Category Analysis RIN, 2009 - 2013

Response
22 May 2014

As submitted to the AER

CONTACT

This document is the responsibility of the Commercial, Regulatory and Strategy Group within the Distribution Business of Aurora Energy Pty Ltd (ABN 85 082 464 622). Please contact the indicated owner of the document with any queries or suggestions.

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Introduction

This document (RIN Response) represents the response of Aurora Energy (ABN 85 082 464 622) to the Regulatory Information Notice (RIN) issued in March 2014 by the Australian Energy Regulator (AER), under Division 4 of Part 3 of the National Electricity (Tasmania) Law, for the purposes of collecting information for category analysis.

The information and explanatory material included in this RIN Response relate to Aurora's activities as a licensed Distribution Network Service Provider (DNSP) during the Regulatory Years from 2008-09 to 2012-13 inclusive.

Contents

Definitions and interpretation

In this document and Aurora's response to the RIN, unless otherwise noted:

'**Aurora**' refers to Aurora Energy, acting in its capacity as a licensed Distribution Network Service Provider in the Tasmanian jurisdiction of the National Electricity Market.

Abbreviations	
AER	Australian Energy Regulator
Aurora	Aurora Energy Pty Ltd
CAM	Cost Allocation Method
DM	Aurora's Electronic Document Management System
DNSP	Distribution Network Service Provider
ICAM	Indirect Cost Allocation Model
MDMS	Meter Data Management System
Navision	Aurora's financial system
OTTER	Office of the Tasmanian Economic Regulator
POW	Program of Work
RIN	Regulatory Information Notice
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCS	Standard Control Services
SDW	Spatial Data Warehouse
Transend	Transend Networks Pty Ltd
WASP	Aurora's program-of-work management system (Works, Assets, Solutions and People)

Global assumptions

In this document and Aurora's response to the RIN, unless otherwise noted:

- Aurora has interpreted "(0's)" to mean the value reported in each cell is to be divided by ten.

Confidentiality

Title, page and paragraph number of document containing the confidential information	Description of the confidential information.	Topic the confidential information relates to (e.g. capex, opex, the rate of return etc.)	Identify the recognised confidentiality category that the confidential information falls within.	Provide a brief explanation of why the confidential information falls into the selected category.	Specify reasons supporting how and why detriment would be caused from disclosing the confidential information.	Provide any reasons supporting why the identified detriment is not outweighed by the public benefit (especially public benefits such as the effect on the long term interests of consumers).
AER CA RIN Aurora Energy (2009-13) – Basis of Preparation.pdf	CEO personal details	Statutory Declaration	Personal Information	CEO personal information (privacy)	Personal Information	There is no public benefit from the release of Aurora CEO's personal information.

Submission Title	Number of pages of submission that include information subject to a claim of confidentiality	Number of pages of submission that do not include information subject to a claim of confidentiality	Total number of pages of submission	Percentage of pages of submission that include information subject to a claim of confidentiality	Percentage of pages of submission that do not include information subject to a claim of confidentiality
AURORA ENERGY'S RESPONSE – CATEGORY ANALYSIS REGULATORY INFORMATION NOTICE	1	101	102	1%	99%

Statutory Declaration

OATHS ACT 2001

STATUTORY DECLARATION

I (full name) ..... PETER LEIGH DAVIS .....

of (residential address)..... [redacted] .....

.....

Occupation..... CHIEF EXECUTIVE OFFICER .....

do solemnly and sincerely declare that:

1. I am an officer, for the purposes of the *National Electricity (Tasmania) Law* (**NEL**), of Aurora Energy Pty Ltd (ACN 082 464 622) (**Aurora Energy**), a regulated network service provider for the purposes of section 28D of the NEL. I am authorised by Aurora Energy to make this statutory declaration as part of the response of Aurora Energy to the Regulatory Information Notice dated 7 March 2014 (**Notice**) served on Aurora Energy by the Australian Energy Regulator (**AER**).

2. I say that the actual information provided in Aurora Energy's response to the Notice is, to the best of my information, knowledge and belief:

   (a) in accordance with the requirements of the Notice; and

   (b) true and accurate.

3. Where it is not possible to provide actual information to comply with the Notice, Aurora Energy has, to the best of my information, knowledge and belief:

   (a) provided Aurora Energy's best estimate of the information in accordance with the requirements of the Notice; and

   (b) provided the basis for each estimate, including assumptions made and reasons why the estimate is the best estimate, given the information sought in the Notice.

I make this solemn declaration under the *Oaths Act 2001*.

Declared at ..... HOBART .....
(place)

on ..... 22 May 2015 .....
(date)

.....
(Signature)

Before me.....
(Justice, commissioner for declarations or authorised person)

Regulatory Information Notice under Division 4 of Part 3 of the National Electricity Law 12

Audits Reports

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Independent Auditor's Report to the Directors of Aurora Energy Pty Ltd

We have audited the financial information within tables 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 4.1, 4.2, 4.3 and 4.4 in the data template entitled *'Aurora Energy CA RIN 2013 Actual Information.xlsx'* ("Actual Financial Information") attached at Appendix A, which has been prepared in accordance with Aurora Energy Pty Ltd ("Aurora Energy")'s Basis of Preparation (the "Basis of Preparation") in response to the Category Analysis Regulatory Information Notice ("the Notice") issued by the Australian Energy Regulator ("AER") on 7 March 2014, for the regulatory years 2008/09 to 2012/13 inclusive. In accordance with the requirements of the Notice, information presented in the Actual Financial Information before this date range has not been subject to audit.

The Australian Energy Regulator requires the Actual Financial Information and the accompanying Basis of Preparation for the performance of a function conferred on it under the National Electricity Law, namely conducting various benchmarking exercises as outlined in the Regulatory Information Notice issued to Aurora Energy on 7 March 2014.

Management's Responsibility for the Data Template and Basis of Preparation

Management is responsible for the preparation and fair presentation of the Actual Financial Information in accordance with the requirements of the Notice and Aurora Energy's Basis of Preparation, and for such internal controls as management determines are necessary to enable the preparation of the Actual Financial Information that is free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on the Actual Financial Information based on our audit. We conducted our audit in accordance with ASA 805 *Special Considerations - Audits of Single Financial Statements and Specific Elements, Accounts or Items of a Financial Statement* ("ASA 805"). ASA 805 requires that we comply with relevant ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the Actual Financial Information is free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the Actual Financial Information. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the Actual Financial Information, whether due to fraud or error. In making those risk assessments, the auditor considers internal controls relevant to the entity's preparation of the Actual Financial Information in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal controls.

Independence

In conducting our procedures we have complied with the independence requirements of the Australian professional accounting bodies.

Opinion

In our opinion, the Actual Financial Information is presented fairly, in all material respects, in accordance with the requirements of the Notice and Aurora Energy's Basis of Preparation.

