Aurora new customer connections forecasts

Prepared for Aurora Energy

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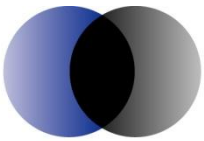

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Contents

List of figures

List of tables

1 Introduction

To assist in the budgeting and planning process, Aurora Energy requires forecasts of the number of new network connections extending for a period from 2010-11 to 2016-17.

ACIL Tasman has undertaken to produce forecasts of new customer connections for each of the following groups:

- New residential connections
- New commercial connections
- New irrigator connections
- New residential subdivisions (number of lots)

For each of these customer classes, ACIL Tasman has produced disaggregated forecasts across three distinct regions:

- North
- North West
- South

In addition, a further split is made between overhead and underground connections for new residential and commercial customer connections.

It is important to note that the forecasts do not include new connections that require only a simple service connection. This is true for all customer classes.

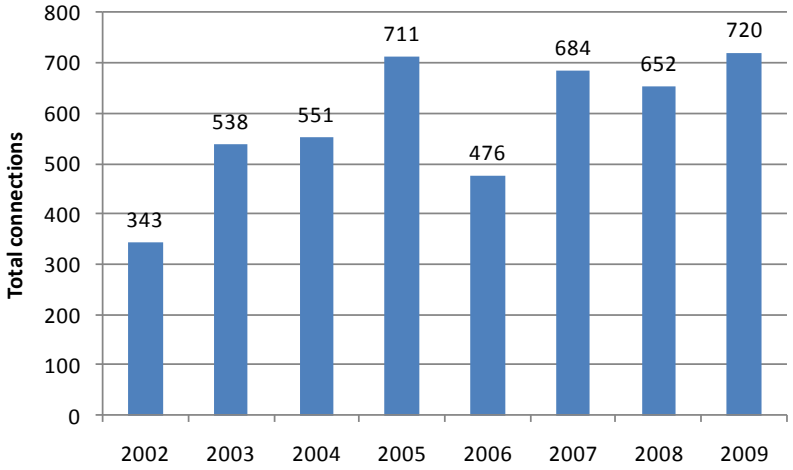
This report is structured as follows. Section 2 describes the stylized facts of the customer classes to be forecast. Section 3 maps out the methodology to be applied to the process and Section 4 presents the forecast results.

2 New customer connections

2.1 Residential connections

The number of new residential connections in each financial year from 2002-03 to 2009-10 for the whole of Tasmania are shown in Figure 1 below.

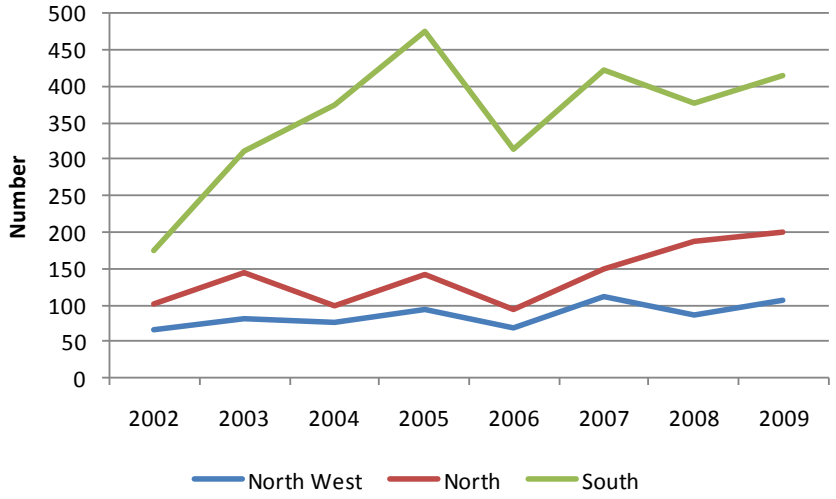
Figure 1 **Total new residential connections, 2002-03 to 2009-10**



Data source: Aurora Energy

The data are characterised by a pattern of cyclical movements around a rising trend. New residential connections have risen steadily from 2002-03 to reach 720 by 2009-10.

Figure 2 **Total residential connections by region**

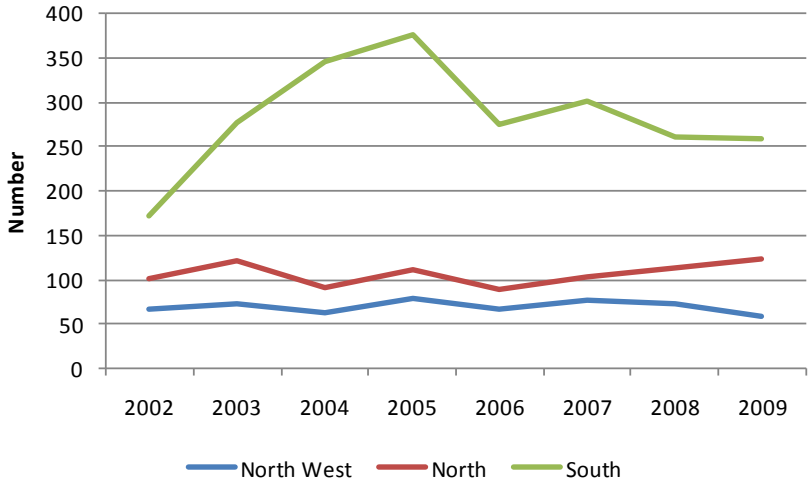


Data source: Aurora Energy

A breakdown of total new residential connections by region is shown in Figure 2. The figure shows that the majority of new residential connections occur in the Southern region, followed by the North and North West.

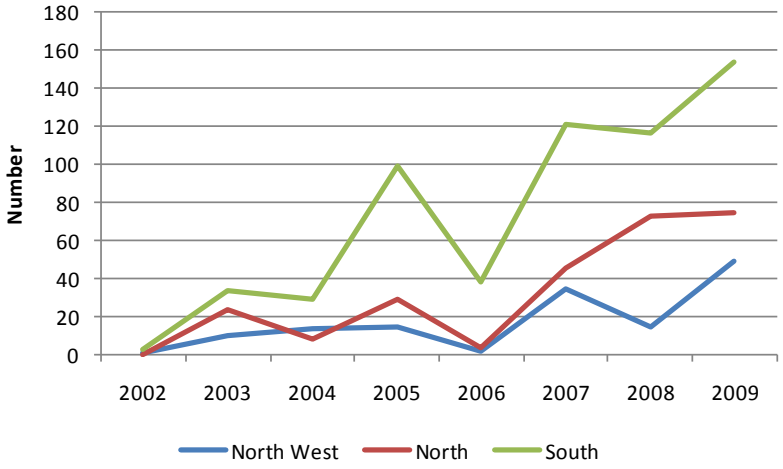
Figure 3 and Figure 4 show the number of overhead and underground connections for each of the three regions. It can be seen that there is a trend away from overhead connections towards underground connections. This is true for all three regions.

Figure 3 **Overhead residential connections by region**



Data source: Aurora Energy

Figure 4 **Underground residential connections by region**

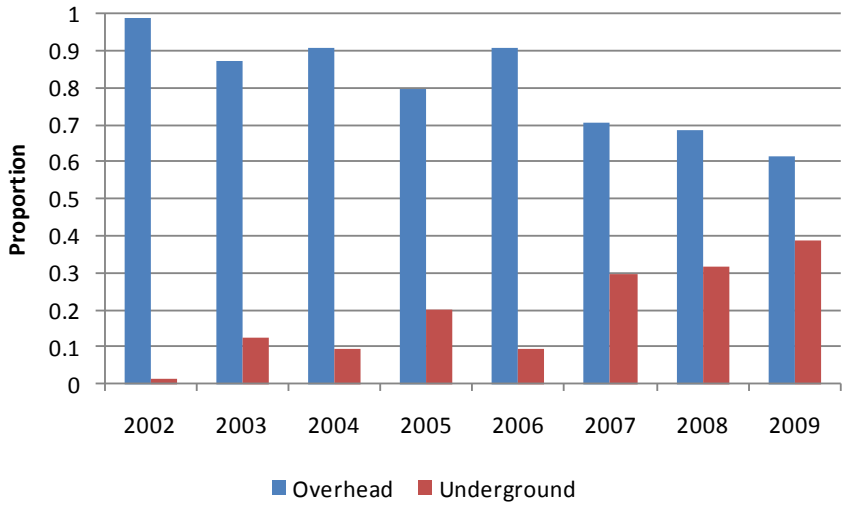


Data source: Aurora Energy

The trend away from overhead connections can be seen more clearly in Figure 5 which shows the proportion of each connection type for all new residential connections. The figure shows that in 2002-03 the number of underground

connections made up only just over 1% of all connections, while by 2009-10 this figure had reached nearly 40% of all new residential connections.

