiency from an econometric model is the need for a single industry cost function and sufficient explanatory variables to account for different characteristics between businesses - unlikely given the limited dataset and diverse range of operating conditions across the Australian transmission network.

Notwithstanding the above limitations, Huegin constructed an econometric model of Australian TNSP operating expenditure to predict the operating expenditure for each TNSP over the last 9 years. The specification of the econometric model is shown below right, whilst the results of the model prediction over time and compared to actual is shown above right.

This analysis is provided for illustrative purposes to highlight the "shape" of Transend's actual opex compared to a modelled prediction of opex. The econometric modelling adopted by the AER may produce different results due to the sensitivity of the results to the particular model specification and the lack of adequate data in such a small sample size.

Econometric Analysis - Predicted and Actual Opex



Econometric Model Specification

Dependent Variable	Opex			
Independent Variables	Peak Demand, Connections, Line Length, Energy Density and Previous Year Opex			
Coefficients	Estimate	Std. Error	t value	
Intercept	33.509	10.873	3.082	
log (Peak Demand)	0.643	0.186	3.455	
Connections	-0.0002	0.0013	-0.169	
log (line length)	-7.996	2.578	-3.102	
I(0.5*log(line length)^2)	0.928	0.297	3.130	
Energy Density	-0.112	0.040	-2.784	
LADJ Opex	0.001	0.001	1.037	

Assessment Framework

Reviewing Transend's base year opex

Given the limitations of econometric analysis as a tool for evaluating base year efficiency, other methods for evaluating the suitability of the base year as an efficient starting point for opex forecasts must be utilised. Three such methods are comparison of the base year opex against the forecast opex, against the previous performance and the benchmarking of opex against peers.

Huegin has produced a peer benchmarking report for Transend that demonstrates comparative performance, but also highlights some of the unique circumstances in the Tasmanian electricity supply environment that must be considered when comparing Transend to other networks. That analysis is not duplicated in this report. The focus of this report is the adequacy of the 2012/13 year as the base year for opex forecasting. The analysis is therefore based on evaluation of the 2012/13 year opex in the context of historical opex and the change in that opex compared to the changes in the rest of the transmission industry operating expenditure. The significance of the changes in Transend's opex compared to the changes in the industry opex lies in the AER's intent to introduce economic benchmarking. MTFP in particular relies on the changes in inputs and outputs of an individual business relative to industry average changes to identify relative efficiency.

We note that in the recent ElectraNet determination, the AER also used the comparison of base year expenditure in the context of costs in adjacent years in assessment of the most appropriate base year (which led to a change in the base year from 2011/12 to 2010/11). From the AER Final Determination for ElectraNet:

"We consider the base year should be a year in which expenditure was efficient and reflective of ongoing recurrent costs and likely prevailing economic conditions. We thus used the actual expenditure in 2010–11 as the reference for the base year because the actual controllable expenditure closely represented average expenditure for the whole current regulatory period for all opex categories. ElectraNet accepted this as a base reference year."

The framework for the evaluation in this report is shown to the right.

Operating Expenditure Evaluation- three methods

	A. Actual vs Forecast	Review of the 2012/13 actual operating expenditure against the forecast of operating expenditure from the previous regulatory determination.
	B. Base Year vs Historical	Review of the 2012/13 actual operating expenditure against the historical trend and the previous base year at the aggregate and component levels.
	C. Comparison with Peers	Review of the 2012/13 actual operating expenditure against peer organisations to the extent possible by the available data.

Transend Opex Performance Method A. Actual vs Forecast

Actual vs Allowance

Comparing current period opex to the previous allowance

Transend have implemented several cost reduction initiatives in the current regulatory period - some of these have been documented in the company Annual Reports each year. Further to this, many of the expected drivers of growth estimated in 2007/8 for the current regulatory period have not eventuated. Transend, like all businesses in the national electricity supply industry have experienced a trend of decreasing demand (although unlike other states, Transend's energy transmitted has not decreased). The compound effect of lower than expected growth drivers and targeted opex savings have resulted in an actual compound annual opex growth rate in the period of -1.3% compared to the forecast rate of 3.4%.

The 2012/13 year of opex represents the lowest point of actual cost on the period growth path; an indication of its suitability as the most efficient year of the four available. The 2012/13 year actual controllable opex is 22% less than what was deemed an efficient level of expenditure in the previous regulatory determination. Whilst an assessment of the behaviour under the Efficiency Benefit Sharing Scheme (EBSS) is beyond the scope of this report, the gradual reduction in opex against the allowed forecast for the current regulatory period is at least an indication that Transend is responding appropriately to the EBSS incentive.

