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CUSTOMER INITIATED CAPITAL WORKS (CICW)

MANAGEMENT PLAN

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EXECUTIVE SUMMARY

This plan articulates the management of Customer Initiated Capital Work (CICW) activities associated with electrical infrastructure connections to the distribution network, owned and operated by Aurora Energy Pty Ltd (Aurora) on mainland Tasmania.

CICW activities are recognised as a significant component of the annual network investment program and continue to be of high priority with respect to the program of work undertaken by Aurora.

The CICW activities are initiated and undertaken at the request of customers through the customer *connection process*. The infrastructure investments relate to; building *connection assets* at the customer's premises; modifying the existing network or building additional network; and the connection of those assets to the network.

The National Electricity Rules and Tasmanian Electricity Code articulate the minimum specific technical requirements and framework for access arrangements to the network to be provided when assessing, considering and/or establishing a *customer connection*.

For the purposes of managing the CICW activities, the CICW category of work is segmented into four (4) classes (*connection class*):

- residential,
- commercial,
- irrigation and
- subdivision developments.

These segments articulate the type of *connection assets* and the external influencing factors in determining forward volume estimates and forecast allowances and investment.

To recognise the impact on the capability of the network and the expected levels of CICW effort and investment, the future CICW activities are forecast through historical assessment and application of econometric forecasting. This forecasting approach recognises the underlying drivers that influence the number of new connections and predicts the forward estimated volumes and allowances.

Whilst over the past 4 – 5 years there has been significant increases in the CICW volumes and expenditure levels, the current econometric drivers and influencing trends in Tasmania indicate these activities are not expected to increase from the currently experienced growth levels of investment over the 5 year period to 2017. Accordingly, total expenditure allowances are forecast to remain at current levels during that period. Of note however, is the forecast increase in investment levels for the irrigation connection class, reflecting the Tasmanian Government's policy for a 'Food Bowl' State within the agribusiness sector and continuing intentions of establishing irrigation systems in particular rural areas of the State.

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REV NO.	DATE	REVISION DESCRIPTION	APPROVALS	
0		Original Issue	Prepared by	ICG
			Reviewed by	DB'A
			Approved by	MJIG

1.0 INTRODUCTION

1.1. Purpose

The purpose of this document is to describe Customer Initiated Capital Work (CICW) activities associated with electrical infrastructure connections to the distribution network, owned and operated by Aurora Energy Pty Ltd (Aurora), on mainland Tasmania. This plan includes:

- Aurora's approach, as reflected through its legislative and regulatory obligations and Network Management Strategy;
- The key projects and programs underpinning its activities for the period 2012/2013 – 2016/2017; and
- Forecast CAPEX and OPEX, including the basis upon which these forecasts are derived.

1.2. Scope

This plan covers all effort and expenditure associated with the negotiation, planning, solution development, design, construction and commissioning activities for establishing or modifying *customer connections*; that is, the Customer Initiated Capital Works Thread within System Management.

The CICW activity does not include:

- demand, quality, and reliability related capital works;
- connection of stand alone embedded generation; and
- non-demand related network alterations, which have been requested by a third party or customer, e.g. asset relocation for road widening, pole relocations, or undergrounding.

1.3. Overview of CICW in Aurora

CICW activity is initiated and undertaken at the request of customers through a 'Connection Enquiry/Application to Connect' process (*connection process*), which includes assessing and subsequently agreeing to the conditions for connection to the network. This *connection process* focuses on facilitating and establishing the connection of new and altered private electrical infrastructure (*customer connection*) to Aurora's distribution network through either direct connection or via dedicated distribution connection assets (*connection assets*).

Customer connection to the network allows a customer to not only primarily import energy (consume) from the network but also, in certain circumstances, generate (produce) and export energy into the network, e.g. rooftop solar-voltaics.

In determining the scope of work for a specific *customer connection* there are two (2) areas where infrastructure investment may be required:

- Customer **connection assets**, specific to that *customer connection*; and
- **Network alterations, expansion and extension works** associated with strengthening the network specifically to facilitate that *customer connection* (*shared assets alterations*)

The CICW infrastructure investments for *connection services* therefore relate to:

- Building *connection assets* at the customer's premises;
- Modifying the existing network or building additional network; and
- Connecting *connection assets* to the network.

The specific technical requirements, commercial arrangements, location and type of *customer connection*, and capability or constraints of the existing network influence the magnitude of individual CICW projects.

For larger load connection requests, e.g. 10MW and greater, the joint planning process established between Aurora and Transend Networks Pty Ltd facilitates collective assessment and solution recognition for establishing optimum technical and commercial arrangements.

