Energy consumption forecasts

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1. Introduction

Aurora provided the AER with its *Regulatory Proposal* on 31 May 2011 in accordance with the provisions of Chapter 6 of the *Rules*. In its *Regulatory Proposal* Aurora indicated, at sections 7.1.2 and 10.2.4, that due to recommendations provided to Aurora by ACIL Tasman during their review of Aurora's energy consumption forecasts, that Aurora had commissioned ACIL Tasman to undertake further analysis of expected consumption forecasts for the forthcoming *Regulatory Control Period*. Aurora further indicated that it would make the ACIL Tasman consumption forecast available to the AER once it was received by Aurora.

Aurora further indicated in its *Regulatory Proposal* that should the report provided by ACIL Tasman result in changes to Aurora's energy consumption forecasts, that Aurora would address those changes in response to the AER's draft determination.

Aurora has now received the report from ACIL Tasman and has appended it as an attachment to this document for the AER's consideration.

The ACIL Tasman report provides energy consumption forecasts that are more optimistic than those proposed by Aurora in its *Regulatory Proposal*. Whilst Aurora has some reservations regarding the ACIL Tasman forecasts, they represent an independent view of consumption that has been derived from a verifiable methodology and Aurora considers it appropriate to now adopt these forecasts for its *Regulatory Proposal*.

In light of the information now provided by ACIL Tasman, Aurora considers it is also appropriate to provide the AER with amended pricing forecasts as indicative prices are lower under the ACIL Tasman forecasts.

ACIL Tasman has also provided energy consumption forecasts under a carbon tax scenario of $20 per tonne CO_2. Aurora also provides indicative prices under this carbon tax scenario.

2. Energy consumption forecasts

2.1. Consumption forecast methodology

ACIL Tasman has produced an independent energy forecast for six customer classes for Aurora's forthcoming *Regulatory Control Period*. The forecast period also includes the period 2010-12 and therefore encompasses the period 2010-17.

ACIL Tasman has utilised six customer classes in the preparation of these forecasts and they are:

- residential;
- small business – LV;
- large business – LV;
- large commercial – HV;
- irrigation; and
- unmetered supplies.

The ACIL Tasman approach is to estimate multiple regression models for each customer class against a set of drivers which differ for each class and which are validated using standard statistical tools such as goodness of fit, correlation (R^2) and statistical significance (T-test).

The key drivers for residential energy consumption are population growth and weather variation. For the small and large business – LV customers, the key driver of energy consumption is economic growth (GSP). Irrigation energy consumption is driven predominantly by variation in annual rainfall. Unmetered supply is driven by growth in Tasmanian GSP.

The large commercial – HV customers contain only a very small number of very large energy customers. In this case, ACIL Tasman considers that a regression based approach is not appropriate as the forecasts would be highly sensitive to changes in company specific factors. The best approach to forecasting energy consumption for very large customers is to survey them regularly to determine their energy requirements. This is the approach taken by Aurora and ACIL Tasman has chosen to adopt Aurora's forecasts for these customers.

Key inputs into the ACIL Tasman forecasting process are projections for Tasmanian economic and population growth rates. For the purposes of ACIL Tasman's economic forecasts, the GSP growth forecasts published in the 2010-11 mid-year financial report of the Tasmanian Department of Treasury and Finance is utilised. ACIL Tasman's population forecasts are the series B population projections produced by the Australian Bureau of Statistics (ABS).

It is important to note the overall rate of growth from 2009-17 includes the positive impact of weather correction between 2009-10 and the first forecast period of 2010-11. The 2009-10 year was substantially milder than usual resulting in lower heating related energy consumption. The ACIL Tasman models assume that the weather patterns return to long run historical behaviour from 2010-11 onwards. This means that a large component of the increase in energy consumption forecast to take place between 2009-10 and 2010-11 is driven by weather correction (normalisation) in the residential sector.

2.2. Economic and demographic drivers

2.2.1. Economic growth

Increasing energy use is driven by higher disposable incomes and subsequent demand for new appliances and equipment. It is also driven by increasing commercial and industrial activity.

ACIL Tasman considers that while the increase in electrical appliances can be expected to have a positive impact on energy consumption, the overall impact is uncertain. For example, many new appliances are considerably more energy efficient than those they replace, potentially leading to lower energy consumption per household.

Economic growth is a major driver of rising incomes and hence growth in energy sales. In addition, it reflects the extent to which economic output is increasing, of which electricity is a key input, particularly for energy intensive manufacturing industries.

