Demand Forecast Summary Recommendations 2020-25

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Contents

1. External Forecast Methodology Review

The following document provides a high-level summary of external forecast methodology reviews with a primary focus on peak demand, and reference to other demand forecast processes in the associated references.

Peak demand forecasts underpin the augmentation component of capital expenditure (capex). Other forecasts produced by Energy Queensland Limited (EQL) include annual energy consumption by tariff and by region, customer initiated capital works, and solar PV capacity, battery storage capacity and electric vehicle adoption.

The Energex and Ergon Energy networks have different characteristics which reflect the different geographic environments in which the networks operate. The Ergon Energy network has lower customer numbers overall, with lower customer density, whilst the Energex network is largely metropolitan. The networks also have a historically different risk profile and asset age. All these factors result in different approaches to forecasting growth in energy, peak demand and customer numbers.

In November 2013, the Australian Energy Regulator (AER) in its 'Better Regulation Explanatory Statement - Expenditure Forecast Assessment Guideline' set out the main principles of best practice demand forecasting[1]. These included:

- transparency and repeatability,
- accuracy and unbiasedness,
- incorporation of key drivers,
- model validation and testing,
- use of the most recent and consistent inputs into the forecasting process; and
- any other attributes considered important.

In preparation for the 2015-20 regulatory submission, Energex and Ergon Energy, engaged independent external reviews to ensure the AER best practice forecasting principles had been incorporated and maintained.

The main methodological improvements for Ergon Energy network in lead up to the 2015-20 AER submission included:

- an independent system peak demand methodology that is used to reconcile spatial forecasts,
- a methodology that allowed for variation in key economic, demographic, appliance and weather factors,
- a weather normalisation process to its forecasting process; and
- documentation of processes and methodology where previously documentation was sparse.

[1] AER, explanatory statement-expenditure forecast assessment guideline, section 5.5.2, November 2013

And the Energex network:

- improved documentation for transparency and repeatability,
- analysed major drivers of system peak demand to determine the exact form that these variables enter the model,
- incorporated the effects from multiple weather stations in the weather normalisation procedure, and
- included a price variable and dummy variables for day of the week effects directly into the estimated model.

In the lead up to the 2020-25 regulatory submission, EQL has again sought independent external consultants to review the various approaches used in forecasting peak demand and annual energy consumption, with an analysis of the strengths and weaknesses of the various approaches, to ensure that best practice forecasting principles had been maintained, and to provide recommendations for further improved efficiency into forecasting techniques[2].

The resulting recommendations are summarised in Table 1 and Table 2 for each network separately[3]. Other recommendations focussed on clarity of documentation of methodology and minor model functional form recommendations.

Major Recommendation	Details
Regional approach	Ergon should consider developing separate regional peak demand models to allow better targeted reconciliation between its spatial level and higher level peak demand forecasts.
Distributed Energy Resources (DER)	Ergon should include post model adjustments for battery storage and electric vehicles scenarios.
Climate change recognition	Ergon should shorten the long run weather time series used in the weather normalisation process to include only the period from around 1980 onwards. This reflects the fact that summer average temperatures have increased over the long term, and is in effect a judgement call that the structural shift in Queensland temperature is permanent rather than temporary.
Broaden variable testing	Ergon should recalibrate its preferred model based on the most up to date data available, and re-introduce variables that were tried previously and found to be statistically insignificant, such as price.

Table 1 Ergon Energy Network Recommendations

[2] ACIL Allen-various>
[3] ACIL Allen, Review of System Maximum Demand and Energy-15 May 2018, ACIL Allen Consulting

Major Recommendation	Details
External economic driver adjustments	Energex has applied the NIEIR low case GSP forecast to produce its medium or base case system peak demand forecast. Independent experts consider that the NIEIR low case is too pessimistic based on recent history and the medium forecasts of GSP should be used as the basis for the base case forecasts. These are more consistent with historical economic activity after the GFC.
DER	Improve the transparency of rooftop PV forecast methodology, through the inclusion of major drivers such as the cost of installation, changes in feed-in tariffs and other subsidies, and electricity prices, rather than relying on a method of extrapolation along an S curve. Improve the transparency and repeatability of forecasts by adding detail to documentation on the methodology used to forecast the uptake of solar PV, battery storage and electric vehicles.