The CICW investment is further defined through a set of existing work categories within the Program of Work (POW) reflecting in more detail the nature, type and size of the *connection assets* required.

All CICW projects are prioritised with other projects within the POW, whilst recognising the customer's supply timing requirements, to ensure efficient resource and materials deployment within the POW.

This category of work, whilst managed by more discrete categories that reflect the type of *customer connection* and relevant infrastructure, is dependent upon several external influencing econometric and demographic factors, which are predominantly outside of Aurora's direct control with respect to the volumes and types of *customer connection*.

An econometric approach to CICW forecasting has been adopted involving a historical assessment and estimation and testing of statistical relationships between the number of new connections and the underlying influencing drivers.

The forecasting of customer connection numbers and network maximum demands (MD) whilst related are separate activities. In particular, the MD forecast is informed by the forecast customer connection numbers and is aimed at providing evidence of emerging system constraints upstream of new connections and more globally across the network. These emerging issues

are a result of both increased customer connections and existing customer usage changes recognising external econometric, weather related and environmental influences. On the other hand, customer number forecasts drive localised requirements for network additions and new connections.

2.0 SUPPORTING PRINCIPLES

The CICW activity is managed within Aurora through a number of areas of responsibility, including:

- the Customer Service Group negotiating the *customer connection* directly with the customer;
- the Network Development Group recognising the impact and technical requirements for the *customer connection*; and
- the Network Services Division undertaking the design and construction to establish the *customer connection*.

There are a number of key supporting principles that guide the CICW approach within Aurora.

2.1. Connections policy

Aurora will provide a *customer connection* to the network in accordance with its Connection Policy.

The Connection Policy provides the basis for the commercial arrangements and any ongoing maintenance and contractual arrangements necessary for any *customer connection* to the distribution network. There is an obligation on both parties to establish a connection agreement to ensure that this happens and that such a *customer connection* meets specific legislative and rule requirements.

2.2. Connection conditions

In establishing a *customer connection* to the network, while satisfying the customer electrical supply requirements, the conditions and arrangements for that *customer connection* must ensure that the network and consequently other *customer connections* are not adversely affected.

Any *customer connection* must comply with the obligations of the National Electricity Rules (NER), Tasmanian Electricity Code (TEC) and relevant Australian Standards.

2.3. Customer service

Aurora's customer charter provides the levels of expected service when establishing a *customer connection* to the network.

2.4. Customer obligations

Each application for a *customer connection* is assessed and investigated to ensure that operation of customer facilities has minimal impact on existing *customer connections* and complies with relevant legislative, commercial and technical obligations.

Customer installations must comply with the relevant rules, legislation and Australian Standards prior to connecting to the network.

2.5. 'Good electricity industry practice'

In establishing a *customer connection* to the network, Aurora recognises infrastructure design and construction required for that connection must be in accordance with good electricity industry practice as defined in Chapter 14 of the TEC.

2.6. Essential service

Additional considerations are given to the required infrastructure and *connection assets* where that *customer connection* has identified reliance of supply as an essential service in terms of emergency, safety and life support requirements.

2.7. Greater asset / network utilisation

In determining the optimum investment for a *customer connection*, recognition of the least cost, most prudent investment and maximum utilisation of the existing infrastructure is paramount to ensure the 'cost to serve' is minimised.

3.0 REGULATORY FRAMEWORK

3.1. CICW under NER

Chapters 4, 5, 6 and 7 of the NER provide various minimum requirements and framework for access arrangements to the network.

In particular, clause 6.1.3 states:

> Access to direct control services and negotiated distribution services
> (a) Subject to and in accordance with the *Rules*:
> (1) a person (a *Service Applicant*) may apply to a *Distribution Network Service Provider* for provision of *direct control services* or *negotiated distribution services*;
> (2) a *Distribution Network Service Provider* must provide *direct control services* or *negotiated distribution services* (as the case may be) on *terms and conditions of access* as determined under Chapters 4, 5, this Chapter 6 and Chapter 7 of the Rules.
> (b) The *terms and conditions of access* are:
> (1) in relation to negotiated distribution services:
> (i) the price of those services (including, if relevant, access charges); and
> (ii) other terms and conditions for the provision of those services;
> (2) in relation to direct control services:
> (i) the price of those services under the approved pricing proposal; and
> (ii) other terms and conditions for the provision of those services.

Aurora is therefore required to provide offers to connect to all connection applicants on fair and reasonable terms and conditions.