Restriction on Distribution

Without modifying our opinion, we draw attention to the fact that the Actual Financial Information is prepared to assist Aurora Energy to meet the requirements of the Notice. As a result, the Actual Financial Information may not be suitable for another purpose. Our report is intended solely for Aurora Energy and the AER and should not be distributed to any other parties.

Ernst & Young

Melbourne
22 May 2014

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Independent Assurance Practitioner's Report to the Directors of Aurora Energy Pty Ltd

We have reviewed the following information:

- The estimated financial information within tables 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 4.1, 4.2, 4.3, 4.4, 5.2, 5.3, 5.4 and 6.3 in the data template entitled *'Aurora Energy CA RIN 2013 Estimated Information.xlsx'* ("Estimated Financial Information") attached at Appendix B; and
- The non-financial information within tables 2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 4.1, 4.2, 4.3, 4.4, 5.2, 5.3, 5.4 and 6.3 in the data templates entitled *'Aurora Energy CA RIN 2013 Actual Information.xlsx'* and *'Aurora Energy CA RIN 2013 Estimated Information.xlsx'* ("Non-Financial Information") attached at Appendices A and B respectively.

This information has been prepared in accordance with Aurora Energy Pty Ltd ("Aurora Energy")'s Basis of Preparation (the "Basis of Preparation") in response to the Category Analysis Regulatory Information Notice ("the Notice") issued by the Australian Energy Regulator ("AER") on 7 March 2014, for the regulatory years 2008/09 to 2012/13 inclusive. In accordance with the requirements of the Notice, information presented in the Estimated Financial Information and Non-Financial Information before this date range has not been subject to review.

The Australian Energy Regulator requires the Estimated Financial Information, Non-Financial Information and an accompanying Basis of Preparation document for the performance of a function conferred on it under the National Electricity Law, namely conducting various benchmarking exercises as outlined in the Regulatory Information Notice issued to Aurora Energy on 7 March 2014.

Management's Responsibility for the Data Template and Basis of Preparation

Management is responsible for the preparation of the Estimated Financial Information, Non-Financial Information and Basis of Preparation, and has noted in the Basis of Preparation whether it considers that the information supplied is appropriate for the benchmarking activities of the Australian Energy Regulator. Management is also responsible for such internal controls as management determines are necessary to enable the preparation of the Estimated Financial Information and Non-Financial Information that are free from material misstatement, whether due to fraud or error.

Assurance Practitioner's Responsibility

Our responsibility is to express a conclusion on the Estimated Financial Information and Non-Financial Information based on our review.

We have conducted our review of the Estimated Financial Information in accordance with the Australian Standard on Review Engagements ASRE 2405 *Review of Historical Financial Information Other than a Financial Report* in order to state whether, on the basis of the procedures described, anything has come to our attention that causes us to believe that the Estimated Financial Information is not prepared, in all material respects, in accordance with the Basis of Preparation and the requirements of the Notice.

We have conducted our review of the Non-Financial Information in accordance with the Australian Standard on Assurance Engagements ASAE 3000 *Assurance Engagements Other than Audits or Reviews of Historical Financial Information* in order to state whether, on the basis of the procedures described, anything has come to our attention that causes us to believe that the Non-Financial Information is not prepared, in all material respects, in accordance with the Basis of Preparation and the requirements of the Notice.

ASRE 2405 and ASAE 3000 require us to comply with the requirements of the applicable code of professional conduct of a professional accounting body.

A review consists of making enquiries, primarily of persons responsible for the information, and applying analytical and other review procedures. Specifically, we have agreed the Estimated Financial Information and the Non-Financial Information to data extracted by company personnel from relevant company operating systems. Our procedures involved undertaking a walkthrough of the systems / process by which data is captured and reported. Due to the nature of the systems / processes used, we have undertaken a substantive approach to our procedures.

A review is substantially less in scope than an audit conducted in accordance with Australian Auditing Standards and consequently does not enable us to obtain assurance that we would become aware of all significant matters that might be identified in an audit. Accordingly, we do not express an audit opinion.

Independence

In conducting our procedures we have complied with the independence requirements of the Australian professional accounting bodies.

Conclusion

Based on our review, which is not an audit, nothing has come to our attention that causes us to believe that the Estimated Financial Information and Non-Financial Information is not prepared, in all material respects, in accordance with the requirements of the Notice or Aurora Energy's Basis of Preparation.

Restriction on Distribution

Without modifying our conclusion, we draw attention to the fact that the Non-Financial Information is prepared to assist Aurora Energy to meet the requirements of the Notice. As a result, the Non-Financial Information may not be suitable for another purpose. Our report is intended solely for Aurora Energy and the AER and should not be distributed to any other parties.

Ernst & Young
Melbourne
22 May 2014

Basis of Preparation

2.1 Expenditure Summary & Reconciliation

2.1.1 Standard control services capex

2.1.2 Standard control services opex by category

2.1.3 Alternative control services capex

2.1.4 Alternative control services opex

2.1.5 Dual function assets capex

2.1.6 Dual function assets opex by category

(a)	Compliance with the requirements of the RIN

The information provided in *Table 2.1 – Expenditure Summary & Reconciliation* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the variables reported by Aurora are based on reliable and objective data sources;
- total expenditure for capex and opex has been reported on an "as-incurred" basis;
- Aurora has reconciled total capex and opex with the sum of capex and opex line items in the "balancing item" row of each table in Template 2.1 using a balancing item which has been calculated in line with the instructions set out in paragraph 2.3 of Appendix E to the RIN;
- a Microsoft Excel spreadsheet containing the calculation of the balancing items reported in Template 2.1 has been provided; and
- a reconciliation has been provided between the total capital and operating expenditure reported in Template 2.1 and the capital and operating expenditure recorded in Aurora's Regulatory Accounting Statements and Audited Statutory Accounts.

(b)	Information sources

The information reported about Standard control services capex in Table 2.1.1 was sourced from Tables 2.2 Repex, 2.3 Augex, 2.5 Connections data and Table 2.10 Overheads capitalised. The balancing lines include items sourced from the regulatory accounts that have not been included in the above tables.

The information in *Table 2.1.2 Standard control services opex by category* was sourced from templates 2.7 Vegetation, 2.8 Maintenance, 2.9 Emergency Response, 2.6 Non-network data and table 2.10 Overheads capitalised. The balancing lines include items sourced from the regulatory accounts that have not been included in the above tables. *Table 2.6.1 Non-network expenditure* has been included in operating overhead expenditure as well as non-network and, therefore, has been reduced in the balancing items.

The information in *Table 2.1.3 Alternative control services capex* was sourced from templates 4.1 Metering and 4.2 Public lighting. The balancing items in Table 2.1.3 include alternative control capitalised overheads identified during the process of responding to template 2.10 (but not reported in that template), as well as regulatory account items.

