Energy Consumption Model

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Version 4.0

Aurora Energy

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	Name	Signature	Date
Prepared by:	S.Wilson	.....	...../...../.....
Reviewed by:		.....	...../...../.....
Accepted by:		.....	...../...../.....
Authorised by:		.....	...../...../.....

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Contact for Enquiries and Proposed Changes

If you have any questions regarding this document contact:

Name: Stephen Wilson
Title: Revenue Assurance Manager
Phone: 0428 004 324

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1.0	25 Mar 11	S Wilson	Original version
2.0	29 Mar 11	S Wilson	Updated commentary
3.0	30 Mar 11	S Wilson	Updated commentary & graph 2
4.0	18 April 11	S.Wilson	Updated commentary & customer class names

Table of Contents

1 Introduction

Aurora is subject to economic regulation as a natural monopoly provider of electrical distribution services. Currently, economic regulation of Aurora's declared distribution services is administered by the Tasmanian Energy Regulator appointed under the provisions of the Electricity Supply Industry Act 1995. With the transfer of the responsibility of economic regulation of electricity distributors to a national level, the administration of this in reference to Aurora will fall under the jurisdiction of the Australian Energy Regulator (AER), as at 30 June 2012.

The actions of the AER in respect to the economic regulation of electricity distributors are governed by the National Electricity Law (NEL) enacted initially in the Parliament of South Australia and subsequently in the remaining state legislatures; the National Electricity Rules (NER) created by the Australian Energy Market Commission under powers granted it by the NEL and any guidelines created by the AER to aid in the performance of its duties.

The process of economic regulation involves the approval of a submission, detailing proposed expenditure and resulting costs to consumers, made by the electricity distributor to the AER. The requirements for the submission are contained in Chapter 6 of the NER and various guidelines issues by the AER. Aurora is required to submit to the AER its submission for the period 1 July 2012 to 30 June 2017 in accordance with these requirements.

2 Purpose

The purpose of this document is to provide an overview of the Consumption Model workbook (the "Energy Consumption Model") which is a requirement for Aurora's Pricing Determination 2012-17.

The purpose and underlying approach of the consumption model is to project energy consumption forecasts forward at a rate that is consistent with recent history for each tariff class at an aggregated group level being Residential, Small LV, Large LV, Large Commercial HV, Irrigation and Unmetered Supplies (UMS). Forecasts include the use of a growth factor that has been constructed to account for weather (summer and winter) and economic factors that are applied to the aggregated tariff class for low, medium and high outlooks.

3 Modeling Architecture

Essentially there are a number of input and output components which comprise the Energy Consumption Model, these include:

- historic energy consumption data from 1/7/02 to 30/6/08 (Frontline) and 1/7/08 to 28/2/11 (DBILL);
- data summary of energy consumption consolidated by financial year;
- tariff classes aggregated;
- growth factor & scenarios in consideration of reports from Australian Energy Market Operator (AEMO), National Institute of Economic and Industry Research (NIEIR), Aurora System Maximum Demand Forecast (MD);
- Processing/Output Worksheets including: aggregated tariff forecast summary (low, medium, high).

4 Consumption data by financial year and consolidated

Data sets have been supplied from Frontline (retail) system from 2002 to 2007 and DBILL distribution system from 2008 to 2010 at specific tariff classes, step rates and time of use (TOU) parameters.

All data has been provided in financial years to ensure a consistent methodology when trending historical and future forecasts.

4.1 Tariff classes aggregated

Tariff classes have been aggregated at Residential, Small LV, Large LV, Large Commercial HV, Irrigation and Unmetered Supplies (UMS); to ensure forecasts provide a high level outcome in establishing trending and to minimise any effects of small customer numbers within individual Tariff classes.

4.2 Growth factor analysis

In determining the forecast growth factor to be applied to Aurora's historic energy consumption for Aurora's Regulatory Proposal for the 2012-17 Regulatory control period, detailed analysis has been completed using Aurora's historic data, AEMO 2010 Electricity Statement of Opportunities report and NIEIR's report for Transend's system forecasts.