Chapter 5 of the NER provides additional detail regarding the connection process and requirements for access to the network for a *customer connection*, including access standards.

3.2. CICW under the AER's Framework and Approach

The AER's Final Tasmanian Distribution Determination - Framework and Approach paper, November 2010, for the regulatory control period commencing 1 July 2012 (*AER F&A paper*) provides assistance in identifying the classification of distribution services to be provided by Aurora.

Clause 2.5.3.5 (page 53) of the *AER F&A paper,* states:

> The AER's likely approach is to classify all connection services as direct control services, and further classify them as standard control services. Consistent with the AER's preliminary position, the AER considers that the capital contributions component of connections requiring augmentation paid for by the customer will remain unregulated. The customer connections policy in the NECF, once finalised and implemented, is likely to provide more guidance to Aurora and customers on the determination and allocation of connection augmentation costs.

For the purposes of this document the *connection services* are classified as direct control services and then as standard control services.

Aurora recognises that:

- Although new *connection services* are listed as fee-based special services, the fee for the installation of the meter and service in normal business hours (a standard *connection service*) is zero ($0), as Aurora recovers these costs through DUOS charges. That is, a customer does not pay for this service through an upfront fee.

- Where a standard *connection service* is not viable due to the cost of the connection and the expected revenue from standard tariffs, a capital contribution is charged to the customer.

- Standard *connection services* are currently provided within the broader offering of network services (clause 2.5.3.1).

Aurora's approach to recovering costs of standard *connection services* is based on Aurora's adaptation of the original Hydro-electric Commission service and installation by-laws of 1993. These by-laws only required customer contributions if the customer required more than two spans of service. The costs of standard *connection services* are currently recovered through DUOS charges.

3.3. CICW under NECF

The National Energy Customer Framework (NECF) proposes to establish a formal framework under a new Chapter 5A of the Rules governing the process of contract formation and the charging arrangements that will apply where a

customer or a non-registered embedded generator is seeking a new connection or a connection alteration. This includes the principles that must be applied when determining whether a connection applicant can be required to enter into a prudential, capital contribution or prepayment arrangement to minimise the financial risks associated with network investment.

The Ministerial Council on Energy has agreed to work towards a target implementation date for NECF of 1 July 2012 and Aurora anticipates that NECF will be introduced into Tasmania from that date, potentially subject to a combination of national and jurisdictional transitional arrangements.

Aurora will closely monitor NECF introduction for impacts on its CICW methodology and plan, given the close linkages between the new connections framework under Chapter 5A and the existing provisions of Chapter 6 governing economic regulation.

4.0 CICW CATEGORIES

4.1. Connection class

For the purposes of managing the CICW activities, the CICW category of work is segmented into four (4) *connection classes.* Each *connection class* reflects the nature of and drivers for the *connection service*, the type of *customer connection*, the appropriate *connection assets* infrastructure, the complexity of supply requirements and the customer's private installation.

These *connection classes* are as follows: -

- Residential installations - including residential construction activities;
- Subdivision developments - residential and commercial/industrial;
- Commercial installations - including agri-business' installations (but not irrigation supplies); supply for commercial construction activities, industrial developments and mining complexes; and
- Irrigation installations.

4.2. Connection class types

Generally the complexity of infrastructure and level of expenditure required for each *connection class* is influenced by:

- Load or maximum demand;
- Type of *customer connection* or technical requirements requested;
- Location (topography) of the *customer connection*; and
- Capability and topology of the existing network infrastructure to establish the *customer connection*.

Accordingly each *connection class* can be sub-divided into types that are typical of each class with the aim of assisting forecasting the CICW investment allowances. *Connection asset* complexity types; namely simple, medium and complex, are recognised to provide indicative unit rates for each type by *connection class*. These typical *connection asset* complexities reflect the magnitude of expenditure, required infrastructure works, and associated technical requirements. In should be noted that actual costs for each specific *customer connection* project are recorded for inclusion in the regulatory asset base.

The various *connection class* types are:

- Residential:
    - simple, medium and complex;
- Commercial:
    - simple, medium and complex;
- Subdivision developments:
    - medium; and
- Irrigation:
    - simple and complex.

The following provides generalised connection designs and arrangements that are the basis of typical unit rates considered in forecasting the CICW investment allowances.