The data reported in Table 2.1.4 Alternative control services opex by category has been sourced from

templates 4.1 Metering, 4.2 Public Lighting and 4.3 Fee-based Services. The balancing items in Table 2.1.4 include alternative control operating overheads identified during the process of responding to template 2.10 (but not reported in that template), as well as regulatory account items. Metering expenditure is included as part of overhead expenditure (as per AER instructions) and the balancing items have been reduced to take this into account.

(c)	**Methodology and assumptions**

In relation to Tables 2.1.5 and 2.1.6, Aurora has no dual function assets and, therefore, has reported no expenditure in these tables.

2.2 Repex

2.2.1 Cost Metrics by Asset Category

Asset Replacement and Failure Volumes

(a)	Compliance with the requirements of the RIN

The asset replacement and failure volumes reported in *Table 2.2.1* are consistent with the requirements of the Category Analysis RIN, in that:

- Where Aurora Energy has provided asset sub-categories corresponding to the prescribed asset categories in Table 2.2.1, the asset replacement / asset failure volumes of these sub-categories reconcile with the higher level asset category.
- In instances where the prescribed asset group categories and the sub-categorisation provisions set out in Table 2.2.1 do not account for an asset on Aurora's distribution system, Aurora Energy has inserted additional rows below the relevant asset group to account for this and provided a corresponding age profile in regulatory template 5.2.
- Replacement volumes by asset group are equal to the applicable replacement volume data provided in Table 2.2.2.
- Where estimated expenditure data has been provided on the basis of historical data that has included works across asset groups, the asset age profile data in regulatory *template 5.2* has been based on that of the most elementary asset category.
- Aurora has provided the total volume of assets currently in commission and replacement volumes of certain asset groups consistent with the aggregated metrics specified by the AER. In instances where this information is estimated Aurora has explained how it has determined the volumes, detailing the process and assumptions used to allocate asset volumes to the aggregated metrics.

(b)	Information sources

Data was obtained from Aurora's works management system (WASP), and Aurora's financial and procurement system (Navision). Aurora's incident and risk management system (RMSS) and outage management system (InService) were also used to source information relating to incidents and outages, respectively.

(c)	Methodology and assumptions

Determination of REPEX work

General

Aurora identified the applicable Work Categories used in WASP that best represented REPEX activities. Jobs falling into those Work Categories were then analysed within the various works tools, including WASP, InService, Navision and WASP Outages.

Poles (replacement / refurbishment / failures)

For Poles replacements (i.e. renewals) and refurbishments, there were two sources of data.

Firstly, all completed condition related pole renewals (REPOL) and pole refurbishments (RESTK) recorded in WASP have been included for the time periods. For pole refurbishments, the staking of wooden poles, and the reinstatement of steel / steel and concrete poles has been included – hence the additional rows specified in table 2.2.2.

The *Staking of a Wooden Pole* row in table 2.2.2 only represents the TOTAL volumes of wooden poles which have been staked, which are not broken down by pole type or voltage. Aurora has elected to provide further detail as to the voltage breakdown and classification of Wood, steel /steel and concrete for each pole type has been included for consistency with the other categories.

Aurora records tasks against each pole that requires renewal or refurbishment, and the data provided reflects tasks recorded WASP that were completed within the back-cast period, for both the two REPOL and RESTK work categories.

Aurora also refurbishes poles made from materials other than wood, and these have been added to the list of asset categories as required. To accommodate this breakdown, the *Staking of a wooden Pole* line in the template has not been utilised, and refurbished poles of any construction, categorised by voltage, have been added as additional lines in the table.

The second source of pole replacement and refurbishment numbers draws on Aurora's records of pole replacements which have not been undertaken as a result of their condition, but are an outcome of other work, such as conductor upgrades. In the case of those jobs, the materials lists for all work packages have been extracted from the financials/stores system. Each piece of material used that correlates to an asset category has been classified as such, enabling the pole replacements arising as a result from other REPEX drivers to be identified and counted, for inclusion in the count of replacements.

Pole Failures

The condition-based replacement of poles is not deemed to constitute an asset failure, based upon the definition provided. Aurora has, therefore, only had a small number of (unassisted) pole failures– All failures of wooden poles have been reported as per the table. Aurora records pole failures in RMSS, and a tabular record of pole failures is also stored in Aurora's electronic document management system (DM).

Pole Top (replacement / failures)

Aurora has a CAPEX task defined within WASP for pole top hardware replacement – principally cross-arms. Aurora has reported all pole-top hardware replacement tasks completed within the back-cast period. However, prior to 2013-14 Aurora did not capitalise pole-top replacement expenditure, and the work category within WASP has only recently been changed from AROCO (OPEX) to RELSA (CAPEX). This means that the numbers are low for the financial years covered by the RIN, but will show an increase in future reportable years.

Aurora reports outages where pole top hardware has failed and requires replacement in Aurora's outage system. This data has been used for 2014 Category RIN. The outage causes reported as pole-top asset replacement/failures are:

- Cross Arm Bent;
- Cross arm Broken; and
- Pole Top Fire.

Overhead Conductors (replacement / failures)

The approach used for Overhead conductor REPEX again involves two components.

Firstly, where a specific program has been created to replace substandard conductor, these work

packages have been identified in WASP. However, because there is no reliable link between asset data and works data, the route length and number of phases involved with each work package is not easily attained. For the relevant work packs completed within the back-cast period, the total of the conductor lengths has been used to calculate the length in the REPEX table, and the values divided by 3 and converted to KM to determine the total KM installed.

The second component relates to other REPEX work categories which involve the installation of overhead conductor. A summary of stores data has been extracted from Navision, and then for the relevant work packs completed within the relevant years, the total of the conductor lengths has been used to calculate the length. The values have then been divided by 3 and converted to KM to determine the total KM installed.

For these values a distribution across voltages has been undertaken.

For conductor failures, it should be noted that conductors are repaired in the majority of cases, and then programmed for replacement if required as part of a program for replacement (Copper and GI). The types of failures reported are:

- Conductor clashing due to wind long span;
- Conductor clashing due to wind slack span;
- Conductor - Bare Wire Broken; and
- Conductor low - Incorrect clearance.

Underground Cables (replacement / failures)

The approach for REPEX where underground cable has been used is similar to the process used in relation to Overhead Conductors. A summary of stores data has been extracted from Navision, and then for the relevant work packs completed within the relevant years, the total of the cable lengths, joints and terminations has been used to calculate the required values. The voltage has been broken down to the required lines by the cable voltage rating.

For cable failures, it should be noted that cables are repaired in the majority of cases, and then programmed for replacement if required as part of a program for replacement (LV CONSAC).The failures reported are:

- UG able Failure;
- UG Joint Failure; and
- UG Cable Termination Failure(s).

Again, all transformer (TX) outages are at LV level, whist others relate to voltage of feeder (HV).