The outlook for the Tasmanian economy is relatively weak. As a State that is not generally participating in the resources led boom which is benefitting resource rich states such as Queensland and Western Australia, Tasmanian economic activity is being detrimentally affected by the strong Australian dollar (relative to the US$).

ACIL Tasman considers that the higher Australian dollar is likely to impact on Tasmanian economic activity by:

- hurting agricultural exports and import competition;
- hurting domestic tourism, with the high dollar making overseas travel more attractive and limiting overseas arrivals;
- hurting the manufacturing sector; and
- hurting international education exports.

Recent analysis conducted by the Commonwealth Bank of Australia (CBA), predicts that employment growth in Tasmania will average just 1.25 percent in 2010-11 and 2011-12, with an associated unemployment rate of 5.75 percent over the same period.

The CBA also forecasts GSP growth to remain significantly below the long run growth rate of 2.35 percent. The CBA forecasts a rate of growth of 1.25 percent in 2010-11 followed by 1.5 percent in 2011-12.

In its 2010-11 budget, the Tasmanian Government projected a more optimistic rate of growth of 2.25 percent in 2010-11, increasing to 2.75 percent from 2011-12 to 2013-14.

ACIL Tasman considers that based on developments to date, the 2.25 percent growth target for 2010-11 seems overly optimistic. The 2010-11 mid-year financial report published by the Tasmanian Department of Treasury and Finance, presented revised GSP growth forecasts for the period from 2010-11 to 2013-14 which are consistent with those of the CBA.

2.2.2. Population growth

Energy sales growth shows a steady upward trend. This rising trend has been driven by the growth in connections, offsetting reduced energy consumption per connection. Increasing residential customer numbers are driven by household formation arising from population growth.

Population growth in Tasmania has gone through periods of both relatively strong growth and also periods of stagnation or decline. In the years between 2000 and 2010, the estimated resident population of the State grew by 0.74 percent per annum, reaching 507,603 by the June quarter of 2010. Over a one and five year time horizon, Tasmania's population growth has averaged 0.9 percent per annum. Longer term growth rates are significantly lower.

A key input into generating energy consumption forecasts is the projected population for the State. The ABS produces three distinct population projections for Tasmania, known as Series A, B and C. Series A and C are the optimistic and pessimistic scenarios respectively. Series B is the mid-point, which is the scenario that ACIL Tasman adopts for the purposes of producing its energy consumption forecasts.

Under the Series B population scenario, the ABS projects Tasmania's population to reach 537,188 by June 2020, an average growth rate of 0.6 percent per annum. This ten year forecast is slightly lower than the actual result of 0.7 percent per annum for the ten years to 2009-10.

ACIL Tasman considers that the rate of household formation is likely to follow population growth closely, given the relatively stable number of 2.4 persons per household for Tasmania in 2006 from data obtained from the ABS Census.

2.2.3. Weather variables

Air temperature

Variations in average weather conditions over the course of a year may drive movements in energy consumption. While a single extreme day is sufficient to result in a season peak maximum demand, that day will make only a small contribution to total annual energy sales. A measure of the overall hotness or mildness of a season is likely to be a better indicator of how temperature is affecting energy consumption. ACIL Tasman assesses the impact of average weather conditions with the concept of heating degree days (HDD) and cooling degree days (CDD).

HDD is a measure designed to reflect the amount of energy required to heat a home or business, while the CDD is designed to reflect how much energy is required to cool a home or business.

In the case of Tasmania, energy consumption is predominantly driven by colder weather which leads to higher energy consumption related to space and hot water heating. Unlike other Australian states, summer peak demand is also predominantly driven by colder rather than hot days. For this reason, ACIL Tasman considers that the more likely driver of energy consumption is heating degree days rather than cooling degree days.

Rainfall

ACIL Tasman considers that annual rainfall is expected to be a significant determinant of energy consumption for the irrigation customer class. Periods of below average rainfall would be expected to correspond to an increased need to irrigate crops resulting in higher energy consumption. Conversely, in periods of above average rainfall, the need to irrigate crops is reduced and hence energy consumption associated with pumping to supply irrigation is also reduced.

2.2.4. Electricity prices

ACIL Tasman considers that another potential driver of energy consumption is the retail price of electricity as there is a negative relationship between price and consumption. Energy consumers are likely to exhibit some sensitivity to rising energy costs, particularly in 2008-09, 2009-10 and 2010-11 as retail prices increased by substantially more than the preceding years where retail prices exhibited more modest rates of growth.