Residential installations

- Simple type connection (LV connection):

  Connection assets may include only the:
    - *customer connection* service fuses; and / or
    - one (1) span of overhead service wire.
- Medium type connection (LV connection):

  Connection assets may include:
    - *customer connection* service fuses; and / or
    - greater than one (1) span of overhead service wire and crossover;
    - small extension, overhead and/or underground, of the LV feeder; and
    - additional street furniture (i.e. turret or cabinet).
- Complex type connection (LV connection):

Connection assets may include:

- *customer connection* service fuses; and / or
- greater than one (1) span of overhead service wire and crossover;
- large extension of the LV feeder;
- extension of the HV feeder; and
- installation of a distribution transformer (predominantly pole-type);

Upstream *shared asset alterations* may be required.

Commercial installations

- Simple type connection (LV connection):

  Connection assets may include: -

  - *customer connection* service fuses; and / or
  - greater than one (1) span of overhead service wire and crossover;
  - small extension, overhead and/or underground, of the LV feeder; and
  - additional street furniture (i.e. turret, cabinet or wall box).

- Medium type connection (LV or HV connection):

  Connection assets for LV connections may include: -

  - Large extension, overhead and/or underground, of the LV feeder;
  - Small extension, overhead and/or underground, of the HV feeder;
  - installation of a distribution transformer (predominantly pole-type).

  Connection assets for HV connections may include: -

  - small extension, overhead and/or underground, of the HV feeder; and
  - installation of a HV isolator.

  Upstream *shared asset alterations* may be required.

- Complex type (LV or HV connection):

  Connection assets for LV connections may include:

  - large extension, overhead and/or underground, of the HV feeder; and
  - installation of a distribution transformer (predominantly ground-type).

  Connection assets for HV connections may include:

  - large extension, overhead and/or underground, of the HV feeder; and
  - installation of a HV isolator

  Upstream *shared asset alterations* expected to be required.

Subdivision developments

The infrastructure required for subdivisions, both residential and commercial, is based on basic infrastructure and typical loadings per block. The 'per block' assessment includes the electrical infrastructure and does not include civil works associated with any excavation, trenching, backfilling or reinstatement within the subdivision development.

- Medium type complexity which includes:
    - LV & HV feeders;
    - installation of a distribution transformer; and
    - possible upstream *shared asset alterations* may be required.

Irrigation installations

- Simple type connection (LV connection):

  Connection assets may include: -
    - *customer connection* service fuses; and / or
    - one (1) span of overhead service wire; and
    - small extension, overhead and/or underground, of the LV feeder;

- Complex type connection (LV connection):

  Connection assets may include: -
    - *customer connection* service fuses; and / or
    - greater than one (1) span of overhead service wire;
    - large extension of the LV feeder;
    - large extension of the HV feeder; and
    - installation of a distribution transformer (predominantly pole-type).

  Upstream *shared asset alterations* may be required.

4.3. Investment scope and implementation

In order to facilitate the scoping, scheduling and implementation of the CICW for each *connection class* there are a number of work categories within the Programme of Work schedules that record expenditure volumes and reflect the complexities.

5.0 FORECASTING METHODOLOGY

An econometric methodology has been adopted to forecast the new customer connections. 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 by each connection class.

Reference: *ACIL Tasman's report on Aurora new customer connections forecasts – February 2011*.

Aurora's process and methodology for forecasting CICW investment includes:

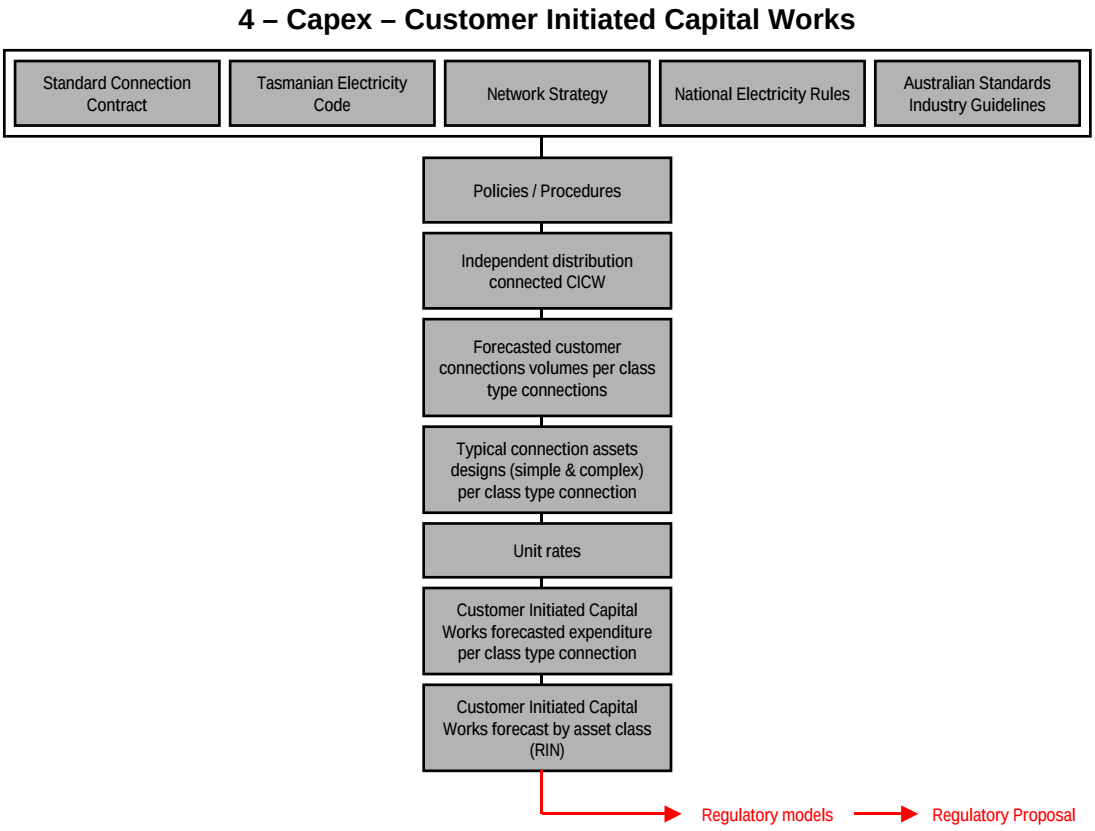
- Establishing trend analysis of past CICW projects volumes by CICW class, per region (north, north west and south) and statewide;
- Identifying the extrapolated project volumes trend for up to ten years by CICW class;
- Applying relevant econometric forecast drivers; such as, population growth; state economy; and house & land purchase prices; government incentives and strategies; which are considered to impact the forecast trend;
- Adjusting the trends by CICW class;
- Identifying typical unit rates for typical simple, medium complex and complex projects for each CICW class;
- Applying relevant unit rates to volume forecasts to provide forecast investment allowance per CICW class; and
- Summation of forecast investment providing the expected CICW allowances within the next ten years.

Factors influencing the forecasts predominantly include, but not limited to, econometric trends; commercial decisions; population growth and shifts in demographics; government incentives, projects and policy; and individual lifestyles decisions such as rural living and holiday destinations. Forecast allowances and investment are currently being influenced by the emerging State government policy and direction that focuses on the future of Tasmania, which includes:

- greater emphasis and planning for substantially more public housing,
- refocusing on population centre's redesign,
- establishing new specific commercial and industrial areas,
- development of irrigation schemes promoting the 'Food Bowl State' and agribusinesses; and
- 'clean and green' direction for Tasmania, which facilitates the establishment of a greater volume of renewable energy sources throughout the state.

In addition to global factors, localised growth in the number of connections and their types is taken into account in the forecasts. For example irrigation connections arising from the State government irrigation schemes increases localised volumes of this investment above the historical trends.

The basic process for CICW can be illustrated as:



6.0 FORECASTS

The following tables and graphs provide historic and forecast expenditure for CICW activities, in total and by connection class.