Service Lines (replacement / failures)

For service lines, Aurora does not have a specific replacement program in place. Instead it has work rules that require the service fitting and service line to be replaced if they meet certain parameters, specifically the type of fitting/service. Aurora does not record the details of the arrangement, make or model of service connection assets and is unable to provide a breakdown of service line replacements and/or failures on the basis of actual data.

Transformers (Include ground substations) (replacement / failures)

Aurora has a replacement program for transformers, HV and LV switchgear and substations. The data provided in this section is for the work categories relating to those replacement programs. Additional lines have been added – specifically:

- GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; 22 KV ; > 600 KVA ; MULTIPLE PHASE;
- GROUND MOUNTED LV SWITCHGEAR;
- GROUND MOUNTED FULL SUBSTATION 11KV;
- GROUND MOUNTED FULL SUBSTATION 22KV;
- GROUND MOUNTED HV SWITCHGEAR 11KV; and

- GROUND MOUNTED HV SWITCHGEAR 22KV.

The additional categories of substation assets inserted into Table 2.2.2 by Aurora are required in order to capture the replacement of LV switchgear, and to differentiate between component replacement within substations and the replacement of entire substations (which is a less costly option in some instances than component replacement).

In relation to asset failures, Aurora's outage management system records failed transformers, ground switchgear and substations. The task reported is:

- Transformer Failure.

The feeder voltage is provided for the voltage breakdown.

Switchgear (replacement / failures)

For switchgear, Aurora has specific programs for the replacement of ground mounted units. The data is sourced from WASP, and the count is based upon installed units from stores records here. For overhead switchgear there is a small formal replacement program, and to provide clarity, the following lines were added to Table 2.2.1.

- ≈ 11 KV ; Links (OH);
- 11 KV & < ≈ 22 KV ; LINKS (OH);
- 22 KV & < ≈ 33 KV ; LINKS (OH);
- 11 KV & < ≈ 22 KV ; ABS (OH); and
- 22 KV & < ≈ 33 KV ; ABS (OH).

To provide these values, WASP work packages were identified and the units installed totalled for each financial year.

For substation switchgear failures, RMSS data is used. This includes specific details that identify the substation and quantity of units that have failed.

For Overhead switchgear failures, the data was estimated.

Public Lighting

Public lighting data has been sourced from the same location as that used to populate template 4.1 (specifically, Table 4.1.2 - Descriptor metrics annually).

WASP work tasks where a streetlight has been reported as not functioning as intended. Completed tasks are aggregated across each financial year.

SCADA, Network Control

Aurora has very small amounts of SCADA units in commission. There is no formal REPEX category for replacement work, as the units are relatively new and have no discernible record of REPEX activity.

The estimated financial data in table 2.2.1 has been apportioned across categories using actual financial information for that year and the volumes of replacements from 2012-13 FY.

(d)	Estimated information

a. Rationale
b. Derivation

Poles (replacement / refurbishment / failures)

Regarding asset failures, for 2008-09 to 2010-11 estimates have been used to divide pole failures by pole type and voltage as Aurora's Outage Reporting Systems do not identify either the particular asset or the

specific type of asset that causes an outage. However, the total number of failures are actual, based on Aurora's records. No details of the specific asset are available in an easily obtainable dataset.

For the replacement of poles not based upon condition (e.g. not REPOL), the count of poles used from the stores system has been used for each financial year. The detail relating to the specific poles that were replaced is not available through the systems.

For the breakdown of voltages for poles replaced by other drivers for REPEX, an estimation of the voltage has been done on a purely on a ratio basis of other poles. There is no detail available to provide more accurate data.

Pole Top (replacement / failures)

A process of capitalisation of the OPEX costs for materials against this fault work is undertaken monthly as a way to capitalise the replacement of failed components with new. There is no simple, auditable or consistent method to determine the asset breakdown against the asset class as this is a financial process only. Therefore, other than for recent replacements of pole top assets, there is no count available for the failures which have occurred in each year of the back-cast period.

It is assumed the vast majority of pole top hardware replacements have been captured in the outage management system.

It is assumed the vast majority of pole top hardware is changed at the time the defect is addressed; hence all outages have been counted. Other assumptions made are that all TX outages are at a LV level, whilst all others relate to the voltage of the relevant feeder (HV). Finally outages where the voltage is undeterminable will be distributed across 22kV principally because the vast majority of pole tops are 22KV.

Overhead Conductors (replacement / failures)

For overhead conductors, the total conductor used from the stores system (Navision) has been divided by three to calculate the total kilometres installed, based on the assumption that all installations are three phase.

It is assumed that the majority (≈87.5%) of installations are 22kV, with a smaller proportion (≈12.0%) being 11kv conductors and a very small number being LV (≈0.05%). This proportion is based broadly upon voltage distribution across the state where this work would have taken place. From a pole top/construction perspective, however, voltage makes very little difference in terms of the materials used, as the same components are used for both 22kV and 11kV voltages.

For conductor failures, it has been assumed that all TX outages are at LV conductor level; that others relate to voltage of feeder (HV); and conductor replacements with no recorded voltage level involve 22kV conductors, on the basis that the vast majority are 22KV.

Underground Cables (replacement / failures)

For cable / Termination failures, those reported outages where the voltage reported in 'blank', will be distributed across 22kV principally because the vast majority are 22KV.

Service Lines (replacement / failures)

From the failure data, it is assumed that firstly all service fuses and service lines are replaced on failure. The reported task list for service connections failures includes:

- Conductor Failure - Insulated
- Switchgear - Service Fuse Failure

It assumes that all SF outages are at Installation level - but not internal to the installation

Voltage relates to feeder (HV), and is not relevant. Again, 'blank' will be included in the total count.

Residential / Commercial & Industrial split is assumed to be 85% / 15% approximately, based on the ratio of customer types.

Where insulated service / service fuse has failed, the vast majority have both items replaced with new. There is no detailed information to support or counter this position other than anecdotal.

Aurora has no other services connection types / at other voltages, as they are deemed part of the network, or relate to consumer mains (private).

Transformers (Include ground substations) (replacement / failures)

For Transformer failures, the voltage is determined form the feeder voltage that the transformer is connected to.

Unless otherwise known, it is assumed that 50% of transformers failures are smaller than 60kVA, and 50% of those are single phase.

Switchgear (replacement / failures)

No reliable data is available on which to base the volumes of overhead switchgear failures. Therefore, it has been estimated that 20% of the replacement of overhead switchgear is due to failure (i.e. condition based replacement).

Public lighting (replacement / failures)

For public lighting, the exact details of whether a failed light is major or minor are not able to be determined. Therefore, a ratio method has been applied, namely 75% of public road lighting is minor, the remainder major. There is no other way to gather this information reliably.