NIEIR's econometric regression equation was developed for Transend's Pricing Determination in 2009 in providing a system forecast with input and outputs including weather normalisation methodology, economic growth and changing demographics.

The random nature of weather means that any comparison of historical energy loads over time requires these loads to be adjusted to standardise weather conditions and utilises the 40 year average forecasts to determine the sensitivities.

Economic data incorporates gross state product growth as well as the impact of changes in real electricity prices and other policy drives of the energy projections.

ACIL Tasman have reviewed the methodology used for the growth factor in the consumption model (refer report 28 April from ACIL NW30183276). ACIL have recommended an econometric model to derive Aurora's energy forecast and is this work is currently in progress.

4.2.1 Methodology

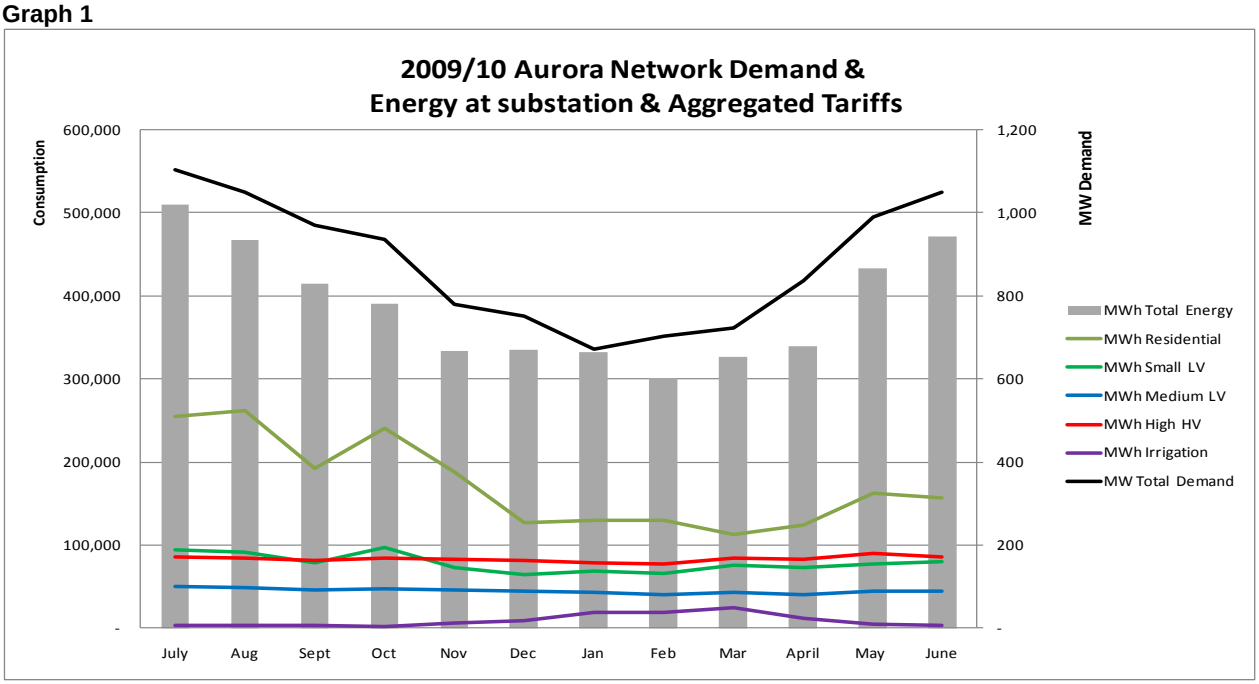
Aurora's methodology and approach with the energy consumption forecast was to use NIEIR's growth factor and consideration of the profile relationship as shown in graph 1.