Figure 5 **Proportion of new residential connections by type**

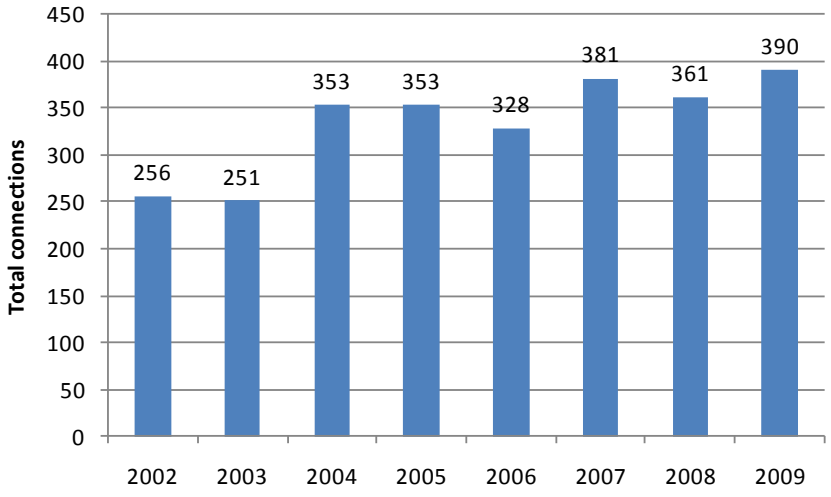


Data source: Aurora Energy

2.2 Commercial connections

Figure 6 shows the number of new commercial connections across Tasmania. As in the case of residential connections, the number of new commercial connections are characterised by a rising trend with some cyclical variation around this trend. By 2009-10 the number of new commercial connections had reached 390 across Tasmania.

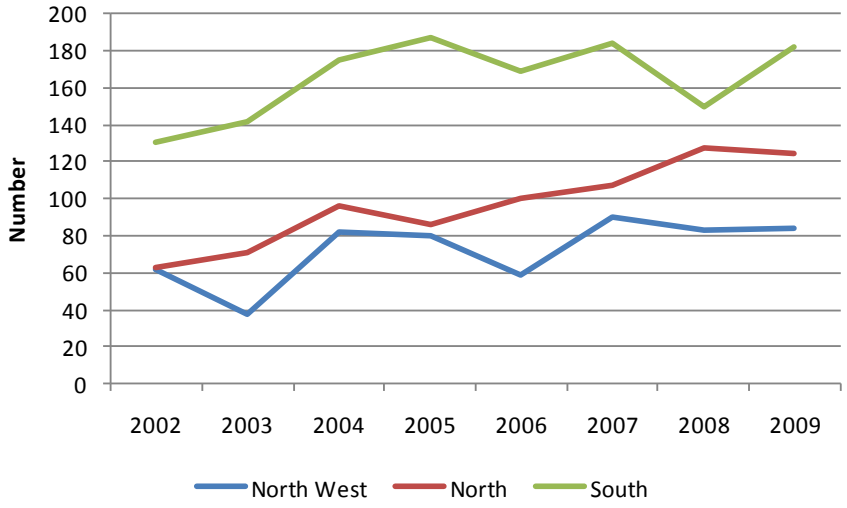
Figure 6 **Total commercial connections, 2002-03 to 2009-10**



Data source: Aurora Energy

The number of new commercial connections by region is shown in Figure 7.

Figure 7 **Total commercial connections by region**

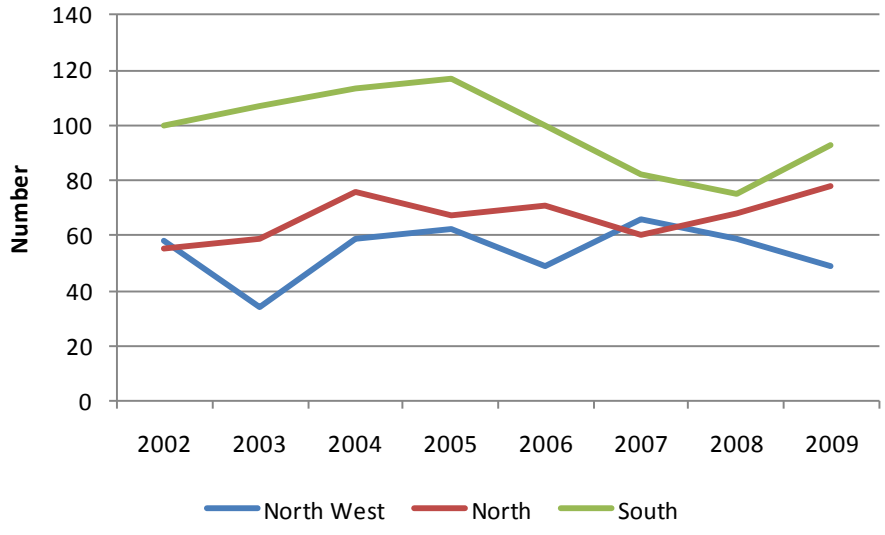


Data source: Aurora Energy

The figure shows that a similar uptrend is evident across all three geographic regions, with some declining years.

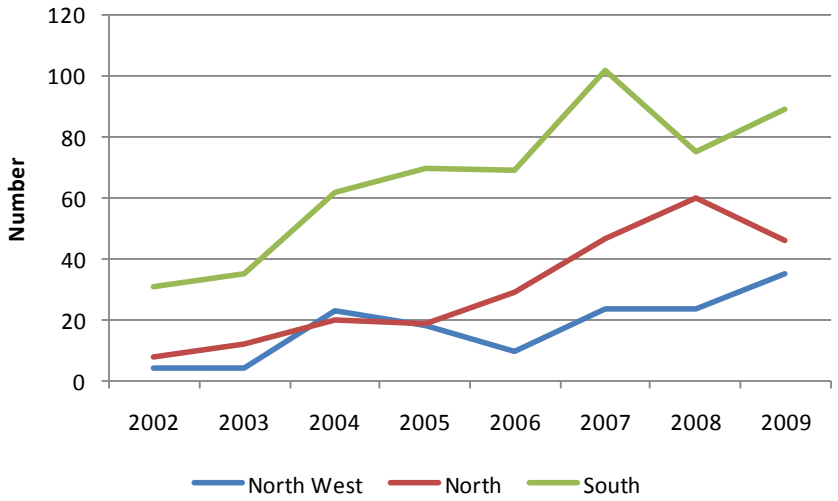
Figure 8 and Figure 9 show the regional break down on new commercial overhead and underground connections. As in the case for residential connections, there is a marked trend away from overhead towards underground connections.

Figure 8 **Overhead commercial connections by region**



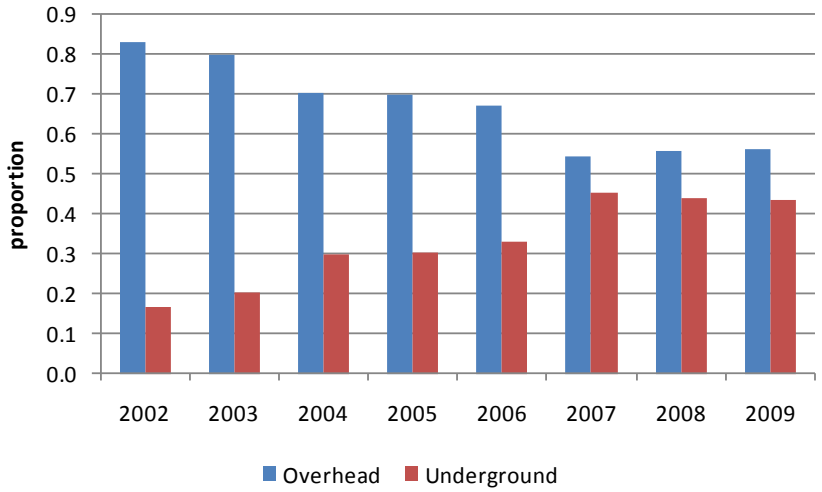
Data source: Aurora Energy

Figure 9 **Underground commercial connections by region**



Data source: Aurora Energy

Figure 10 **Proportion of new commercial connections by type**

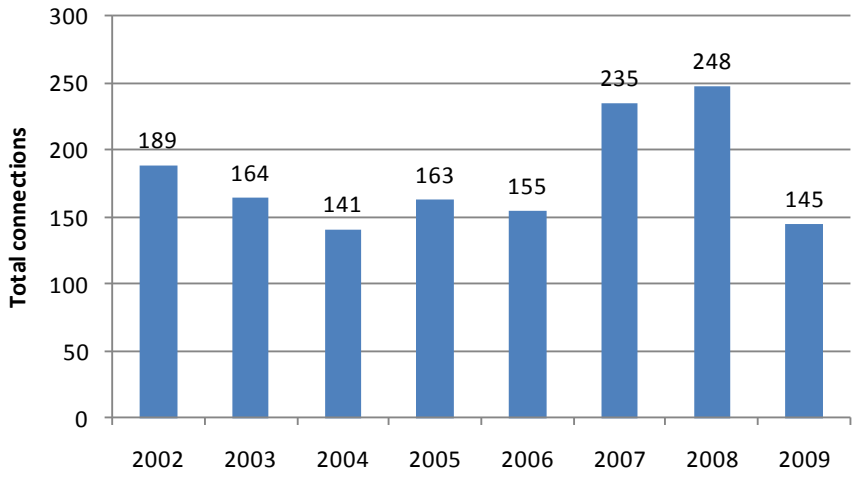


Data source: Aurora Energy

2.3 Irrigation connections

The number of new connections to the Aurora network for the purposes of irrigation declined between 2002-03 and 2006-07, before jumping substantially to 235 connections in 2007-08 and 248 in 2008-09. They then declined sharply to 145 in 2009-10 (see Figure 11).