Table 2 Energex Network Recommendations

Subsequent to receiving this methodology review, EQL has engaged Energeia to develop a project implementation pathway or "road map" to best implement the recommendations, using risk mitigation measures over the short, medium and long term. This road map is under development and will be available during 2019.

Peak demand and energy forecasting are initial inputs in a long planning cycle. As a result, they face the inevitable challenge of only being able to incorporate methodological changes on an annual basis; otherwise, the current forecast will be out of sync with the forecast being used for planning and pricing. While almost all of the recommendations have been implemented or under review, the impact of those refinements will not be evident until the next round of forecasts. The materiality of any impacts between next year's forecast and the forecasts used in the development of the DAPR's can be assessed and any adjustments made in the final submission.

In terms of forecast accuracy, the table and the charts below set out the most recent Energex and Ergon forecasts (note: actuals in the table do not weather correct for extremeness of season).

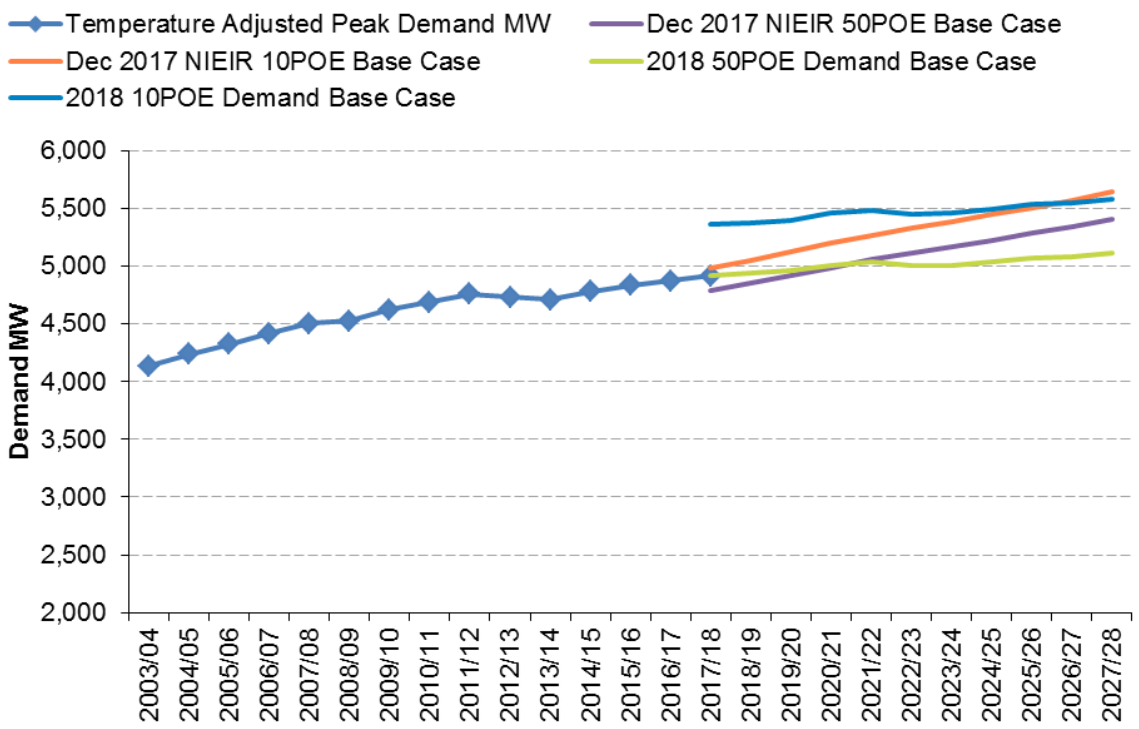
	Energex				Ergon			
	50 POE MW Forecast	Actual MW	Energy Forecast GWh	Energy Actual GWh	50 POE MW Forecast	Actual MW	Energy Forecast GWh	Energy Actual GWh
2016-2017	4 640	4 814	21 105	21 386	2 458	2 637	13 349	13 332
2017-2018	4 900	4 920	21 253	21 281	2 551	2 597	13 715	13 243
2018-2019	4 939	4 627*	21 206		2 549	2 491*	13 115	