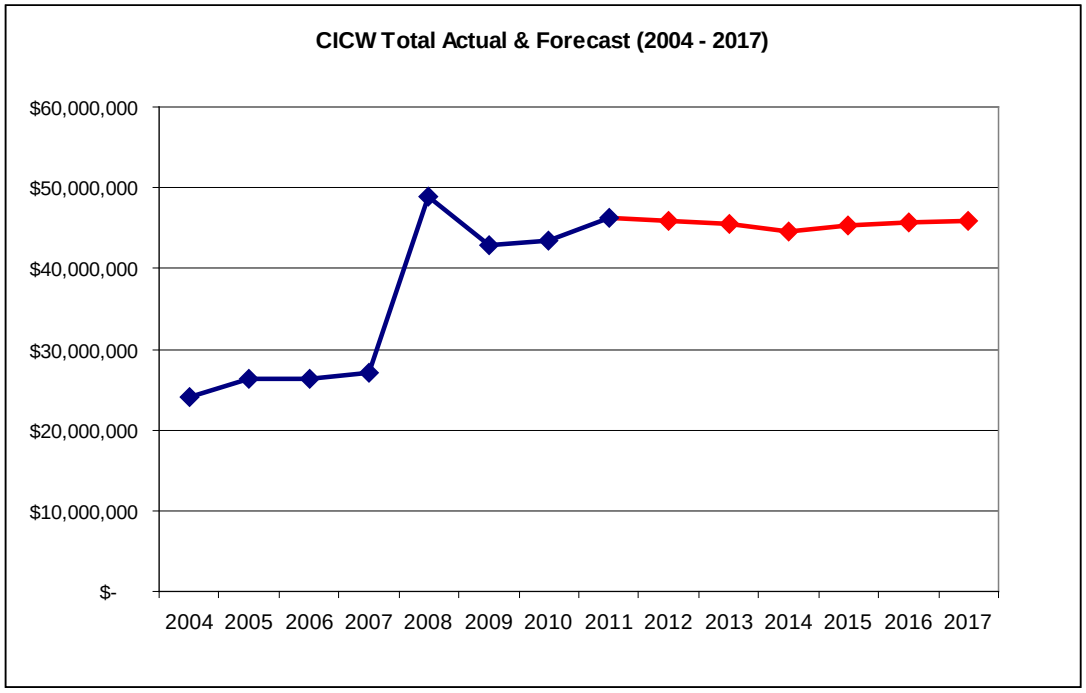
6.1. Total CICW expenditure

Year	Connection Class expenditure ($'000)				
	Residential	Subdivision	Commercial	Irrigation	Total
2004	$ 7,243	$ 8,615	$ 5,393	$ 2,736	$ 23,987
2005	$ 7,613	$ 9,410	$ 6,123	$ 3,167	$ 26,314
2006	$ 8,426	$ 7,644	$ 7,093	$ 3,150	$ 26,314
2007	$ 8,018	$ 7,594	$ 8,363	$ 3,171	$ 27,145
2008	$ 10,306	$ 9,749	$ 24,300	$ 4,495	$ 48,849

2009	$ 11,042	$ 10,674	$ 16,137	$ 4,946	$ 42,799
2010	$ 11,273	$ 11,547	$ 17,360	$ 3,256	$ 43,436
2011	$ 11,446	$ 15,395	$ 15,936	$ 3,480	$ 46,257
2012	$ 11,727	$ 15,755	$ 14,823	$ 3,660	$ 45,966
2013	$ 11,007	$ 16,126	$ 14,422	$ 3,885	$ 45,440
2014	$ 11,039	$ 15,092	$ 14,064	$ 4,064	$ 44,573
2015	$ 11,602	$ 15,092	$ 14,064	$ 4,266	$ 44,338
2016	$ 11,602	$ 15,701	$ 14,467	$ 4,379	$ 45,618
2017	$ 11,602	$ 15,311	$ 14,467	$ 4,491	$ 45,871

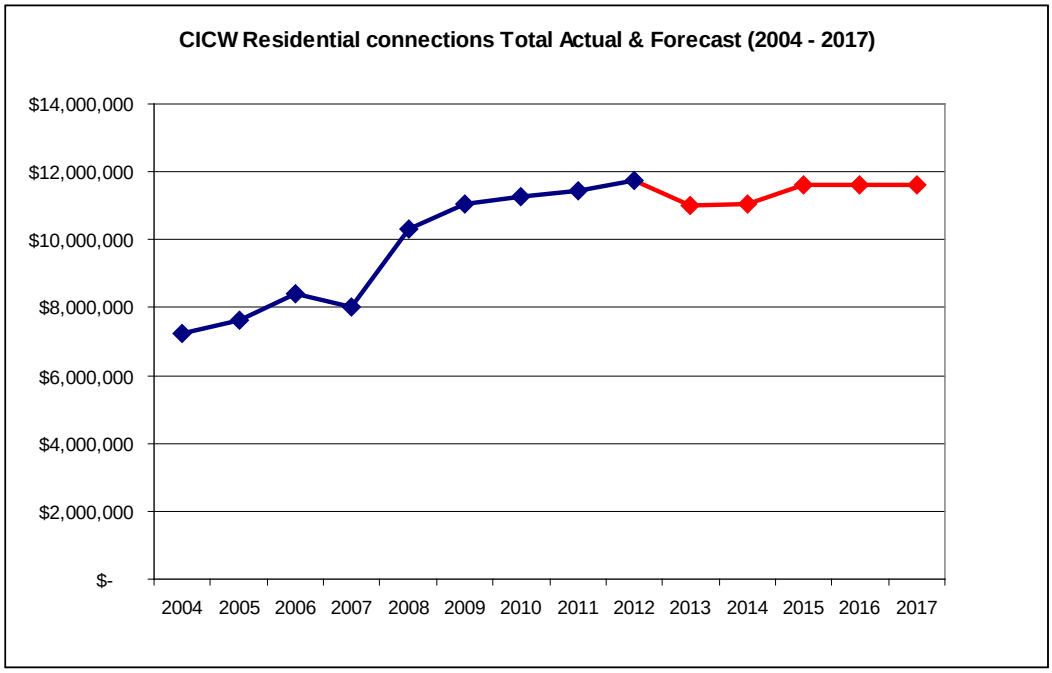
Table 1: CICW Total expenditure; actual (2004 - 2010) and forecast (2011 - 2017)