Controllable Opex by Year - Allowance and Actual

Transend Operating Expenditure Performance

Forecast compound annual growth rate of regulatory allowance opex	3.4%
Compound annual growth rate of actual regulatory period opex	-1.3%
Operating expenditure decrease 2009/10 to 2012/13 (%)	5.0%
Operating expenditure decrease 2009/10 to 2012/13 (\$)	\$2.3m
Level of underspend against allowance in base year (2012/13)	22%
Value of underspend against allowance in base year (2012/13)	\$11.8m
Level of underspend against allowance for period 2009/10 to 2012/13	13.1%
Value of underspend against allowance for period 2009/10 to 2012/13	\$27.0m

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2012/13 Opex Evaluation Method B: *Trend Analysis*

Controllable Opex

Comparison of current period years

To provide a high level view of the suitability of the 2012/13 year as the base year, the controllable opex for each year in the current period was compared using four criteria:

- 1. Comparison of the opex in that year to the current period average;
- 2. Comparison of the opex in that year to the current period minimum;
- 3. Comparison of the opex in that year to the previous period base year opex; and
- 4. Comparison of the opex in that year to the long term, linear trend (shown below from FY05 to FY13).

As shown below, the 2012/13 year controllable opex is the current period minimum (and therefore also the lowest compared to the average) and it also represents one of two years that are lower than the long term trend (along with 2010/11) in the current period.

Also of note in the trend shown to the right is the ongoing decrease in opex since FY09. As mentioned previously, an assessment of the behaviour under the Efficiency Benefit Sharing Scheme (EBSS) is beyond the scope of this report, however the reduction in opex in the current regulatory period is an indication that Transend is responding to the opex incentive in place.

Criterion	FY10	FY11	FY12	FY13
Variation from current period average	1.7%	-1.7%	3.4%	-3.4%
Variation from current period minimum	5.3%	1.8%	7.0%	0.0%
Variation from previous base year	5.7%	2.2%	7.4%	0.3%
Variation from long term trend	4.0%	-1.0%	2.5%	-5.7%

Current Period Actual Opex

\$60m \$50m \$40m Previous Proposed **Base Year Base Year** The 2012/13 year \$30m controllable opex is the current period minimum (and therefore also the lowest compared to the average) \$20m Long Term Trend \$10m **Current Period Average Previous Period Current Period** \$0m FY05 FY06 FY07 FY08 FY09 FY10 FY11 FY12 FY13

Controllable Opex History - Actual, \$FY13

Category Analysis

Trend Analysis

Total controllable opex was also broken down into major components of Field Operations and Maintenance Costs, Operating Costs and Other Controllable Opex.

As shown to the right, for each of the major categories of costs, the 2012/13 year opex is:

- 1. Less than the long term trend; and
- 2. The lowest cost in the period for two of the three categories.

Other observations include:

- 1. Maintenance costs have decreased this period, with the significant decrease in the base year due mainly to a decrease in substation maintenance expenditure.
- 2. Operating costs have been relatively flat in this period, with the significant decrease in the base year due mainly to a decrease in engineering services.
- Other costs appear to be quite cyclical with peaks occurring in the lead up to regulatory determinations.

Viewing the costs at this level, there appears to be no evidence that anomalous costs have occurred in the 2012/13 base year nor is there any evidence that another year in the period represents a more efficient level of expenditure.

Total Controllable Opex over Time

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2012/13 Opex Evaluation Method C: *Comparative Analysis*

Comparative Trends

Industry growth rates for opex ratios

As discussed earlier in this report, the analysis of opex and the drivers unique to Transend that were presented in a previous Huegin benchmarking report are not duplicated in this report.

Benchmarking opex across transmission businesses in Australia based on simple, high-level ratios is limited in its ability to inform discussions of relative efficiency. Whilst this restricts the ability to infer relative efficiency in a single year, the changes in these ratios over time provides at least a high level indication of performance of the individual TNSPs compared to the industry performance. The graphs on the right show the change in opex ratios between 2007/08 and 2012/13 for Transend against the aggregate industry change¹ in opex ratios between 2007/08 and 2011/12². Transend is included in the industry average as this is representative of the form of the economic benchmarking methods - that is, the AER's benchmarking methods rely upon the changes in inputs and outputs of an individual firm compared to the industry average changes, including that firm.

As shown, Transend's decreasing opex in the current period has improved its relative efficiency to the industry aggregate on high level opex ratios. That is, whilst at an industry aggregate level opex has increased 2 to 3% relative to the growth in network length, energy consumption and demand, these same ratios have decreased by as much as 23% for Transend.

1. Aggregate industry ratios are derived by summing the operating expenditure and ratio denominators for all five TNSPs.

2. The 2011/12 year is used for the industry aggregate ratios as data is not available for all TNSPs in 2012/13.

Improving efficiency

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Conclusion

Huegin's analysis of Transend's 2012/13 financial year opex has found that it compares favourably in the context of the historical performance and also relative to the broader industry. In particular, Huegin found:

- 1. Transend benchmarks well, given its unique circumstances (see previous Huegin benchmarking report) within the industry;
- 2. Transend has decreased opex in the current period to the point where the proposed base year is similar to the level of expenditure in the previous period base year (FY07)
- 3. Transend has achieved a decrease in opex during a period where the industry (the five TNSPs) on average has experienced an increase in opex.

Given that the 2012/13 year is the most recent audited financial year and also reflects the latest year of a period of deliberate opex reduction, Huegin concludes that it is an appropriate base year for the purposes of forecasting future opex.