Analysis has used 2009/2010 financial year data to profile the relationship between historical MW total demand and MWh total energy for network substations across Tasmania. The aggregated tariff data that makes up the components of the total energy has then been applied to demonstrate the different profiles depending on the tariff classes.

Tariff class types of residential, small and medium business reflect profiles similar to the total energy consumption, however, large business is flat and irrigation spikes during the summer months (Dec-April) due to lower rainfall.

The profile alignment has provided Aurora with the ability to utilise the reconstructed growth percentages for weather and economic as provided in the ACIL Tasman's MD Forecast model. The growth factors used also reflect the different tariff profiles and is discussed further in section 5.1.

Graph 1



5 Growth factor (low, medium, high);

The aggregate tariff forecast utilises NIEIR approach to determining the probability of exceedance levels (POE).

Probability of Exceedance levels (POE)

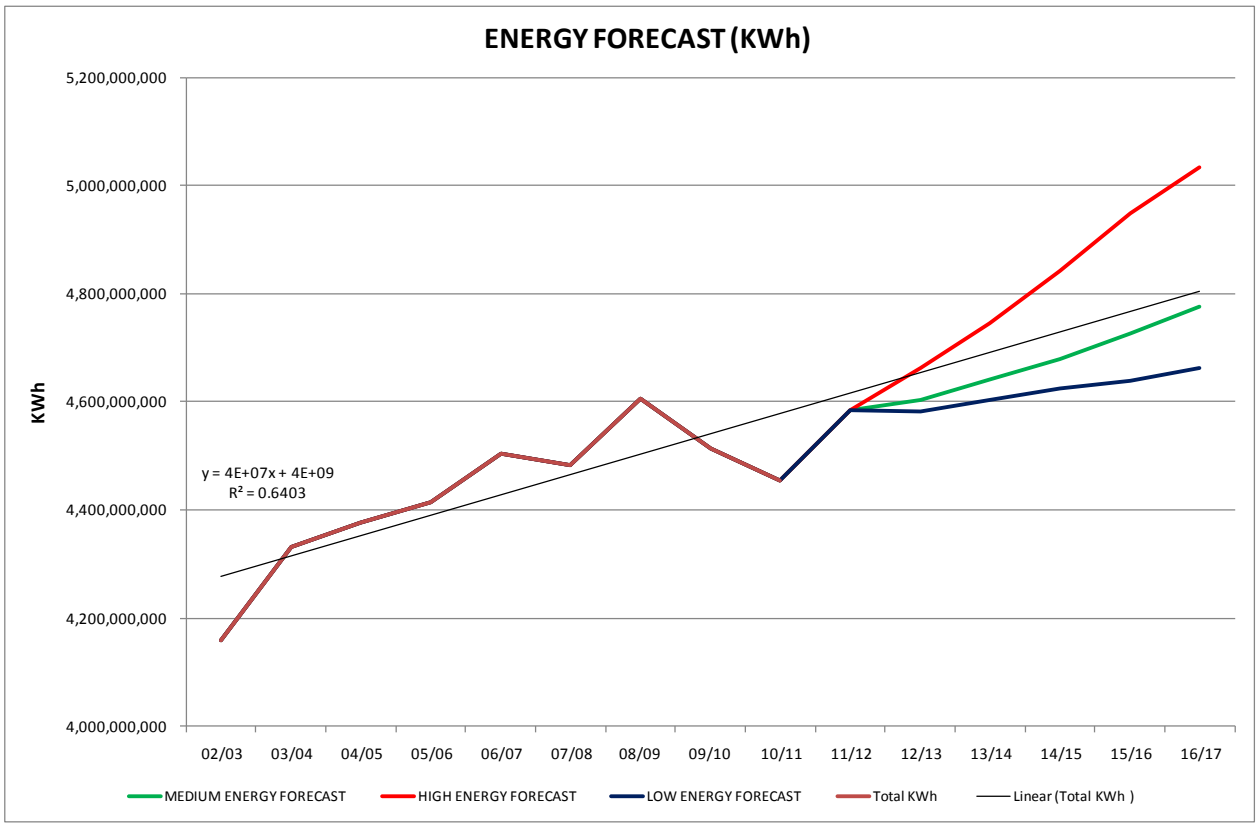
- 10th percentile: temperature met once in every ten years (10% POE);
- 50th percentile: temperature met once in every two years (50% POE);
- 90th percentile: temperature met nine out of ten years (90% POE).