Tariffs were relatively stable up to 2007 across all tariff classes, before commencing a more rapid ascent. ACIL Tasman considers that it is therefore reasonable to expect that the strong price rises of recent years have had a dampening effect on energy consumption across the main customer classes.

The degree of responsiveness of energy consumption to changes in price is known as the price elasticity of demand. The degree of responsiveness is thought to differ considerably across customer classes, with residential customers thought to be generally less responsive to price changes compared to commercial and industrial users. This is because energy costs comprise a significantly larger proportion of the total expenditures of large energy users, so that significant price increases might be expected to lead to adaptive behaviour designed to reduce energy consumption and hence costs.

2.3. Forecast results

ACIL Tasman has produced energy consumption forecasts for the six customer classes of:

- residential;
- small business – LV;
- large business – LV;
- large commercial – HV;

- irrigation; and
- unmetered supplies.

Figure 1 and Figure 2 present the ACIL Tasman energy consumption forecast for the distribution network and each customer class.

Figure 1: Forecast energy consumption

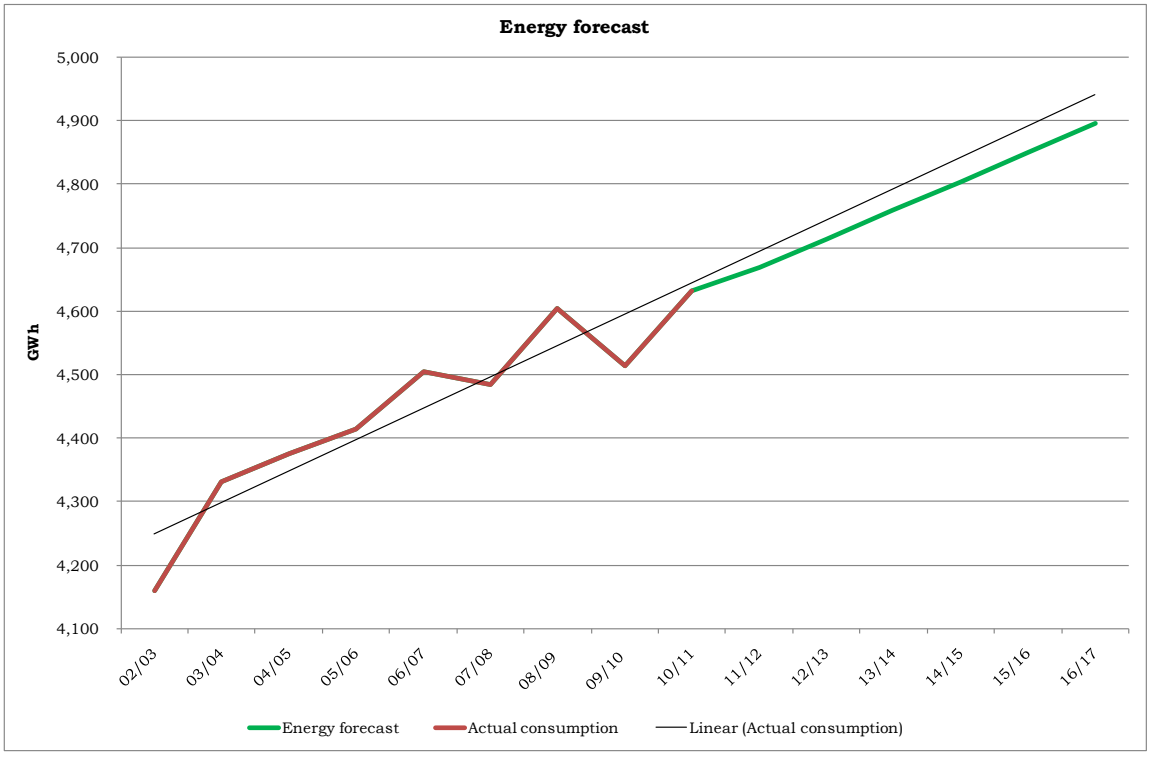
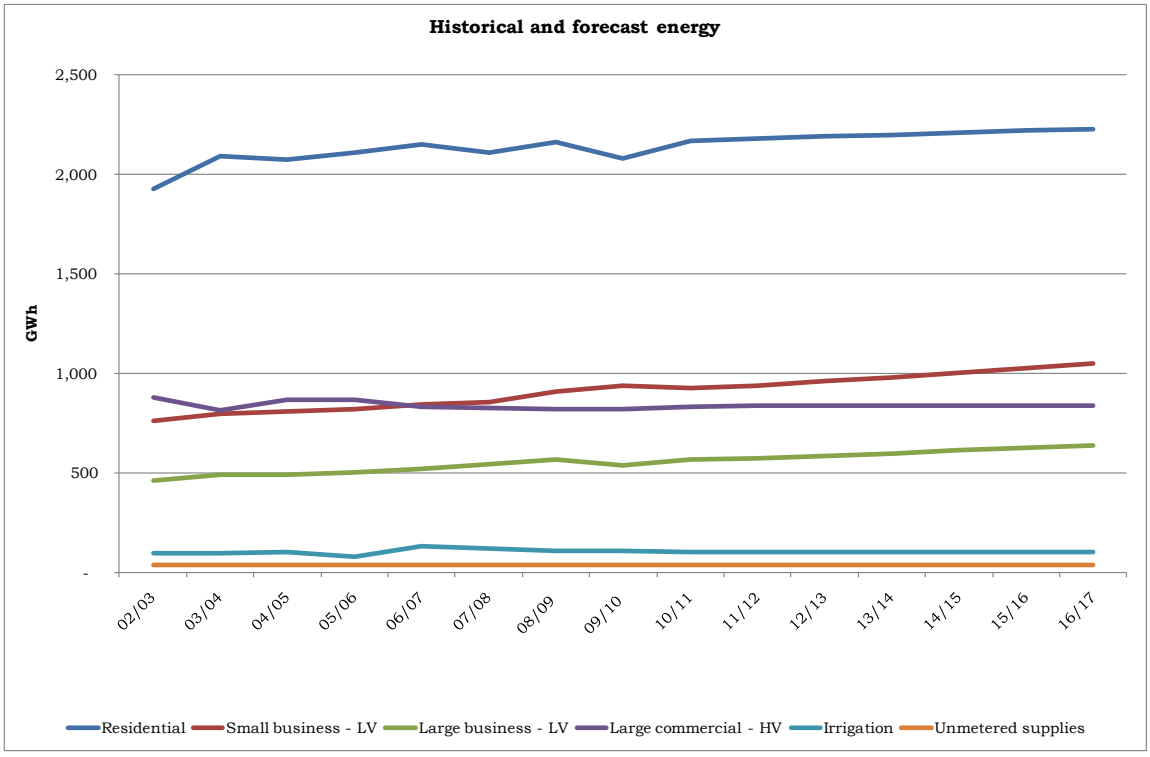