The estimated financial data in Table 2.2.1 has been apportioned across categories using actual financial information for that year and the volumes of replacements from 2012-13 FY.

2.2.2 Descriptor Metrics

(a)	**Compliance with the requirements of the RIN**

The asset volumes reported in Table 2.2.2 are consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the information presented by Aurora is based on reliable and objective data sources gathered from records used in the normal course of business; and
- as required under section 5 of Appendix E of the RIN, specifically paragraph 5.2, Aurora has provided explanations of how it has determined any estimates of the total volume of assets currently in commission and replacement volumes of certain asset groups, including the assumptions used.

(b)	**Information sources**

Data was obtained from WASP – Aurora's works management system, G-Tech – Aurora's spatial asset GIS, and Navision – Aurora's financial and procurement system. RMSS is Aurora's incident management system records pole failures. DM is Aurora's document management system, storing key business documents and asset performance data.

(c)	Methodology and assumptions

Determination of REPEX Descriptor Metrics

General

From the REPEX data obtained previously the following information has been determined

Poles (Pole Replacements)

For poles, asset replacement (REPOL) volumes have been previously determined for 2.2.1. Based on this data a classification of Feeder by AER definition has been applied, and summarised in the table 2.2.2.

AER has made no provision for Subs transmission Poles as per AER Feeder Classification, and hence Aurora has added this classification in.

The Asset Volumes Currently in Commission has been determined through spatial analysis, where feeders were attributed to all poles.

Overhead Conductors (Conductor Replacements)

Overhead Conductors by feeder has been derived by applying a ratio of the respective feeders by AER classification against the known feeders for upgrade projects.

Overhead Conductors by conductor type have replicated the volumes for GI and Copper replacements from table 2.2.1.

The Asset Volumes Currently in Commission has been provided principally from the 5.2 Asset Age Profile. Total KM installed has been summed and, based on an average span length, the total length per feeder category has been calculated using the number of poles per feeder category.

For Total installed for GI / CU, an extract of the GIS data was performed and summarised.

Underground Cables (Cable Replacements)

Underground cables replaced by feeder category are not readily achievable from the project information available. An estimation of apportionment according to the installation ratios for Urban, Rural Long and Rural Short has been applied for the total km of cable replaced as per Table 2.2.1.

Similarly the breakdown of total underground cables by feeder category is again not readily achievable, and hence estimation across Urban, Rural Long and Rural Short has been applied for the total km of cable in commission as per 5.2 Asset Age Profile.

To ensure completeness, Sub transmission Feeders have been included.

Transformers by MVA (Replaced / Disposed)

Determination of the installed capacity of transformers, and the disposed capacity of transformers through REPEX programs is again not readily achievable, and hence estimations have been made.

A total of the installed transformers has been calculated from the Stores data.

An assumption was made that on average the capacity increase for REPEX was 10%, and hence the figures for removed capacity MVA Disposed is 10% less than installed.

2.3 Augex Project Data

2.3.1 Augex asset data - Subtransmission Substations, Switching Stations and Zone Substations

(a)	Compliance with the requirements of the RIN

The data provided in Table 2.3.1 is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the variables reported by Aurora are based on reliable and objective data sources;
- augmentation projects undertaken during the back-cast period and involving total cumulative expenditure over the life of the project of more than $5 million have been reported individually; and
- for all other projects completed within the back-cast period, total direct expenditure, the total cost of land purchases and total easement costs incurred in relation to those projects have been aggregated and reported in the penultimate row of the table 2.3.1.

> 7.2 Table 2.3.1 (on *regulatory template* 2.3) instructions:
>
> (a) For projects with a total cumulative expenditure over the life of the project of greater than or equal to $5 million (nominal):
>
> (i) insert a row for each *augmentation* project on a *subtransmission substation*, *switching station* and *zone substation* owned and operated by Aurora Energy where *project close* occurred at any time in the years specified; and
>
> (ii) input the required details.
>
> (b) For projects with a total cumulative expenditure over the life of the project less than $5 million (nominal) (non material projects):
>
> (i) input the total expenditure for all non material *augmentation* projects on a *subtransmission substation*, *switching station* and *zone substation* owned and operated by Aurora Energy where *project close* occurred in the years specified in the penultimate row in the table, as indicated.

If zone is over $5 million, has its own **row** in RIN table. Howrah was the only Zone with this. If less than $5million AND completed in the RIN period: total direct expenditure, years incurred, $ land purchase and $ easements totalled.

For Howrah Zone therefore:

Voltage is listed primary/secondary

> (j) For *substation voltages*, enter *voltages* in the format xx/xx, reflecting the primary and secondary *voltages*. For example, a *transformer* may have its *voltage* recorded as 500/275, where 500kV is the primary *voltage* and 275kV is the secondary *voltage*.

Ratings: PRE all left blank

(k) For *substation* ratings, 'Pre' refers to the relevant characteristic prior to the *augmentation* work; 'Post' refers to the relevant characteristic after the *augmentation* work. Where a rating metric does not undergo any change, or where the project relates to the establishment of a new *substation*, input the metric only in the 'Post' column.

Normal cyclic rating	The maximum peak loading based on a given daily load cycle that an asset or element of the *network* can supply each day of its life under normal conditions resulting in a normal rate of wear. Aurora Energy must provide its definition(s) of 'normal conditions'.

Aurora has defined the normal cyclic rating as the nameplate full load rating of the transformer.

Aurora has no related parties involved with Howrah Zone substation, as defined in RIN Definitions.

Switchgear in the Zone substation has been taken to be all primary and secondary breakers, bus couplers and feeder breakers. Station supply fuses, etc. have been excluded.

Switchgear	These are assets used to control, protect and isolate segments of the network This includes disconnect switches, fuses, circuit breakers, links, reclosers, sectionalisers, ring main units, oil insulated fuses etc.
Civil works	The construction and/or installation of the infrastructure which will house or provide supporting foundations for electrical cables and equipment. It includes buildings, earthworks, foundations, access roads, as well as support structures not included in any other category.

Despite the Definitions document specifying that Zone substations must transform voltage from above 33kV to below this voltage, we have called our 33/11kV stations Zone Substations for the purposes of this RIN report. 33kV is a standard sub transmission voltage for Aurora.

Project close	When the project account(s) are closed off at the completion of the project.

Total expenditures have been taken as of when the project is closed off.

(b) Information sources

The data reported in Table 2.3.1 has been sourced from Aurora's program-of-work management system (WASP), Aurora's Finance System (Navision), schematic diagrams of Aurora substations and project scope documents.

(c) Methodology and assumptions

The POW (Program of Work) for the previous five years has been combined into a master table and grouped by WASP ID numbers (to show projects spanning multiple years). Items have been considered for AUGEX if they are listed as a CAPEX expenditure under the column "CAPEX_OPEX" and the "Thread" column is either:

- "System Performance – Reliability", "System Performance – Power Quality", "System Development" for POW years 2008-09 to 2011-12.
- "System Development", "Power Quality", "HV Regulators" for POW year 2012-13.