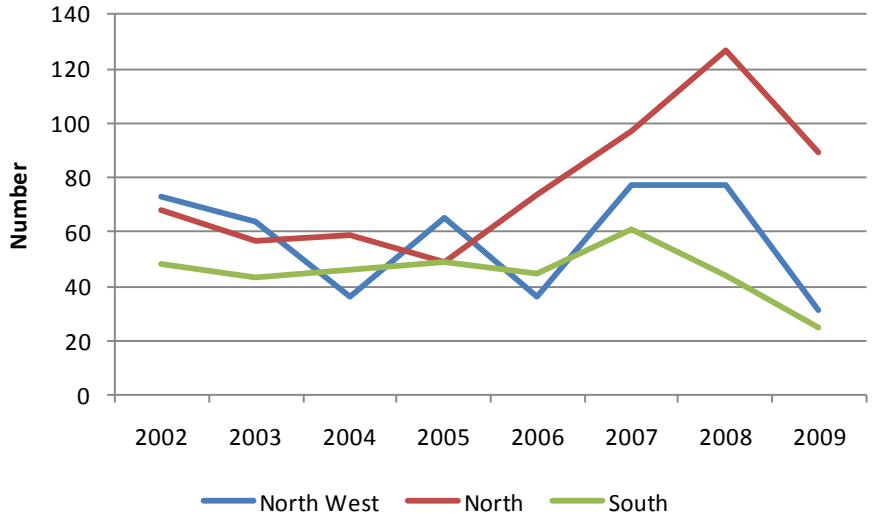
Figure 11 **Total irrigation connections**



Data source: Aurora Energy

Figure 12 shows the regional breakdown of new irrigation connections. The figure shows that while the number of new connections in the North West and South has declined over time, there has been a sharp increase in the number of connections in the North.

Figure 12 **Total irrigation connections by region**



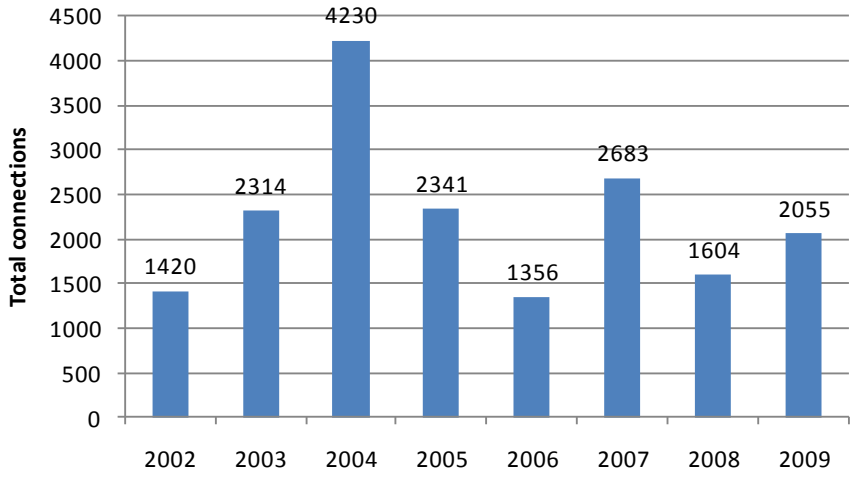
Data source: Aurora Energy

2.4 Residential sub divisions (lots)

The number of new residential lots arising from sub-divisions is shown in Figure 13 below. The number of new connections follow a cyclical pattern, peaking at 4230 in 2004-05 before declining to a cyclical low point of 1356 in

2006-07. By the end of the 2009-10 year the number of new lots connected had reached 2055.

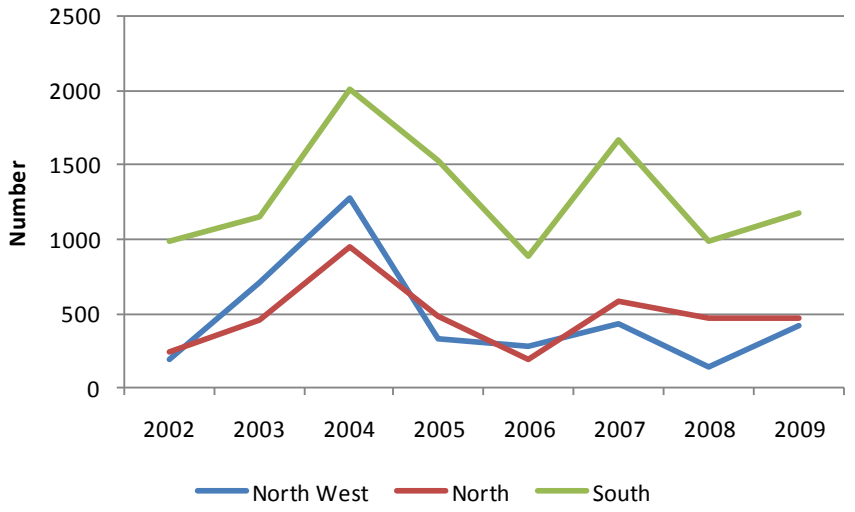
Figure 13 **Total residential sub-division (lots) connections**



Data source: Aurora Energy

Figure 14 shows the number of historical subdivision (lots) connections by region.

Figure 14 **Total residential sub-division (lots) connections by region**



Data source: Aurora Energy

3 Forecasting methodology

ACIL Tasman has opted to apply an econometric methodology to forecast new customer connections in the Aurora network. This approach requires the estimation and testing of statistical relationships between the number of new connections and the underlying drivers that influence the number of new connections.

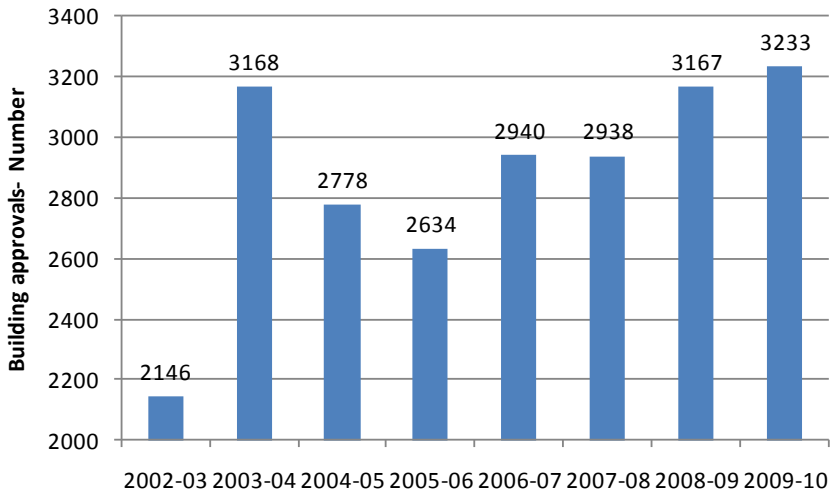
3.1 Potential explanatory variables

In the case of new residential and commercial connections the most obvious driver is the number of new buildings. The number/value of dwelling commencements can therefore be regarded as a suitable proxy for the level of building activity.

The best publically available data related to building activity are the ABS Building Approvals series (Catalogue number 8731.0) and Building Activity series (Catalogue number 8752.0) which is updated monthly and provides data for Tasmania.

The number of residential dwelling approvals in each year from 2002-03 to 2009-10 is shown in Figure 15 below.

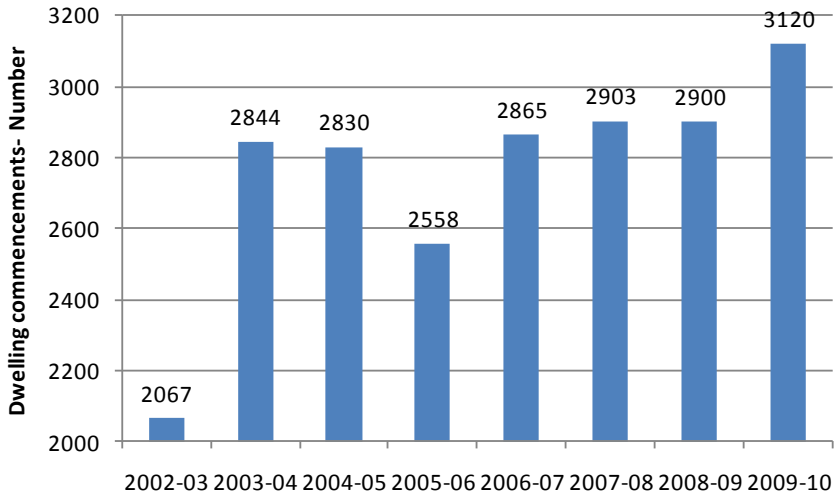
Figure 15 **Tasmanian dwelling units approved, original number, 2002-03 to 2009-10**



Data source: Australian Bureau of Statistics, 8731.0 Building Approvals, Australia

The actual number of residential dwelling starts is shown in Figure 16 below.