Figure 2: Forecast customer class energy consumption



ACIL Tasman has also produced energy consumption forecasts under a carbon tax scenario of $20 per tonne of CO_2. Figure 3 and Figure 4 present the ACIL Tasman energy consumption forecast for the distribution network and each customer class for the carbon tax scenario.

Figure 3: Forecast energy consumption – carbon

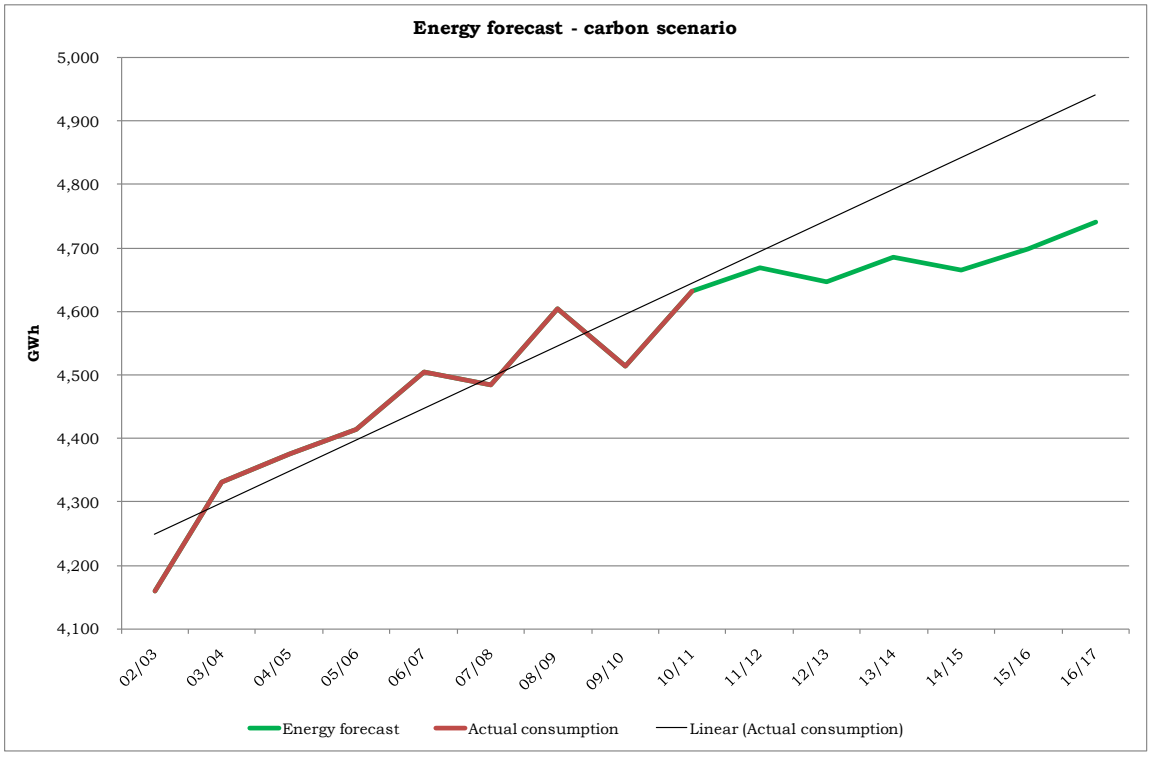
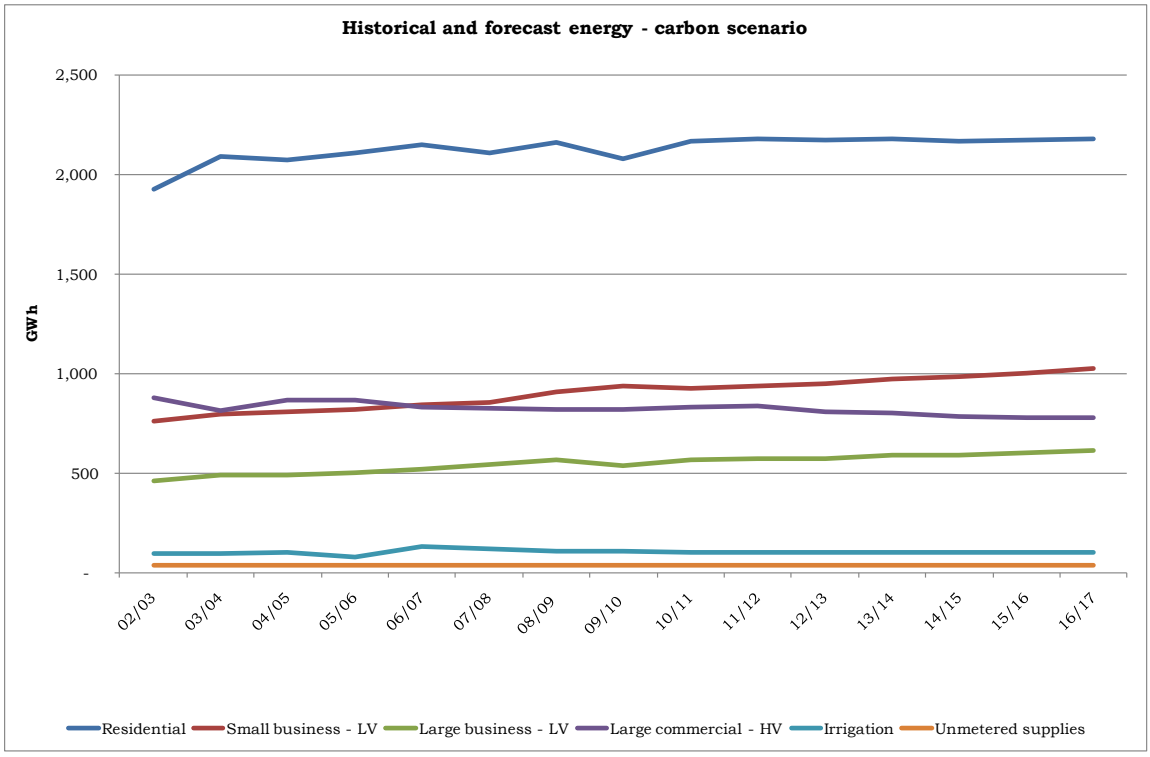


Figure 4: Forecast customer class energy consumption – carbon



3. Indicative prices

For the purposes of determining indicative prices Aurora has adopted an approach of segregating total network sales by the following customer classes:

- residential;
- small business – LV;
- large business – LV;
- large commercial – HV;
- irrigation; and
- unmetered supplies.