Each item has been considered and assigned a RIN AUGEX table, using the WASP category codes as a guide. The following category codes relate to Zone Substations:

- CAZNC – zone only – there may be incorrect allocation, e.g. HV feeders for zones captured in this

and work for tap setting adjustment and FL upgrades associated with zone.

- CAZPC – fibre optic station protection – relating to zone substations.
- COLAB – land acquisitions relating to zone substations.
- LANDZ – land purchase relating to zone substations.

Schematic diagrams in PI Historian showing bus couplers, HV and LV breakers have been used to count switchgear quantities.

After POW grouping and extraction, only one zone substation (Howrah Zone) cost more than $5 million.

Tender submission costs have been used to apportion the total cost of the Howrah Zone substation.

Substation ID and Project ID:

The name of the Zone Substation has been used for both of these fields.

Substation Type:

The designation of the substation in Aurora Webmap 6.1 has been used as the substation type. Substations appearing in Aurora Webmap as Zone Substations for example are given the Substation Type 'Zone Substation'

Project Type:

The Project Type can be determined by reading the project scope document (for Howrah Zone NS40032089)

Project Trigger:

The Project Trigger can be determined by reading the project scope document (for Howrah Zone NS40032089)

Substation Voltage, Substation Rating – Normal and N-1 and Transformer Quantity:

Nameplate ratings have been obtained from schematics in PI Historian, as only a new substation is to be reported in the Reporting Period. Aurora does not record cyclic limits. Therefore, an assumption has been made that the cyclic rating is the same as the nameplate rating from the manufacturer.

Switchgear:

- No. of 11KV panels inclusive of 11kV transformer breaker, bus couplers and HV feeder circuit breakers.
- Panels include protection relays but exclude station supply elements.
- Switchgear costs are a portion of the final finances (at project close) based on the tender breakdown of costs.

Capacitors:

- Designs take into account future provision, none in present regulatory period.

Other plant:

- SCADA and Protection, Ancillary equipment.

Labour:

- All installation items listed by the contractor.

- Earthing work performed by the contractor has been assumed as labour costing.
- Labour costs associated with any WASP number in the Howrah Zone project has been added to the total labour costs. This is labour performed by Aurora employees.
- Labour hours totalled = 0, as all external labour completed. Aurora does not have access to the number of hours which were completed.

All non-related party contracts:

- Since zone substation was contracted out to an (unrelated) external company, the total contract cost has been entered in this column for Howrah zone.

Other Direct Expenditure:

- An apportionment of the total contract cost has been entered into the Other Direct expenditure column, considering items of the contract not already included in any other column of Table 2.3.1.

Years Incurred:

- The financial years listed in the compiled POWs were used to provide the entries of the Years Incurred.

Land costs:

- Where land purchases mentioned in POW description, the WASP ID from the POW was recorded and the actual expenditure was retrieved from the financial system.

Total Zones Completed valued less than $5M (last row in Table 2.3.1):

- Wasp ID numbers collected, finance have totalled the final costs. Land purchase WASP ids kept separate and costs retrieved also from finance.

(d)	Estimated information

a. Rationale

The Howrah Zone Substation augmentation was undertaken by an external contractor, meaning that Aurora has no breakdown of the project's actual cost between the different cost categories set out in Table 2.3.1.

b. Derivation

The costs of the transformers, switchgear, other plant items, installation, civil works and other direct costs involved with the Howrah Zone Substation augmentation have been estimated by Aurora. Having established the total amount paid to the external contractor in relation to the project, the project's total cost has been apportioned between each of the cost categories in Table 2.3.1 based on the projected breakdown of project costs provided to Aurora in the original tender submission. The tender submission contains the most detailed likely breakdown available to Aurora of the costs that were incurred in relation to the augmentation of this zone substation.

It is assumed that the specification of the tender submission was adequately proportioned.

This method of estimation was used as it is the only division of the costs associated with the Howrah Zone Substation project which Aurora has on record.

2.3.2 Augex asset data - Subtransmission Lines

(a)	Compliance with the requirements of the RIN

The data relating to the augmentation of subtransmission lines provided in *Table 2.3.2* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the variables reported by Aurora are based on reliable and objective data sources;
- information regarding subtransmission augmentation projects has been provided on a project close basis;
- all project expenditure has been provided in real dollars ($2012–13) and the calculations used to convert nominal dollars to real dollars for this purpose have been provided;
- expenditure data has not been included where project close has occurred after the years specified but expenditure was incurred prior to the closure date during the back-cast period;
- no data has been provided for individual subtransmission augmentation projects because all subtransmission projects undertaken during the back-cast period involved total cumulative expenditure over the life of each project of less than $5 million each; and
- total direct expenditure, the total cost of land purchases and total easement costs are, therefore, the only costs reported in the penultimate row of the table 2.3.2.

(b)	Information sources

The data reported in Table 2.3.2 has been sourced from Aurora's program-of-work management system (WASP) and Aurora's Finance System (Navision).

(c)	Methodology and assumptions

The POW (Program of Work) for the previous 5 years has been combined into a master table and grouped by WASP ID numbers (to show entries spanning multiple years). Items have been considered for AUGEX if they are listed as a CAPEX expenditure under the column "CAPEX_OPEX" and the "Thread" column is either:

- "System Performance – Reliability", "System Performance – Power Quality", "System Development" for POW years 2008-09 to 2011-12.
- "System Development", "Power Quality", "HV Regulators" for POW year 2012-13.

Each item has been considered and assigned a RIN AUGEX table, using the WASP category codes as a guide. The following category codes relate to Subtransmission:

- CAZNC – those with subtransmission or subtransmission voltages (33 or 44kV) referred to in the project name.
- CAHVF – If augmenting subtransmission voltages 33 or 44kV.

- The WASP ID numbers for each of these project items have been used to find actual costs from the financial system.
- POW items in the above category codes are grouped together into projects based on location (for e.g. "Rosny")

- Totals of WASP line items for each project were checked to see if the $5 million total project expenditure had been exceeded. All project costs were below $5million for each sub-transmission project, so none have been recorded in individual rows in Table 2.3.2
- Land costs – where land purchases were mentioned in POW descriptions, the WASP ID from the POW would be recorded and the actual expenditure retrieved from the financial system. No Subtransmission line augmentations required land purchase in the considered regulatory period.
- Total costs equal the sum of all subtransmission costs minus the land costs. WASP IDs from Aurora's POW were recorded, then "at project close" costs were retrieved from finance based on these codes.