Figure 16 **Tasmanian dwelling units commenced, original number, 2002-03 to 2009-10**

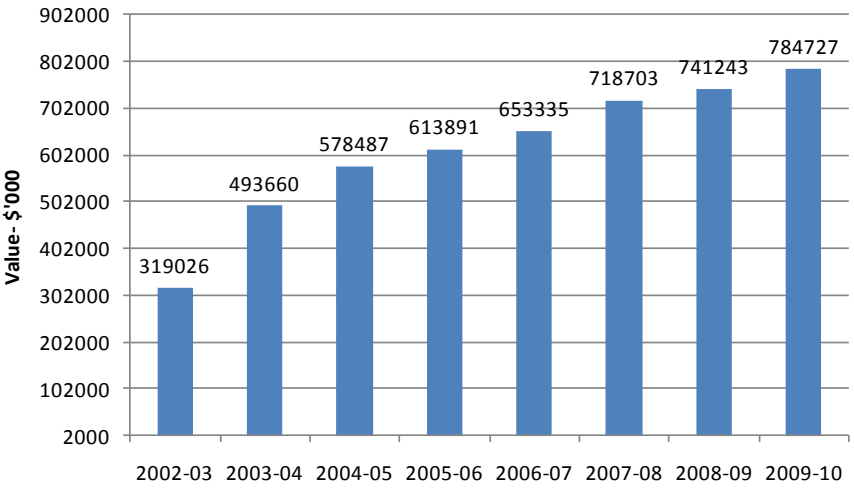


Data source: Australian Bureau of Statistics, 8752.0 Building Activity, Australia

Both series show a steady upward rise in the number of annual residential dwelling commencements/approvals, apart from a sharp dip in 2005-06.

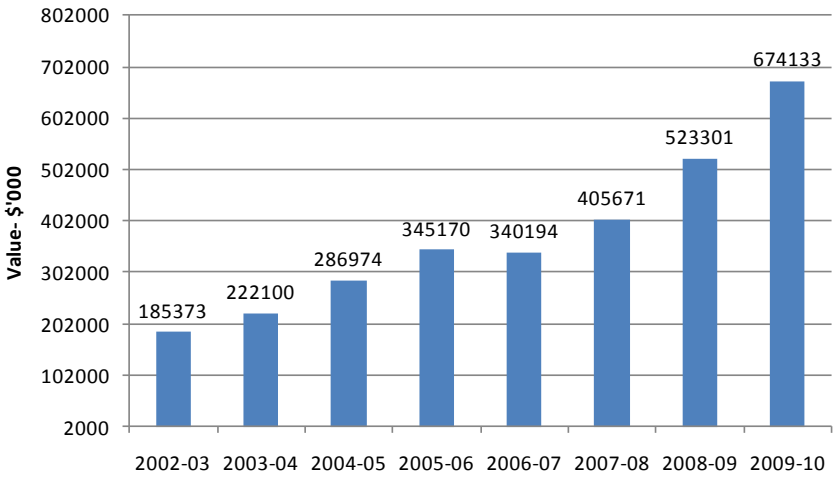
Figure 17 and Figure 18 show the value of Tasmanian residential and commercial construction respectively from 2002-03 to 2009-10.

Figure 17 **Tasmania Value of residential construction, 2002-03 to 2009-10, $'000**



Data source: Australian Bureau of Statistics, 8752.0 Building Activity, Australia

Figure 18 **Tasmania Value of non-residential construction, 2002-03 to 2009-10, $'000**



Data source: Australian Bureau of Statistics, 8752.0 Building Activity, Australia

3.2 Projections of building activity

As mentioned in the previous section, the econometric approach entails establishing a relationship between the number of new connections and building activity. This historical relationship is then used to forecast new customer connections based on projections of building activity for the forecast period.

Unfortunately, the ABS does not project building approvals/activity. However, there are a number of reputable organizations that provide forecasts of building activity across Australia.

3.2.1 Housing industry association (HIA)

The HIA is one potential source of residential construction activity forecasts.

The HIA's Economics Group regularly collects, analyses and presents a range of facts, figures and forecasts relevant to Australia's Housing and Renovation industries. HIA has over 42,000 members who account for 85 per cent of Australian residential activity and regularly survey their members to provide localised on-the-ground intelligence.

Over a number of years, the HIA economics unit has built a detailed forecasting model of housing starts. According to the HIA, their forecasting model takes inputs related to:

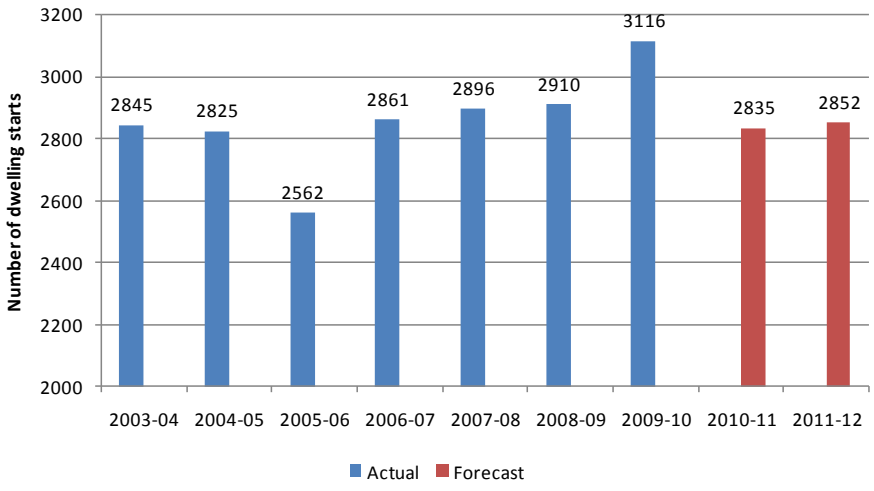
- Economic Growth
- Interest Rates
- Employment Growth

- Consumer Confidence
- Level of Oversupply or Pent-up Demand for Housing
- Interstate and Overseas Population Movements
- Household Formation, and
- Land Availability

The forecasting model produces forecasts for new housing, renovations, non-residential building and engineering construction for each state.

Unfortunately, the HIA only produces forecasts for up to 2 years in advance. Figure 19 shows HIA's forecasts of residential dwelling commencements for 2010-11 and 2011-12. They predict a decline in the number of new commencements in Tasmania to 2835 in 2010-11 before increasing to 2852 in 2011-12.

Figure 19 **HIA forecasts of Tasmanian housing starts/dwelling commencements**



Data source: Housing Industry Association

3.2.2 Construction forecasting council (CFC)

Based on ACIL Tasman's research, one of the best sources of investment projections are those available from the Construction Forecasting Council (CFC). The CFC was established by the Australian Construction Industry Forum (ACIF) with support from the Department of Industry, Tourism and Resources with the mission '*to create a better compass of the industry's direction for decision makers*'. The CFC provides:

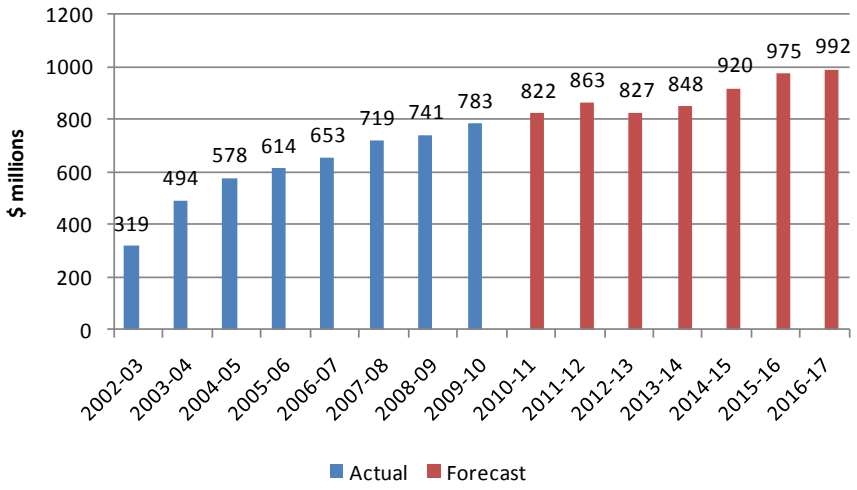
- regular short and long term forecasts of the construction and property sectors
- profiles of national construction activity for major non-residential building and engineering projects across Australia

- analysis of the factors driving supply and demand and economic scenarios that underpin the forecasts and sensitivity analysis.

The forecasts distinguish twenty categories of construction activity in each state and territory. As best as possible, the forecasts take into account current (and expected) economic fundamentals along with detailed current and forthcoming activity data published by the ABS and Reed Data Construction, combined with industry intelligence from CFC members. More information regarding the forecasting methodology and current projections are available at CFC's website (www.cfc.acif.com.au).

Figure 20 and Figure 21 show the CFC's current forecasts for the value of residential and non-residential construction activity.

Figure 20 **Construction forecasting council- Forecast of Tasmanian residential construction activity, $ million**



Data source: Construction forecasting council

According to the CFC residential construction activity is projected to increase steadily up to 2011-12 before experiencing a decline in 2012-13. Residential construction activity is then projected to recommence its upward trajectory from 2013-14 onwards, reaching $992 million by 2016-17.