Separate consumption forecasts have been produced for each customer class.

Table 1 and Figure 5 provide an indication of distribution prices for standard control services by customer class. These prices have been calculated using energy consumption forecasts and annual revenue requirements at the customer class level.

Table 1: Indicative prices (nominal cents)

Customer Class	2012-13 (c/kWh)	2013-14 (c/kWh)	2014-15 (c/kWh)	2015-16 (c/kWh)	2016-17 (c/kWh)
Residential	7.32	7.48	7.64	7.81	7.98
Small business – LV	9.53	9.56	9.58	9.61	9.63
Large business – LV	4.58	4.56	4.53	4.51	4.48
Large commercial – HV	1.26	1.28	1.30	1.31	1.33
Irrigation	7.03	7.15	7.34	7.44	7.72
Unmetered supplies	8.43	8.61	8.79	8.97	9.14
All classes	6.36	6.45	6.55	6.64	6.74

Figure 5: Indicative prices (real 2009-10 cents)

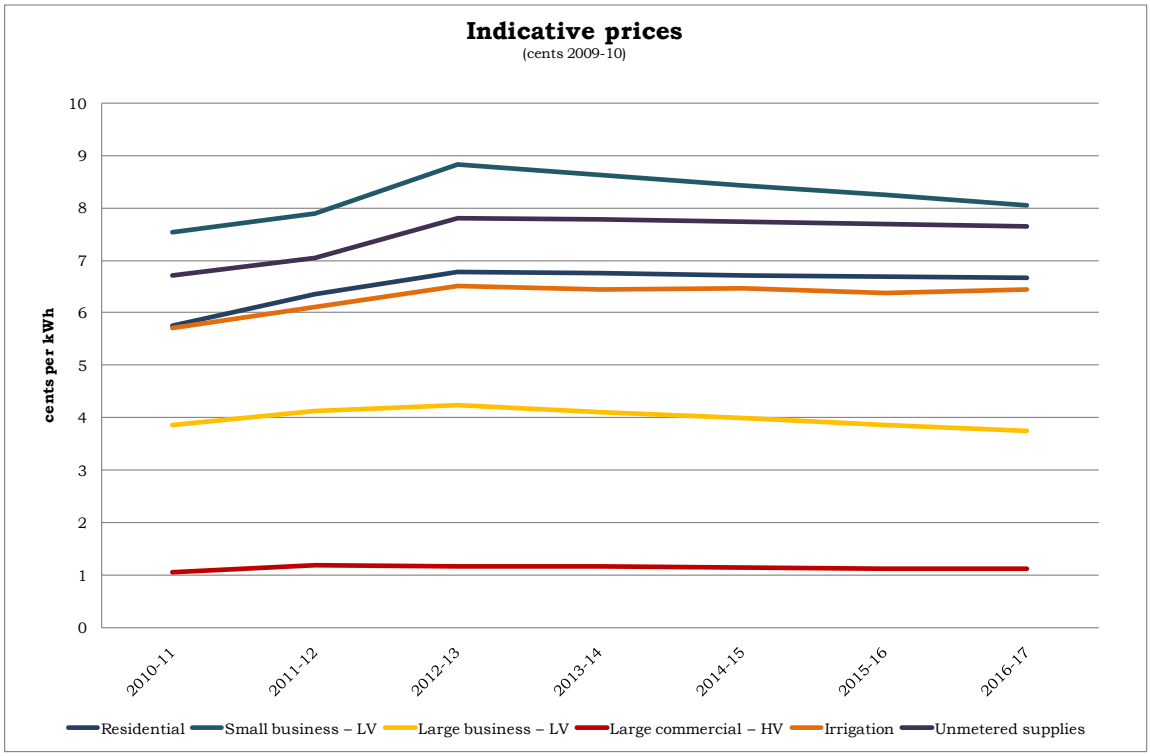
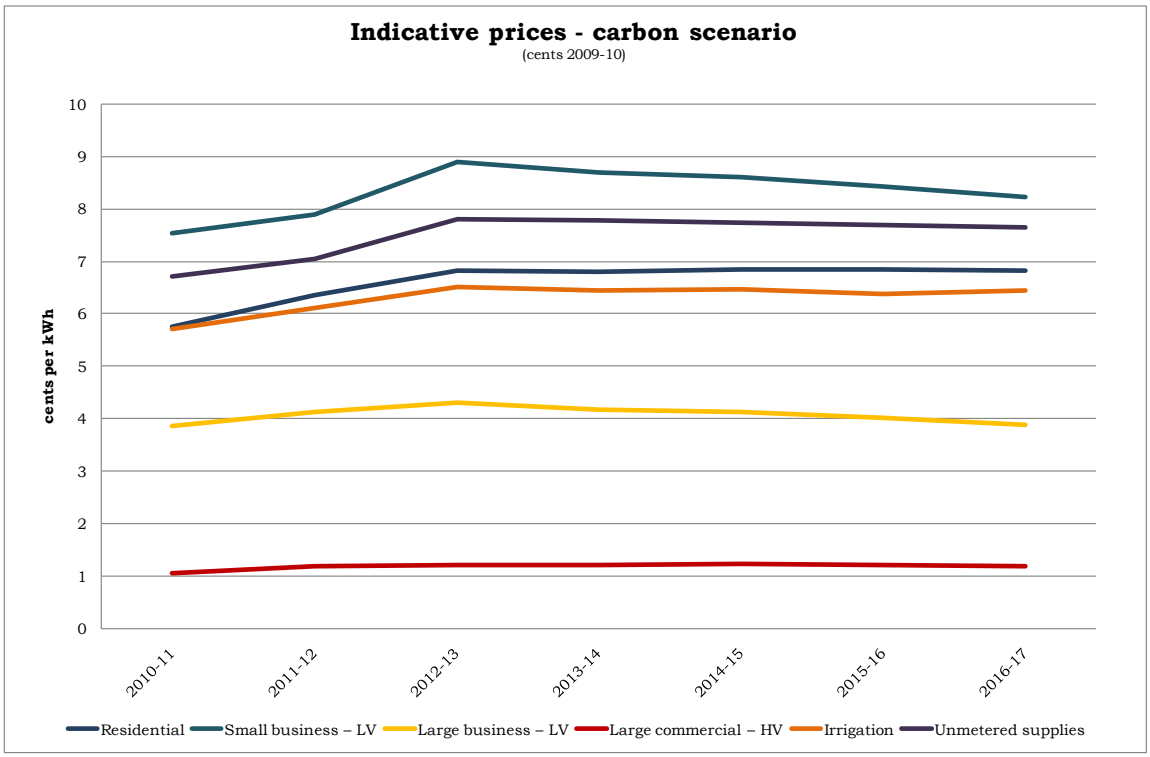