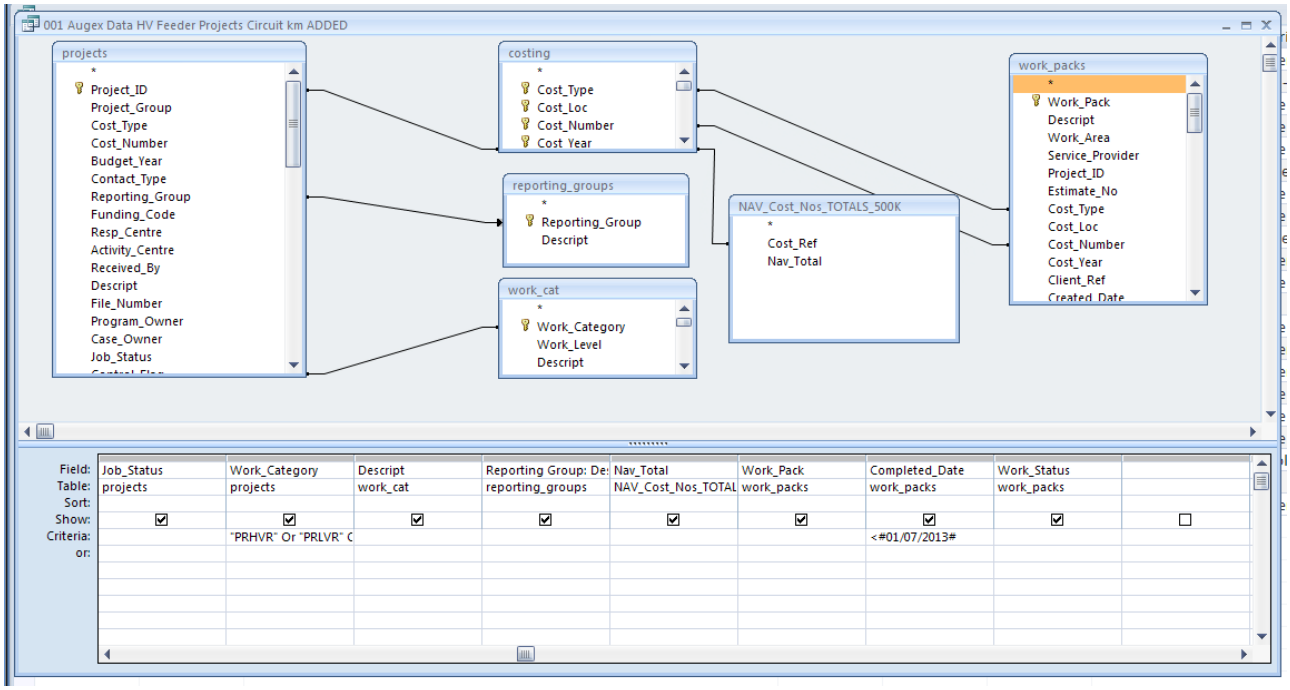
2.3.3 Augex Data - HV/LV Feeders and Distribution Substations

2.3.3.1 Descriptor Metrics

(a)	**Compliance with the requirements of the RIN**
The descriptor metrics in *Table 2.3.3.1* have been compiled with reference to the relevant instructions in the Category Analysis RIN.	
(b)	**Information sources**
The descriptor metrics reported in *Table 2.3.3.1* have been sourced from WASP and Navision.	
(c)	**Methodology and assumptions**

HV Feeder km added:
Jobs (Cost Ref Numbers) identified by;

1. Work Pack Work Category = "PRHVR" Or "PRLVR" Or "PRIFI" Or "LOHVR" Or "PRSPT" Or "PRTXI" Or "SIEMF" Or "PQRIV" Or "PQMET" Or "PQHVV".
2. Work Pack Completed Date < 01/07/2013.
3. Navision Job Transaction Total Cost > $500k.

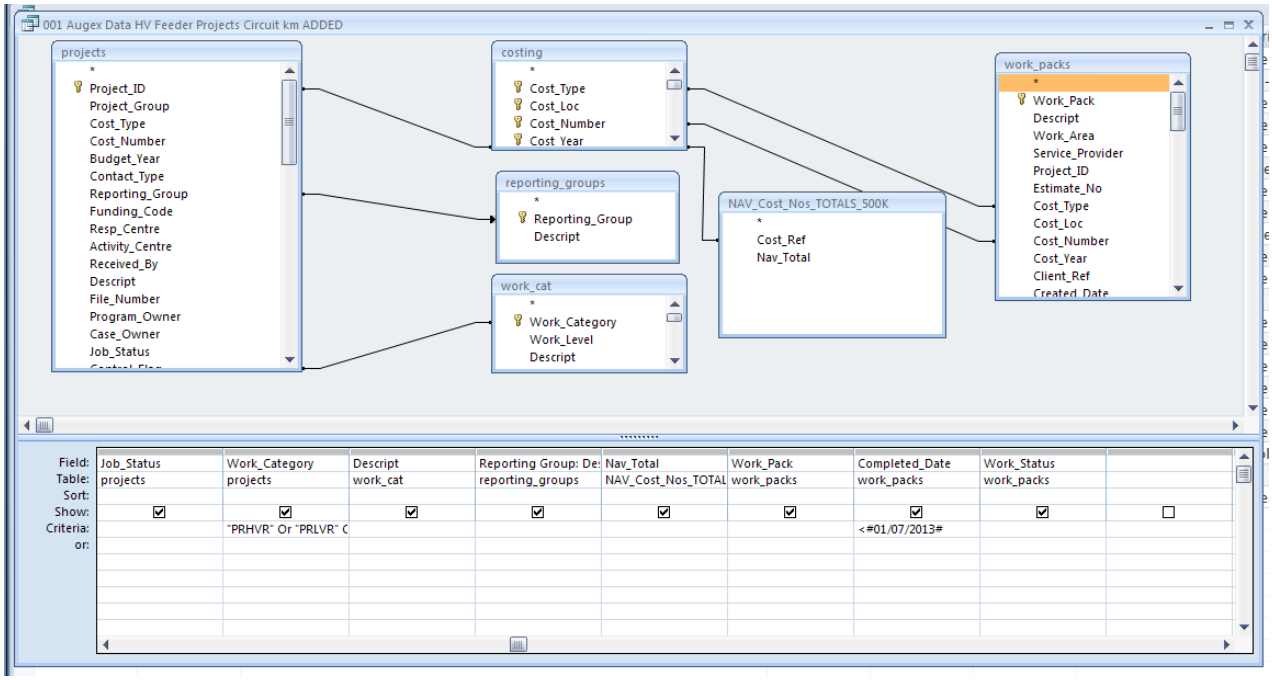


HV Feeder km upgraded:

All data extracted into Access Database "T:\WASPLIVE\..."