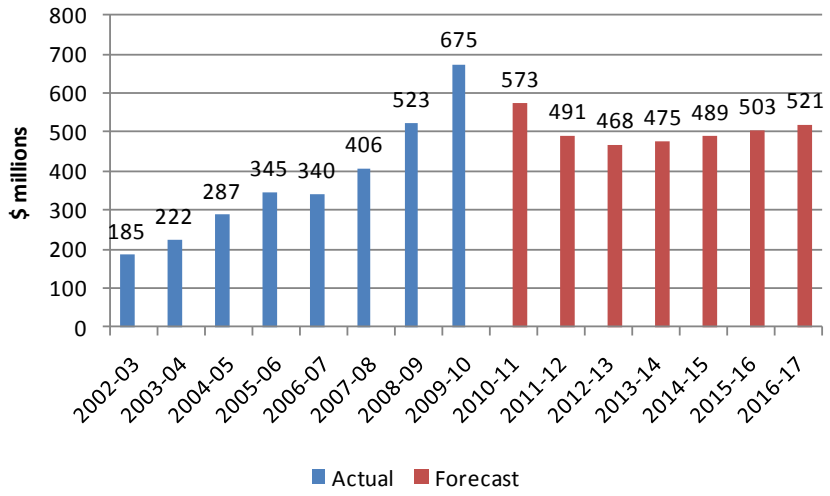
Commercial/non-residential building activity is expected to experience a decline from 2009-10 to 2011-12, before stabilising and resuming an upward trajectory. It is expected to reach $521 million by 2016-17.

A key advantage of the forecasts produced by the CFC is that they extend up to and beyond 5 years which makes them suitable for the purposes of forecasting new customer connections in Tasmania.

ACIL Tasman found that the real value of building construction activity provided the strongest explanatory power of new connections for both

residential and commercial, against a range of alternatives, including building approvals and the number of dwelling commencements.

Figure 21 **Construction forecasting council- Forecast of Tasmanian non-residential construction activity, $ million**



Data source: Construction forecasting council

3.3 Forecasting irrigation connections

For the purposes of forecasting the number of new irrigators connected to the Aurora network ACIL Tasman examined a range of explanatory variables. In particular ACIL Tasman considered historical time series of irrigation activity from the ABS publication "Water use on Australian Farms" (Cat: 4618.0), and looked for any statistical correlations that might exist between the number of new irrigation connections and changes in the total area of irrigated land and the volume of water applied. ACIL Tasman was not able to identify any statistically significant correlations.

For this reason the approach taken to forecasting the number of new irrigation connections is to fit a historical time trend to the data as well as an additional autoregressive term to the model errors to capture some of the dynamics around the upward trend.

3.4 Regional disaggregation

Econometric models relating new connections to real building construction activity and the CFC forecasts are used to generate forecasts at the Tasmania level for both residential and commercial new connections. As mentioned in the previous section, in the case of irrigation, a simple time trend is applied.

In order to disaggregate the forecasts generated across the whole of Tasmania into three separate geographical regions ACIL Tasman have chosen to apply a continuation of the historical trend in the share of total connections across each region. We do this by estimating a time trend regression for the share of total connections within each region for each of the customer types. These are then extrapolated into the future based on the time trend regression and these forecast shares are used to allocate the total forecast customer numbers across each of the three regions.

3.5 Allocation between overhead and underground connections

For commercial and residential connections, the split between the number of underground/overhead connections is determined by estimating separate time trend regressions of the proportion of new connections that are overhead- for each of the three regions under consideration. Based on these trends the proportion of overhead versus underground connections for each region is projected into the forecast period.

4 Forecasts of new connections

Output from the estimated statistical models which forms the basis of the forecasts is presented in the appendix.

In the case of new residential connections (including subdivisions) a regression was estimated with the real value of residential construction used as an explanatory variable. For commercial connections, the real value of non-residential construction was the main explanatory variable.

The new connection forecasts were then generated by applying the forecasts of residential and non-residential construction published by the Construction Forecasting Council (CFC) to the fitted models.

In the case of irrigation, the main driving variable was the historical time trend.

Additional terms were added to the models to capture the dynamic behaviour of the forecast time series.

4.1 Total connections

Forecasts of the total number of connections across the whole Aurora network by customer type are shown in Table 1.

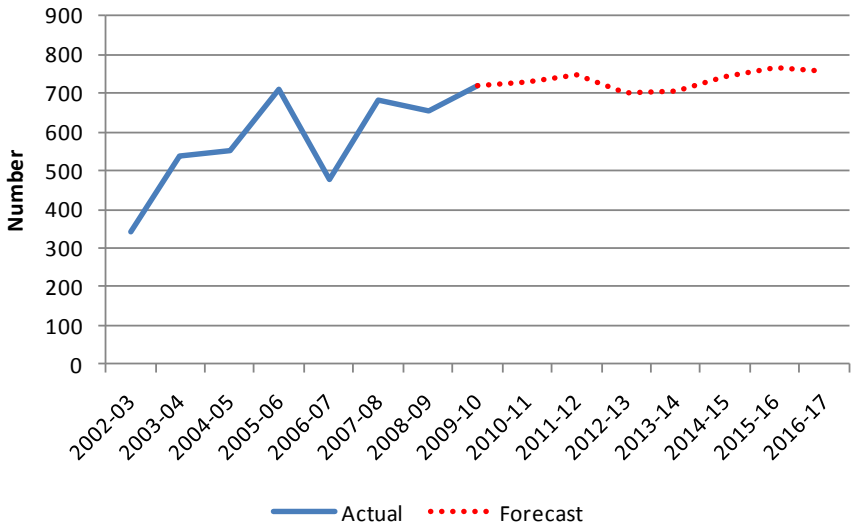
Table 1 **Total new connections by customer class**

Year	Residential	Commercial	Irrigation	Residential subdivision (lots)
2002-03	343	256	189	1420
2003-04	538	251	164	2314
2004-05	551	353	141	4230
2005-06	711	353	163	2341
2006-07	476	328	155	1356
2007-08	684	381	235	2683
2008-09	652	361	248	1604
2009-10	720	390	145	2055
Forecast				
2010-11	731	358	155	2740
2011-12	749	333	163	2804
2012-13	703	324	173	2870
2013-14	705	323	181	2686
2014-15	741	323	190	2686
2015-16	765	324	199	2841
2016-17	759	325	208	2940

Data source: ACIL Tasman model

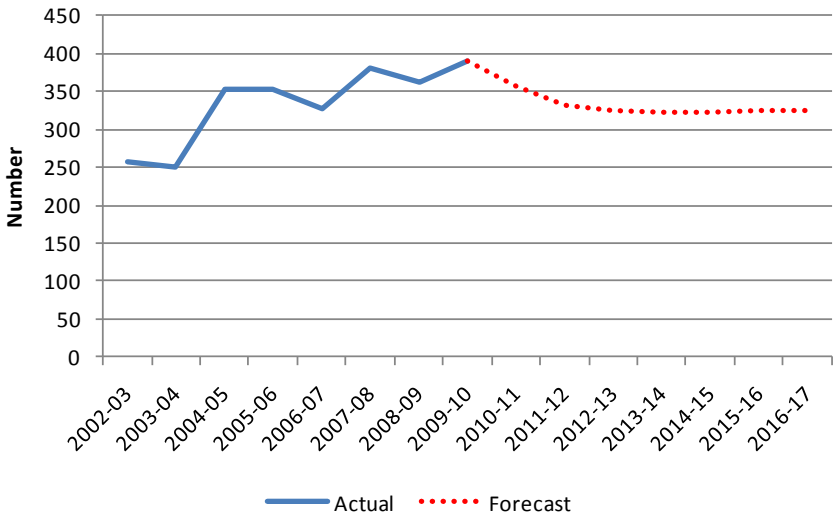
The forecasts are also presented graphically in the 4 figures that follow. New connections are forecast to increase over time for all customer types except commercial, reflecting the more pessimistic outlook for Tasmanian non-residential construction in the CFC's forecasts.