Graph 2 below reflects Aurora's consolidated historic energy and forecasts for low, medium and high growth escalators.

Analysis of Aurora's historic data reflects a constant linier pattern between 03/04 and 09/10, however, the current 10/11 year is considered very low due to the major influence of the current weather conditions being experienced across Tasmania and eastern mainland states. Aurora has estimated that the 11/12 year will return back to trend and has been the basis of the Period 5 pricing submission to the Regulator.

Aurora has therefore applied the above methodology in determining the 11/12 as the base year to apply its forecast from 12/13 to 16/17. This approach is supported when continuing the linier line through Aurora's historical energy consumption data and forecasts that supports the decision to base the consumption forecasts on the medium 50% POE (base).

Graph 2



5 Aggregated Tariff forecast

The below table outlines the final year on year medium energy forecast percentages that have been applied to historic energy consumption in Aurora's energy forecast.

Table 1

% INCREASES - MEDIUM ENERGY FORECAST						
ENERGY FORECAST						
	12/13	13/14	14/15	15/16	16/17	Annual growth
Residential	0.51%	1.03%	0.97%	1.24%	1.22%	**0.99%**
Small LV	0.51%	1.03%	0.97%	1.24%	1.22%	**0.99%**
Large LV	0.51%	1.03%	0.97%	1.24%	1.22%	**0.99%**
Large Commercial HV	0.00%	0.00%	0.00%	0.00%	0.00%	**0.00%**
Irrigation	1.24%	-0.09%	1.53%	-0.38%	3.41%	**1.13%**
Unmetered Supply	1.57%	1.61%	1.59%	1.56%	1.54%	**1.57%**
% increase	**0.44%**	**0.82%**	**0.81%**	**0.98%**	**1.05%**	**0.82%**

Residential
The growth factor in Table 1 has been applied to the aggregated residential tariff class. The annual growth of 0.99 percent reflects historical trends of 1.11 percent. This tariff profile reflects the closest alignment to the total energy profile with total demand (graph 1) and therefore the winter base 50 POE has been used in forecasting the consumption.

Small & Large LV
The growth factor in Table 1 has been applied to the aggregated small & medium business tariff class. (Historical growth to 09/10 is 2.96% pa and 2.19% pa respectively). The methodology for applying a conservative growth factor against historical trends is in consideration of the flat economic outlook as confirmed by the Tasmanian Department of Treasury and Finance publication on the 2010 state accounts that reflect GSP/GDP growth in decline.

Large Commercial HV
Major industrial customers are assumed to be weather/temperature insensitive. The major industrial customers are examined separately with the outlook considered flat in line with historic trend of -0.96 percent.

Irrigation
As demonstrated in graph 1, the irrigation tariff has a unique profile as shown in the summer months energy consumption when pumping of water is required. Due to the energy profile the summer 50 POE base has been applied to the irrigation tariff class and is in alignment with the historical trend of 1.16 percent.

Unmetered Supply (UMS)
As demonstrated in graph 1, this tariff profile is flat with historic trends of 0.50 percent, however, the forecast modelling for unmetered supplies as part of the alternative control framework has made provision for growth of 0.51 percent per annum.

6 Glossary

Term	Definition
AER	Australian Energy Regulator
AEMO	Australian Energy Market Operator
NEL	National Electricity Law
NER	National Electricity Rules
MD	Maximum Demand
NIEIR	National Institute of Economic and Industry Research