Each connection class expenditure forecast has been assessed by analysing the trend in variations from year to year of the forecast volumes of activities. That percentage variation provides the basis for the expenditure levels from 2011 through to 2017.



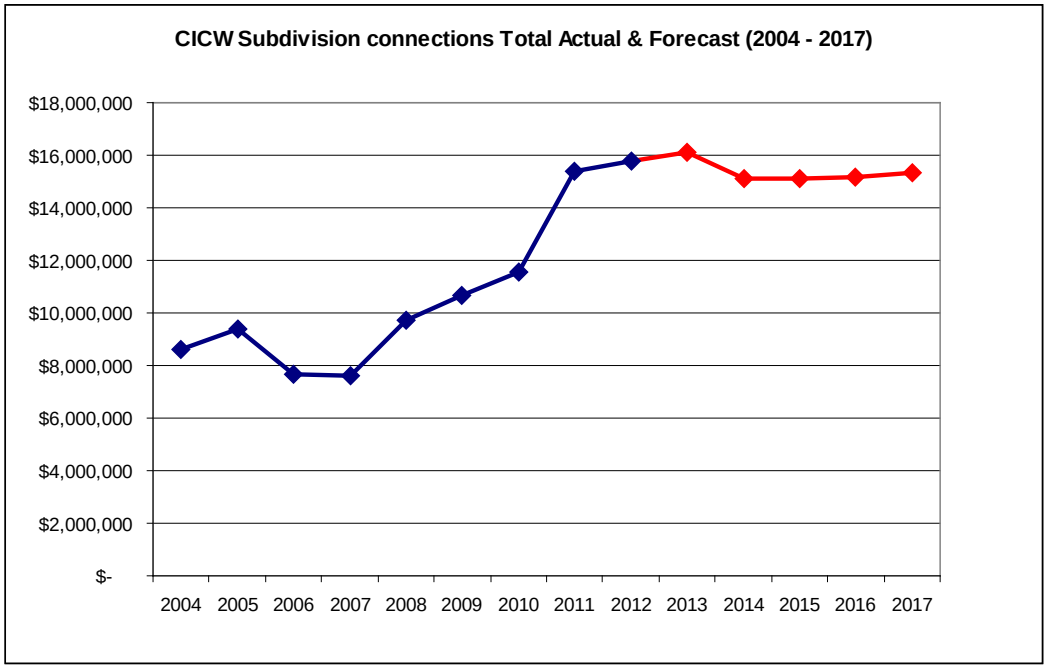
Graph 1: CICW Total expenditure; actual (2004 - 2010) and forecast (2011 - 2017)