Figure 22 **New residential connections, Tasmania**



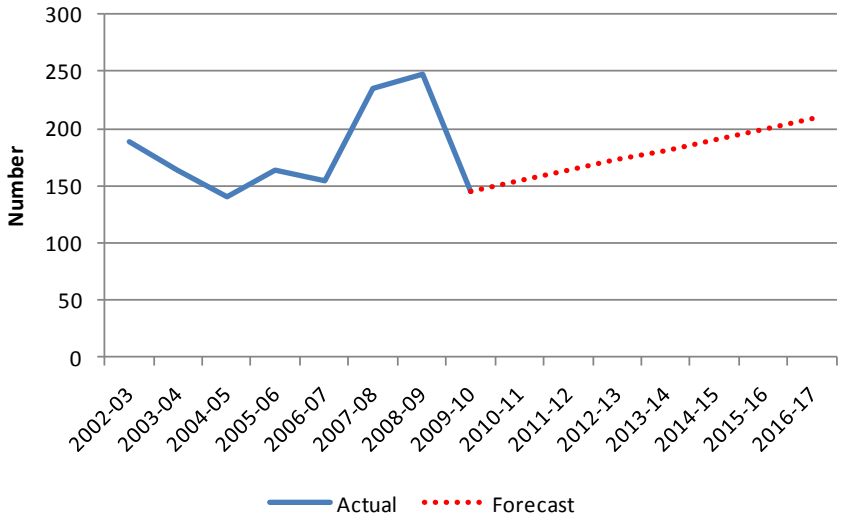
Data source: ACIL Tasman model

Figure 23 **New commercial connections, Tasmania**



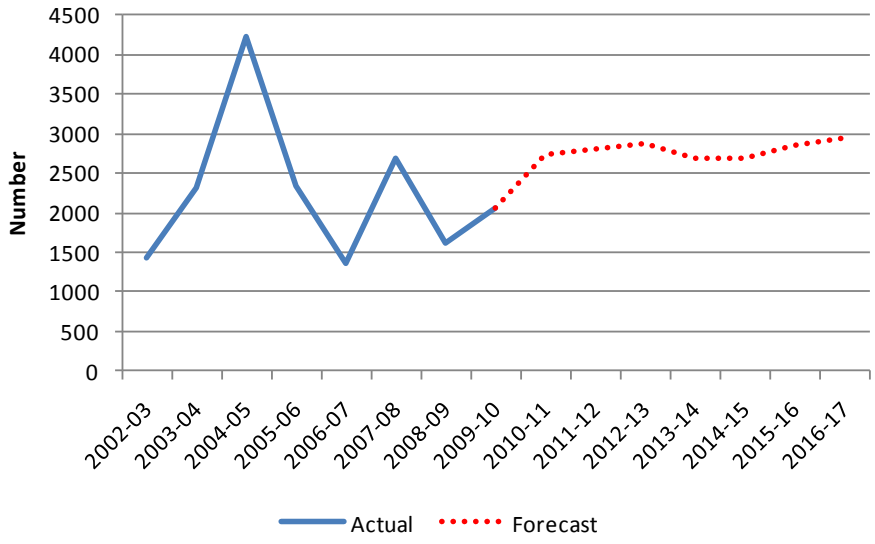
Data source: ACIL Tasman model

Figure 24 **New irrigation connections, Tasmania**



Data source: ACIL Tasman model

Figure 25 **New residential subdivisions (lots), Tasmania**



Data source: ACIL Tasman

4.2 Forecasts by region

As part of the forecasting exercise, forecasts were also produced by region for each of the customer types.

Table 2 shows the historical and projected regional shares of the total number of connections for each customer type.

Table 2 **Projected proportions of total by region**

	Residential			Commercial			Irrigation			Residential subdivisions (lots)		
Year	NW	N	S	NW	N	S	NW	N	S	NW	N	S
2002-03	0.20	0.29	0.51	0.24	0.25	0.51	0.39	0.36	0.25	0.14	0.17	0.69
2003-04	0.15	0.27	0.58	0.15	0.28	0.57	0.39	0.35	0.26	0.31	0.20	0.49
2004-05	0.14	0.18	0.68	0.23	0.27	0.50	0.26	0.42	0.33	0.30	0.23	0.47
2005-06	0.13	0.20	0.67	0.23	0.24	0.53	0.40	0.30	0.30	0.14	0.21	0.65
2006-07	0.14	0.20	0.66	0.18	0.30	0.52	0.23	0.48	0.29	0.21	0.14	0.65
2007-08	0.16	0.22	0.62	0.24	0.28	0.48	0.33	0.41	0.26	0.16	0.22	0.62
2008-09	0.13	0.29	0.58	0.23	0.35	0.42	0.31	0.51	0.18	0.09	0.29	0.61
2009-10	0.15	0.28	0.58	0.22	0.32	0.47	0.21	0.61	0.17	0.20	0.23	0.57
Forecast												
2010-11	0.14	0.28	0.58	0.22	0.33	0.45	0.20	0.65	0.16	0.19	0.24	0.58
2011-12	0.14	0.28	0.58	0.22	0.34	0.44	0.18	0.68	0.14	0.18	0.24	0.58
2012-13	0.14	0.28	0.58	0.22	0.35	0.43	0.16	0.71	0.13	0.16	0.25	0.58
2013-14	0.13	0.28	0.59	0.22	0.36	0.41	0.14	0.75	0.12	0.15	0.26	0.58
2014-15	0.13	0.28	0.59	0.23	0.37	0.40	0.12	0.78	0.10	0.14	0.27	0.59
2015-16	0.12	0.28	0.59	0.23	0.39	0.39	0.10	0.81	0.09	0.13	0.28	0.59
2016-17	0.12	0.28	0.60	0.23	0.40	0.37	0.08	0.84	0.07	0.12	0.29	0.59

Data source: ACIL Tasman

By applying the projected regional shares to the forecast total number of connections, the regional forecasts are obtained.

These are shown for each customer type in the 4 tables that follow.

Table 3 **Forecast residential connections by region**

Year	North West	North	South
2002-03	67	101	175
2003-04	82	145	311
2004-05	77	100	374
2005-06	95	141	475
2006-07	68	94	314
2007-08	112	150	422
2008-09	87	187	378
2009-10	107	199	414
Forecast			
2010-11	106	203	422
2011-12	105	208	436
2012-13	96	196	411
2013-14	93	197	414
2014-15	95	208	438
2015-16	95	215	455
2016-17	91	214	453

Data source: ACIL Tasman

Table 4 **Forecast commercial connections by region**

Year	North West	North	South
2002-03	62	63	131
2003-04	38	71	142
2004-05	82	96	175
2005-06	80	86	187
2006-07	59	100	169
2007-08	90	107	184
2008-09	83	128	150
2009-10	84	124	182
Forecast			
2010-11	78	118	162
2011-12	73	113	146
2012-13	72	114	138
2013-14	72	117	133
2014-15	73	121	129
2015-16	74	125	125
2016-17	75	129	121

Data source: ACIL Tasman

Table 5 **Forecast irrigation connections by region**

Year	North West	North	South
2002-03	73	68	48
2003-04	64	57	43
2004-05	36	59	46
2005-06	65	49	49
2006-07	36	74	45
2007-08	77	97	61
2008-09	77	127	44
2009-10	31	89	25
Forecast			
2010-11	30	100	24
2011-12	29	111	23
2012-13	27	123	22
2013-14	25	135	21
2014-15	23	148	19
2015-16	20	162	17
2016-17	18	176	15

Data source: ACIL Tasman

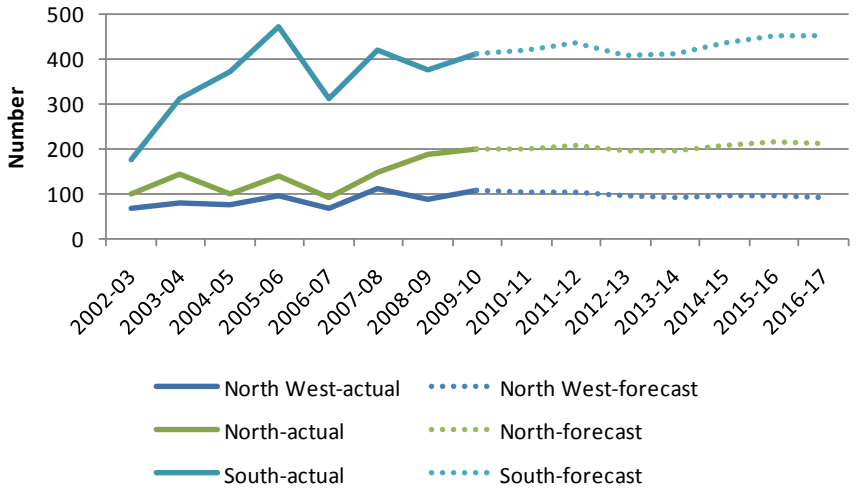
Table 6 **Forecast number of residential subdivisions (lots)**

Year	North West	North	South
2002-03	196	238	986
2003-04	710	459	1145
2004-05	1272	953	2005
2005-06	327	484	1530
2006-07	281	194	881
2007-08	428	588	1667
2008-09	146	472	986
2009-10	412	464	1179
Forecast			
2010-11	517	645	1578
2011-12	496	687	1622
2012-13	473	730	1666
2013-14	411	709	1566
2014-15	379	735	1572
2015-16	367	805	1669
2016-17	345	861	1734

Data source: ACIL Tasman

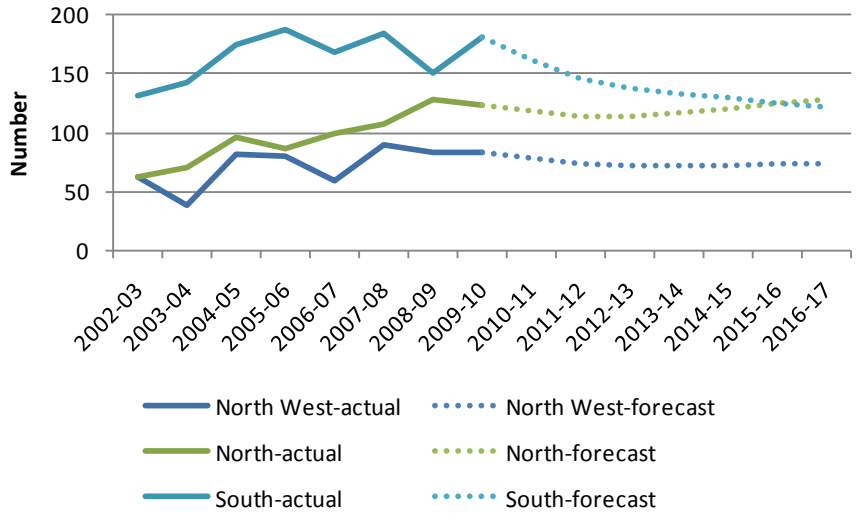
The forecasts are also shown graphically in the accompanying figures.

