NATIONAL ELECTRICITY FORECASTING REPORT

Action Plan Implementation

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AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

1. INTRODUCTION

The Australian Energy Market Operator (AEMO) develops operational consumption and maximum demand forecasting methodologies and uses these to produce forecasts published annually in its National Electricity Forecasting Report (NEFR).[1]

In 2014, AEMO conducted its own review of its forecasting processes. In addition, AEMO's residential and commercial forecasting methodology processes were endorsed and approved by external reviewer Woodhall Investment Research.

Following these methodology reviews, AEMO developed the 2015 NEFR Action Plan[2] which summarises the activities which AEMO proposed to address in the 2015 NEFR.

This document outlines how the activities proposed in the Action Plan were implemented in the 2015 NEFR. It also identifies actions which require further investigation for the 2016 NEFR.

[1] AEMO. *National Electricity Forecasting Report.* Available at http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report

[2] AEMO. *2015 National Electricity Forecasting Report Action Plan*. Available at http://www.aemo.com.au/Electricity/Planning/Forecasting/NEFR-Archive/~/media/Files/Other/planning/NEFR/2014/2014%20Updates/2015%20NEFR%20Action%20Plan%20V2.ashx

2. ACTIONS FOR THE 2015 NEFR

Item	Finding	Action for 2015	Implementation
1	**Operational consumption**		
1.1	Historical data is currently not split according to residential and commercial consumption. Splitting the forecasts where possible may increase their accuracy and identify trends between different consumer types.	• Use Victorian smart meter data to split residential and commercial consumption for the region and assess the practicality and value of using this data in the forecasts. • Investigate data availability outside of Victoria.	• Victorian smart meter data is limited and this means it is currently unsuitable for modelling. • AEMO is continuing to investigate the potential use of data outside of Victoria. • AEMO will monitor smart meter data for inclusion in future modelling.
1.2	While the residential and commercial consumption model is sensitive to price elasticity, it does not model how consumers switch between electricity and gas for appliances and heating.	• Report on the key drivers for fuel switching. • Explore how to capture trends and provide recommendations for implementation in future NEFRs.	• Economic assessment of residential fuel switching was investigated[1] for each NEM region. Behavioural preferences were not considered. • Trends and recommendations will be considered in future forecasting reports.
1.3	The current forecasting methodology does not include electric vehicles (EVs). A large uptake of EVs would affect operational consumption.	• Analyse the key drivers for EV uptake and quantify the current penetration in the Australian market. • Use the data to explore modelling approaches that would capture EV trends for inclusion in future NEFRs.	• Modelling of EVs was not considered due to data availability. Instead, an EV user tool was developed which allows users to investigate EV impact on annual consumption and daily demand. • Plug-in hybrid EVs and battery EVs were considered. • Future NEFRs will include a review of EV uptake as government policy incentives are introduced or the capital cost of EVs drops significantly.

[1] Refer to the *2015 Emerging Technologies Information Paper*. Available at http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report/NEFR-Supplementary-Information

Item	Finding	Action for 2015	Implementation
1.4	Large industrial load (LIL) forecasts are aggregated at region level. Categorising LIL forecasts by sector would provide more granularity that would be beneficial to stakeholders such as state and federal government and network service providers.	• Categorise LIL forecasts by ANZSIC code. • Consult with relevant stakeholders regarding possible approaches to publishing categorised forecasts.	• Due to confidentiality, AEMO could only disaggregate the regional LIL forecasts into 'Manufacturing' and 'Other', however the forecast was based on ANZSIC codes. Benefit: Disaggregating regional LIL forecasts provides more information to stakeholders, while forecasting by sector allows AEMO to capture longer term changes within sectors.
2	**Maximum demand models**		
2.1	AEMO's NEFR presents only maximum demand forecasts. Extending the model to include minimum demand forecasts would benefit both AEMO and network service providers when assessing regions where high levels of wind penetration make minimum demand periods an important planning consideration.	• Publish summer and winter minimum demand forecasts for South Australia as a starting point in the 2015 NEFR. • Consider including minimum demand forecasts for the other regions in the 2016 NEFR.	• Monash University developed the 2015 NEFR minimum demand model for South Australia. AEMO is currently working with Monash University to adapt the model to other regions for inclusion in the 2016 NEFR. Benefit: Minimum demand forecasts help inform future studies that examine network stability.
2.2	Currently, industrial and non-industrial load are modelled separately. Incorporating industrial load into the maximum demand model should improve the accuracy of probability of exceedance (POE) distributions.	• Develop a maximum demand model that produces POEs for both industrial and non-industrial demand.	• Completed as part of the 2015 NEFR. Benefit: Improved accuracy of the POE forecasts.
3	**Energy efficiency (EE) forecasts**		
3.1	The 2014 NEFR included federal EE programs only. Additional state and local government EE schemes are not necessarily captured in the federal data.	• Engage with state governments and investigate alternative data sources. • Where the data allows, incorporate state-based EE schemes, ensuring schemes are not double-counted.	• AEMO included NSW state based EE schemes. • Updated appliance EE data from the Department of Industry was incorporated. Benefit: More accurate forecasts.
4	**Rooftop photovoltaic (PV) forecasts**		

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4.1	The rooftop PV uptake model currently considers installations under the Small Renewable Energy Scheme (<100 kW). These include both residential and commercial installations. As commercial installations have different drivers and growth rates, the model should consider residential and commercial uptake separately.	• Disaggregate the modelling for residential and commercial PV installations to capture the different drivers and trends between these segments.	• Completed as part of the 2015 NEFR. • In addition, the 2015 forecasts include commercial rooftop PV systems greater than 100 kW. Benefit: Improved forecasts that captures different underlying drivers.
5	**Battery storage**		
5.1	The PV model currently considers PV systems as stand-alone. Systems coupled with battery storage may become more viable over the forecast period.	• Investigate key policies and economic drivers for battery storage uptake. • Research modelling frameworks that capture trends. • Quantify the potential impact of storage technology on the consumption and maximum demand forecasts.	• Completed as part of the 2015 Emerging Technologies Information Paper. AEMO modelled the potential uptake of integrated PV and battery storage systems, but did not model retrofitting of existing rooftop PV. Benefit: First time AEMO has developed a battery storage forecast. It was not included in the NEFR forecast, however it allows readers to see the potential impact of battery storage.[1]
6	**Communications**		
6.1	The NEFR publication, particularly the data, could be improved in terms of user-friendliness and accessibility.	• Explore, and implement where practical, improved ways to present published data and investigate developing an interactive web portal.	• AEMO developed a Forecasting Dynamic Interface. This allows users to view graphs and key results, apply filters, and download data. Benefit: Increased data accessibility which allows users to tailor information to their interests / needs.

[1] Refer to the *2015 Emerging Technologies Information Paper*. Available at http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report/NEFR-Supplementary-Information