Table 2 and Figure 6 provide an indication of distribution prices for standard control services by customer class. These prices have been calculated using energy consumption forecasts under the carbon scenario and annual revenue requirements at the customer class level.

Table 2: Indicative prices – carbon (nominal cents)

Customer Class	2012-13 (c/kWh)	2013-14 (c/kWh)	2014-15 (c/kWh)	2015-16 (c/kWh)	2016-17 (c/kWh)
Residential	7.38	7.54	7.79	7.97	8.15
Small business – LV	9.62	9.63	9.77	9.82	9.85
Large business – LV	4.66	4.63	4.69	4.68	4.65
Large commercial – HV	1.31	1.34	1.39	1.42	1.43
Irrigation	7.03	7.15	7.34	7.44	7.72
Unmetered supplies	8.43	8.61	8.79	8.97	9.14
All classes	6.45	6.55	6.74	6.86	6.96

Figure 6: Indicative prices – carbon (real 2009-10 cents)



Indicative prices have been shown in nominal cents per kWh for energy consumed, however, it is noted that actual prices depend on specific tariffs which are made up of additional components including fixed, energy and demand charges. For this reason the above prices are considered indicative only, are not binding and are for the purposes of providing a high level overview of the expected price impact for the forthcoming *Regulatory Control Period* only.

Actual prices for the forthcoming *Regulatory Control Period* will be determined following the submission and approval of Aurora's Tariff Strategy and annual Pricing Proposal to the AER in accordance with clause 6.18.7 of the *Rules*.

All indicative prices are exclusive of GST.