Figure 26 **Residential connections by region, actual and forecast**



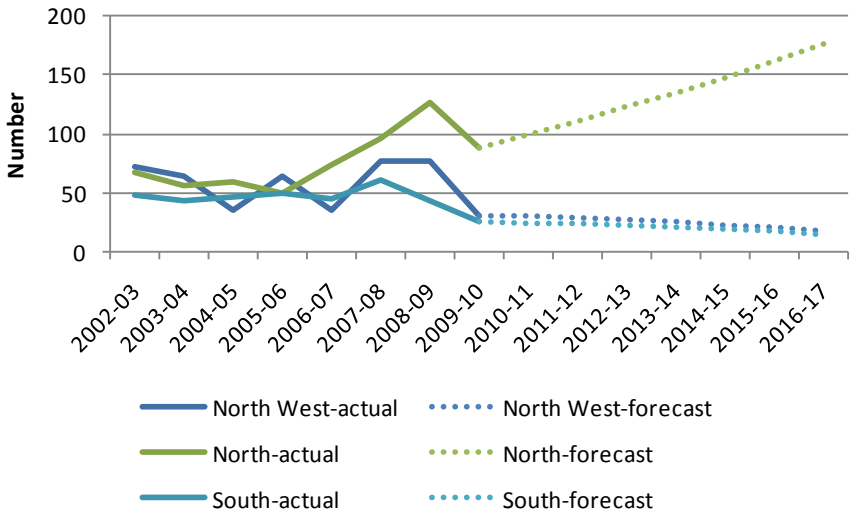
Data source: ACIL Tasman

Figure 27 **Commercial connections by region, actual and forecast**



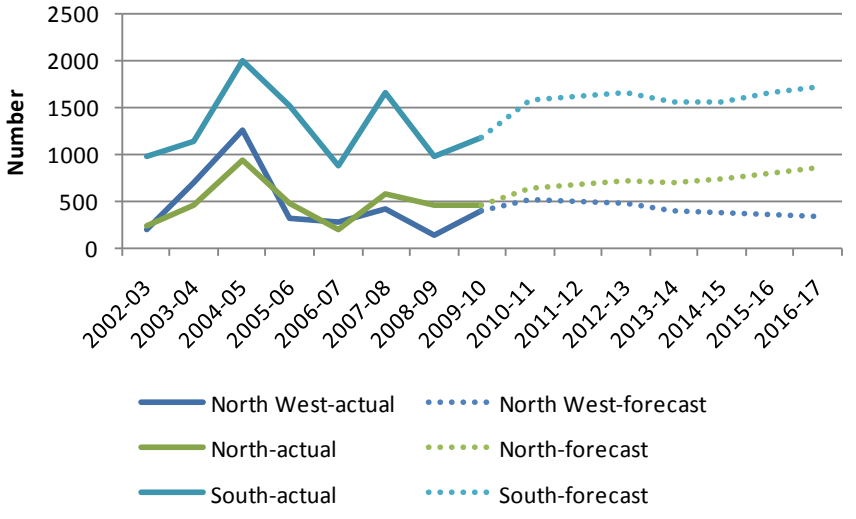
Data source: ACIL Tasman

Figure 28 **Irrigation connections by region, actual and forecast**



Data source: ACIL Tasman

Figure 29 **Residential subdivision (lots) connections by region, actual and forecast**



Data source: ACIL Tasman

4.3 Forecasts by connection type

The regional residential and commercial connections were also disaggregated further between overhead and underground connections. This was done by projecting the proportion of overhead versus underground connections for each region and customer type using historical trends. These projections are shown in Table 7. The projections show a clear trend away from overhead towards underground connections for both residential and commercial connections across all three regions.

Table 7 **Projected proportions of overhead connections by region**

Year	Residential			Commercial		
	NW	N	S	NW	N	S
2002-03	0.99	1.00	0.98	0.94	0.87	0.76
2003-04	0.88	0.83	0.89	0.89	0.83	0.75
2004-05	0.82	0.92	0.92	0.72	0.79	0.65
2005-06	0.84	0.79	0.79	0.78	0.78	0.63
2006-07	0.97	0.96	0.88	0.83	0.71	0.59
2007-08	0.69	0.69	0.71	0.73	0.56	0.45
2008-09	0.83	0.61	0.69	0.71	0.53	0.50
2009-10	0.54	0.62	0.63	0.58	0.63	0.51
Forecast						
2010-11	0.50	0.57	0.58	0.54	0.58	0.47
2011-12	0.46	0.52	0.53	0.51	0.53	0.42
2012-13	0.41	0.47	0.48	0.47	0.49	0.38
2013-14	0.37	0.42	0.44	0.43	0.44	0.34
2014-15	0.33	0.37	0.39	0.39	0.39	0.29
2015-16	0.28	0.32	0.34	0.35	0.35	0.25
2016-17	0.24	0.27	0.29	0.31	0.30	0.21

Data source: ACIL Tasman

The forecasts by type of connection for residential and commercial are shown in Table 8 and Table 9 respectively. The forecasts in these tables are also presented graphically in the Appendix.

Table 8 **Residential connections by overhead/underground connection**

	North West		North		South	
Year	OH	UG	OH	UG	OH	UG
2002-03	66	1	101	0	172	3
2003-04	72	10	121	24	277	34
2004-05	63	14	92	8	345	29
2005-06	80	15	112	29	376	99
2006-07	66	2	90	4	276	38
2007-08	77	35	104	46	301	121
2008-09	72	15	114	73	261	117
2009-10	58	49	124	75	260	154
Forecast						
2010-11	53	53	116	87	245	177
2011-12	48	57	109	100	232	204
2012-13	40	56	92	104	199	212
2013-14	34	59	83	115	181	233
2014-15	31	64	77	131	170	268
2015-16	27	68	68	147	155	300
2016-17	22	69	57	157	133	321

Data source: ACIL Tasman

Table 9 **Commercial connections by overhead/underground connection**

	North West		North		South	
Year	OH	UG	OH	UG	OH	UG
2002-03	58	4	55	8	100	31
2003-04	34	4	59	12	107	35
2004-05	59	23	76	20	113	62
2005-06	62	18	67	19	117	70
2006-07	49	10	71	29	100	69
2007-08	66	24	60	47	82	102
2008-09	59	24	68	60	75	75
2009-10	49	35	78	46	93	89
Forecast						
2010-11	42	36	69	49	76	87
2011-12	37	36	61	53	62	84
2012-13	33	38	56	58	53	86
2013-14	31	41	52	66	45	89
2014-15	28	45	48	74	38	92
2015-16	26	48	43	82	31	94
2016-17	23	52	38	91	25	96

Data source: ACIL Tasman

A Appendix

Statistical output from estimated models

Table 10 **New residential connections**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	55.40149	44.87339	1.234618	0.2845
Residential construction	0.000963	9.12E-05	10.56006	0.0005
AR(1)	-0.730512	0.319398	-2.287151	0.0841
R-squared	0.661851	Mean dependent var	618.8571	
Adjusted R-squared	0.492777	S.D. dependent var	96.27466	
S.E. of regression	68.56641	Akaike info criterion	11.59101	
Sum squared resid	18805.41	Schwarz criterion	11.56783	
Log likelihood	-37.56853	Hannan-Quinn criter.	11.30449	
F-statistic	3.914559	Durbin-Watson stat	2.305915	
Prob(F-statistic)	0.114344			

Data source: ACIL Tasman

Table 11 **New commercial connections**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	216.4931	39.90745	5.424881	0.0016
Non residential construction	0.000356	0.000106	3.368559	0.0151
R-squared	0.645974	Mean dependent var	334.125	
Adjusted R-squared	0.586969	S.D. dependent var	53.19086	
S.E. of regression	34.18442	Akaike info criterion	10.11373	
Sum squared resid	7011.447	Schwarz criterion	10.1336	
Log likelihood	-38.45494	Hannan-Quinn criter.	9.979785	
F-statistic	10.94789	Durbin-Watson stat	1.718851	
Prob(F-statistic)	0.01623			

Data source: ACIL Tasman

Table 12 **New irrigation connections**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	112.3706	23.44942	4.79204	0.0173
TIME	13.59433	5.221058	2.60375	0.0801
AR(1)	-0.553632	0.354889	-1.560014	0.2167
R-squared	0.250086	Mean dependent var	181.1667	
Adjusted R-squared	0.249856	S.D. dependent var	47.54121	
S.E. of regression	53.14963	Akaike info criterion	11.09095	
Sum squared resid	8474.65	Schwarz criterion	10.98683	
Log likelihood	-30.27286	Hannan-Quinn criter.	10.67415	
F-statistic	0.50023	Durbin-Watson stat	2.167841	
Prob(F-statistic)	0.649407			