6.2. Residential connections class expenditure



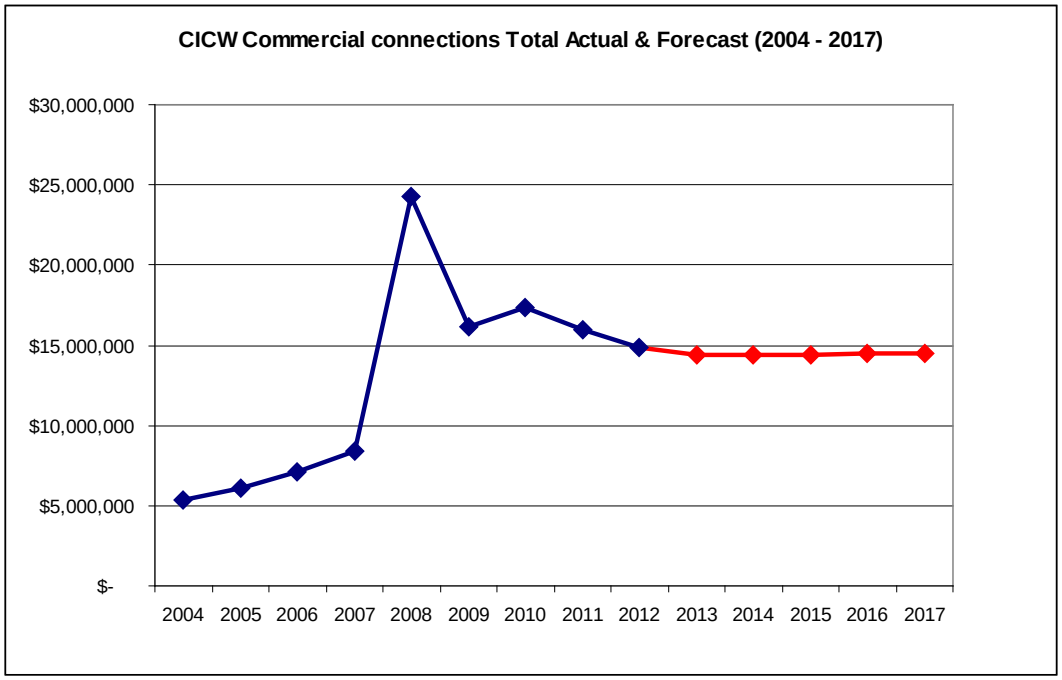
Graph 2: CICW Residential connection class expenditure; actual (2004 - 2010) and forecast (2011 - 2017)

6.3. Subdivision connections class expenditure



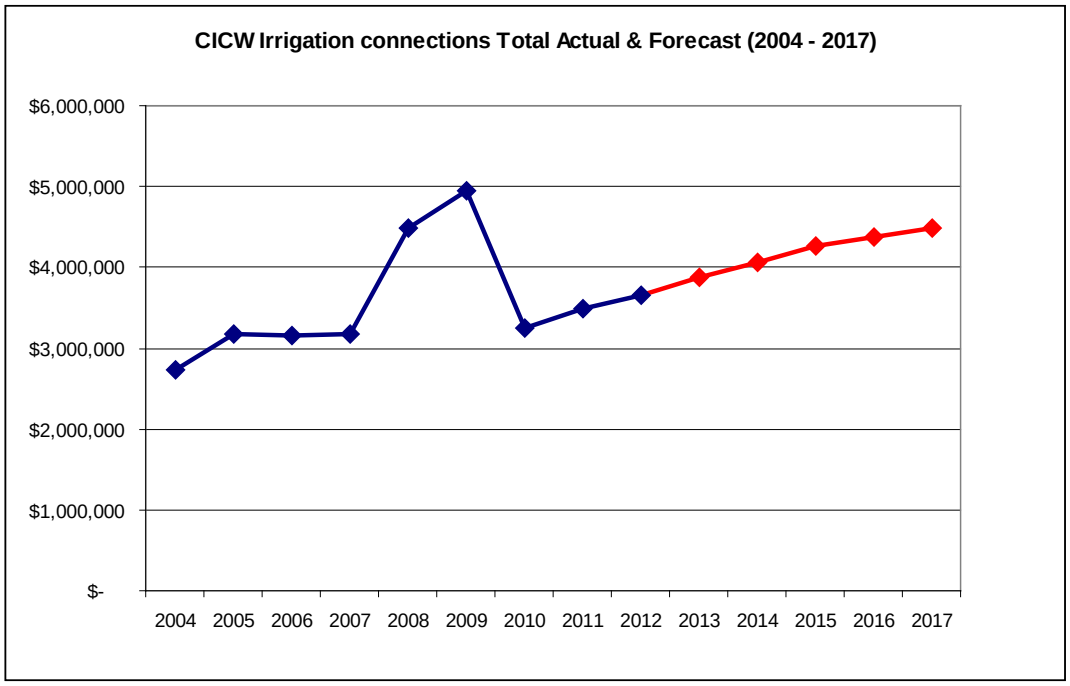
Graph 3: CICW Subdivision connection class expenditure; actual (2004 - 2010) and forecast (2011 - 2017)

6.4. Commercial connections class expenditure



Graph 4: CICW Subdivision connection class expenditure; actual (2004 - 2010) and forecast (2011 - 2017)

6.5. Irrigation connections class expenditure



Graph 5: CICW Irrigation connection class expenditure; actual (2004 - 2010) and forecast (2011 - 2017)

7.0 LIST OF DOCUMENTS REFERENCED

- National Electricity Rules (NER)
- Electricity Supply Industry Act 1995 (ESI Act)
- Aurora Customer Connection Policy
- Aurora Customer Contribution Policy
- Customer connection process
- ACIL Tasman's report on Aurora new customer connections forecasts – February 2011