Table 3 Energex and Ergon Energy Forecast and Usage

For the summer of 2018/2019, the highest peak MW demand recorded to date[4] in the Energex region occurred on 21 December with 4 627MW at 16:30. While that peak is 312MW below forecast, the forecast looks reasonable considering that the majority of annual peak MW demands occur in late January to end of February. For comparison, the peaks recorded up until the end of December for the 2016/17 and 2017/18 years were 389MW and 934MW below their forecast respectively.

Within Ergon, the recorded peak to date is only 58MW below forecast, also indicating that the forecast appears reasonable.

Energex Peak Demand Forecast

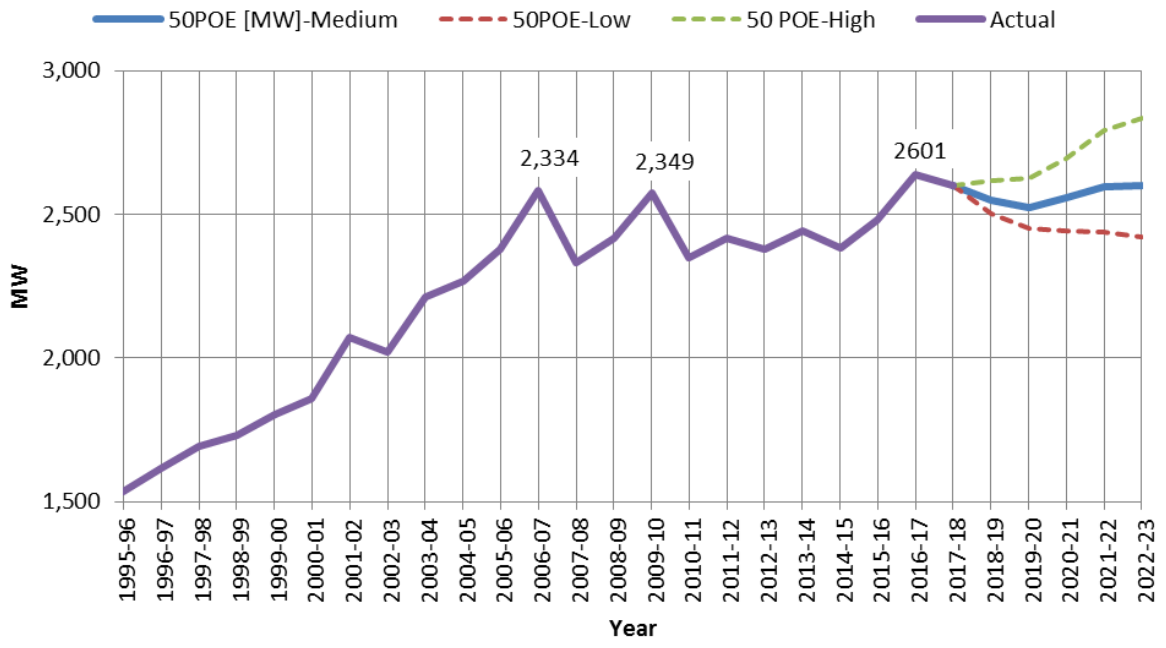


Source: Energex DAPR 2018, Chapter 5, page 27, Figure 16

Figure 1 – Energex Peak Demand

[4] Based on the data available to 10 January 2019 for the summer of 2018/2019

Ergon Energy System-wide Peak Demand



Source: Ergon Energy DAPR 2018, Chapter 5, page 22, Figure 19

Figure 2 – Ergon Energy Peak Demand