Data source:ACIL Tasman

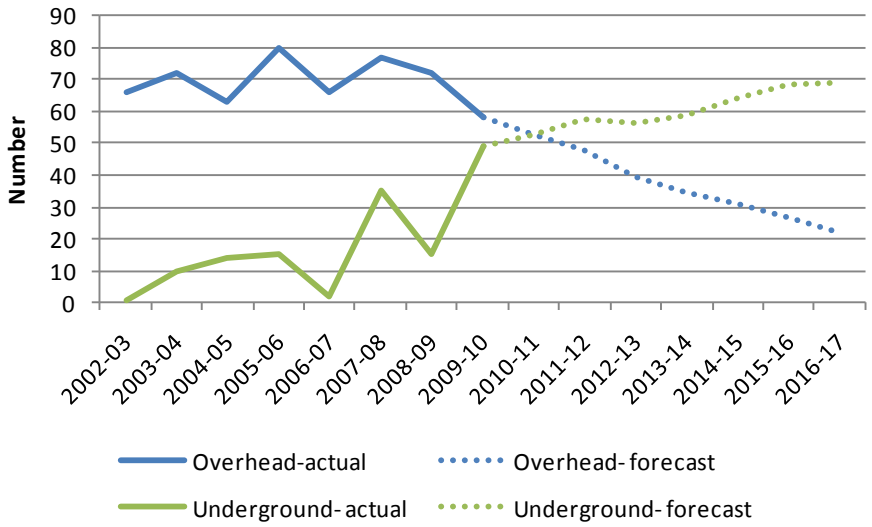
Table 13 **New residential sub-division (number of lots) connections**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Residential construction	0.003919	0.00043	9.106529	0.0001
MA(1)	0.443766	0.119559	3.7117	0.0099
MA(2)	-0.556224	0.119587	-4.651197	0.0035
R-squared	0.302109	Mean dependent var	2304.778	
Adjusted R-squared	0.069479	S.D. dependent var	885.7791	
S.E. of regression	854.4538	Akaike info criterion	16.6	
Sum squared resid	4380548	Schwarz criterion	16.66575	
Log likelihood	-71.70002	Hannan-Quinn criter.	16.45813	
Durbin-Watson stat	1.891322			

Data source: ACIL Tasman

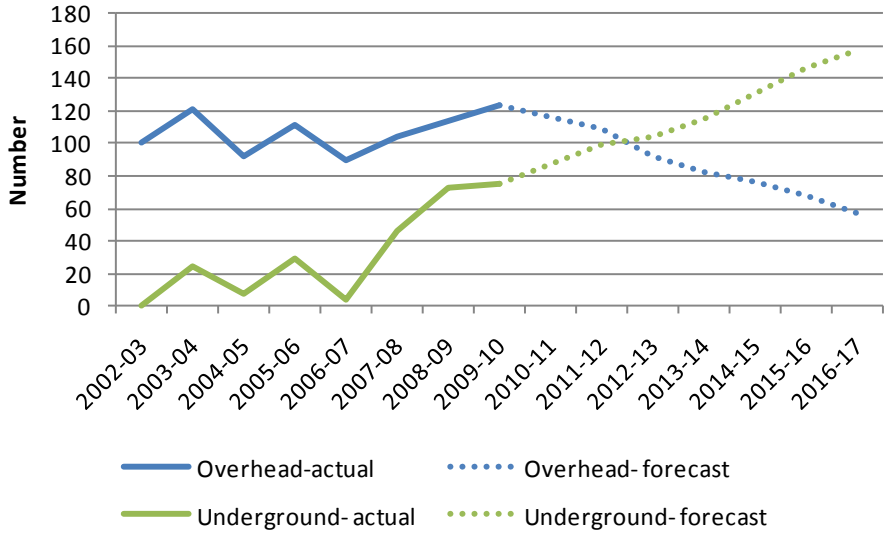
Charts of overhead versus underground connections

Figure 30 **North West region, residential connections by type**



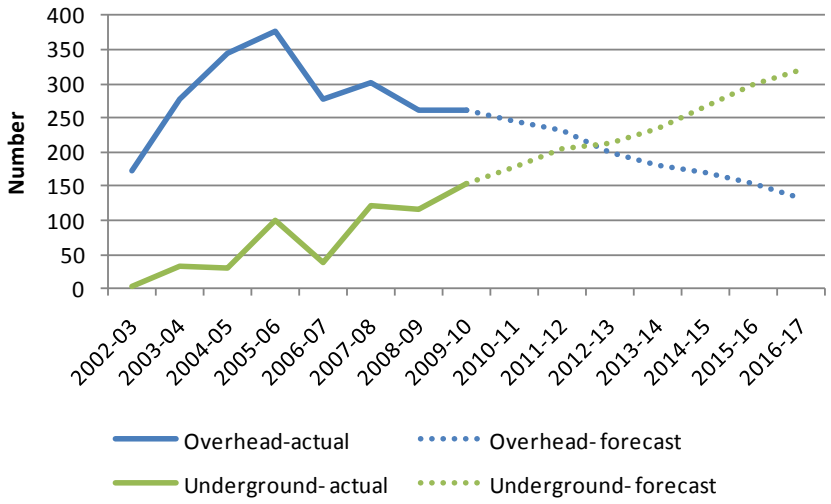
Data source: ACIL Tasman

Figure 31 **North region, residential connections by type**



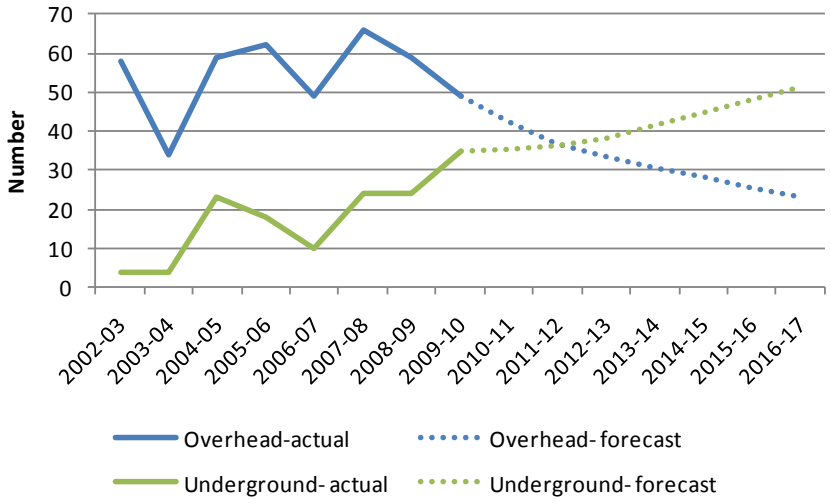
Data source: ACIL Tasman

Figure 32 **South region, residential connections by type**



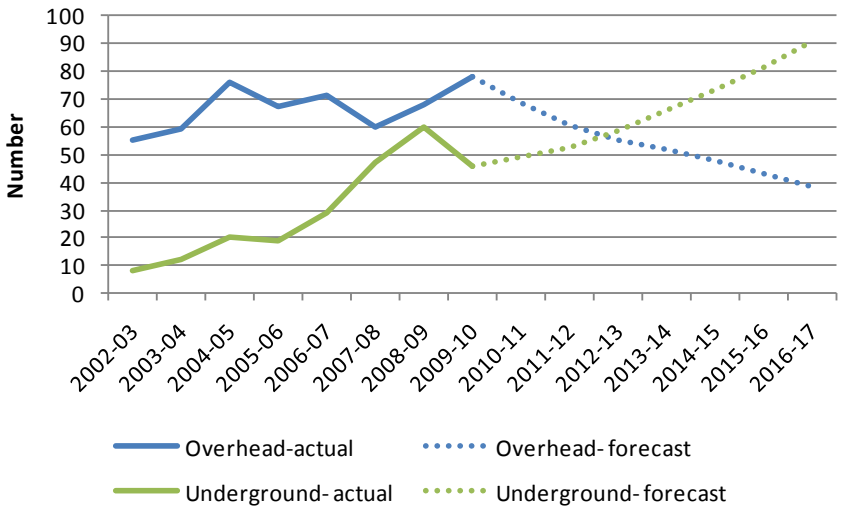
Data source: ACIL Tasman

Figure 33 **North West region, commercial connections by type**



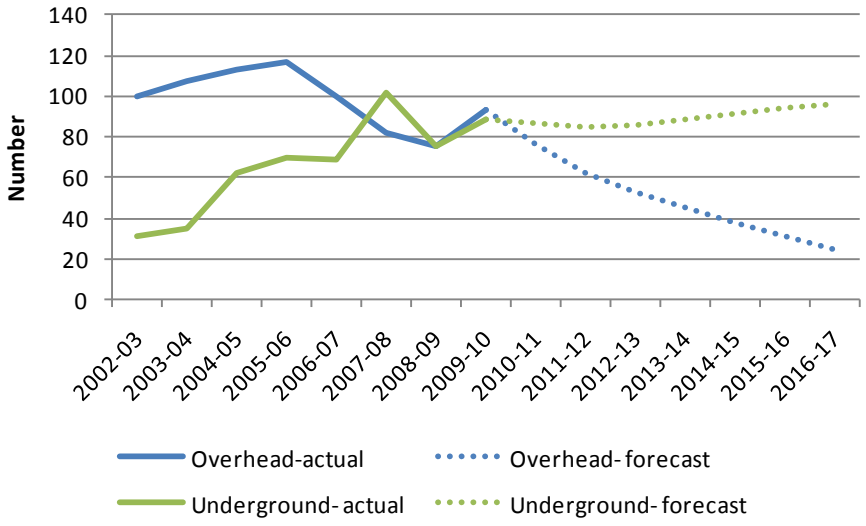
Data source: ACIL Tasman

Figure 34 **North region, commercial connections by type**



Data source: ACIL Tasman

Figure 35 **South region, commercial connections by type**



Data source: ACIL Tasman