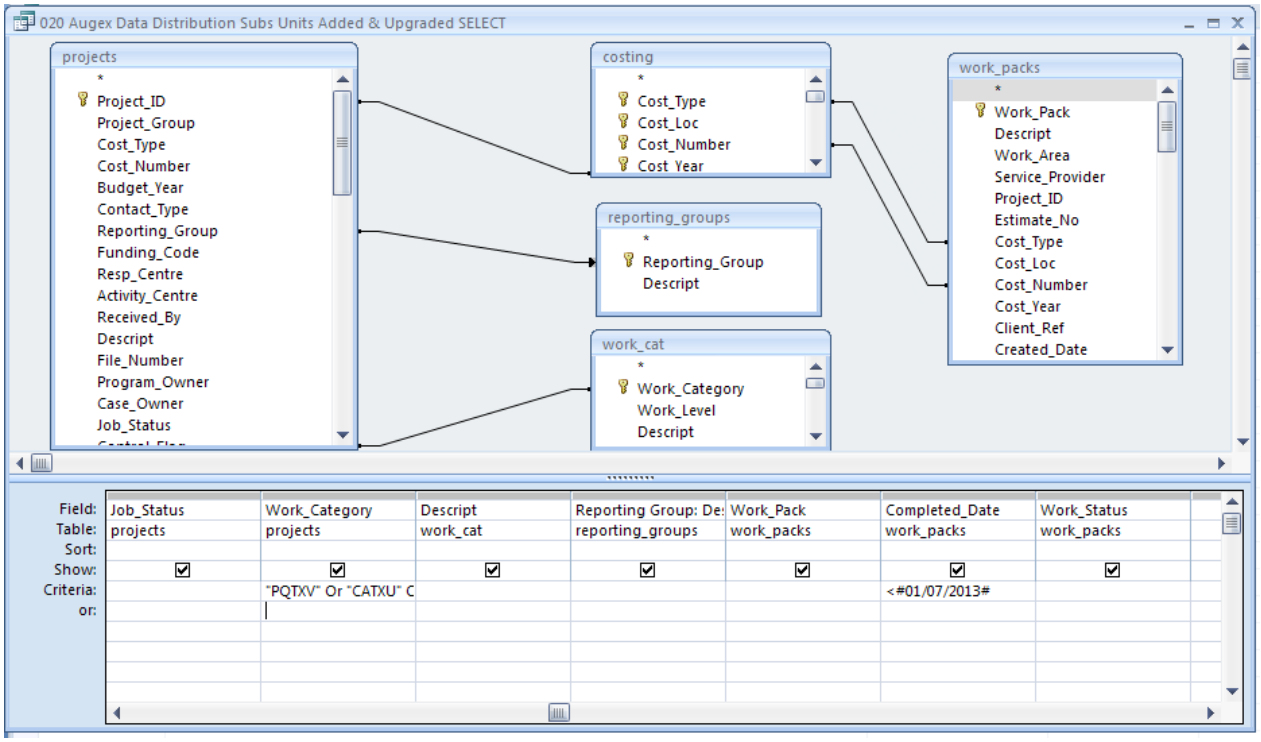
Jobs (Cost Ref Numbers) identified by:

1. Work Pack Work Category = "CAHVF" Or "REHSA" Or "REMGI" Or "REMCU".
2. Work Pack Completed Date < 01/07/2013.
3. Work Pack Status = "A" Or "C" Or "Z".
4. Excluding Work Pack 181304 to prevent double costing because the project has 2 work packs with the same Cost Number.
5. Navision Job Transaction Total Cost > $500k.



Transformer Projects defined by:

1. Work Pack Completed Date <01/07/2013.
2. Work Category on Work Pack = "PQTXV" Or "CATXU" Or "PRLVR" Or "PQRIV" Or "PQHVV" Or "CALVF" Or "CANZC" Or "LOHVR" Or "PRHVR" Or "CASWE" Or "PQLVV" Or "CAHVF".
3. Reduced job list for Costs to select Projects only having a Transformer booked to the job in Navision from 1024 to 427.
4. Separated by Job description into Upgraded & Added, by e.g. Existing Transformer number in the title, or the title indicates an Upgrade or Install.
5. Work Cat 'PQTXV' = Added.
6. Work Cat 'CATXU' = Upgraded.
7. Remaining Jobs with Work Cats having 'Upgrade' in the title = Upgraded.

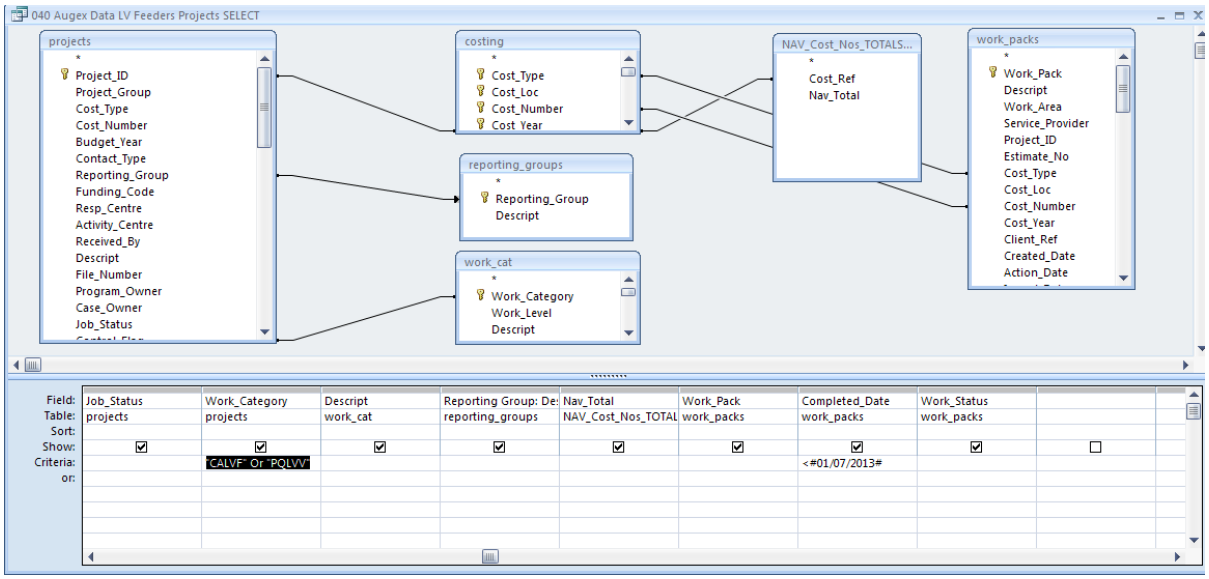


LV Feeder km upgraded:

All data extracted into Access Database "T:\WASPLIVE\..."

Jobs (Cost Ref Numbers) identified by:

1. Work Pack Work Category = "CALVF" Or "PQLVV".
2. Work Pack Completed Date < 01/07/2013.
3. Jobs list reduced by Navision Job Transaction Total Cost > $50k.



2.3.3.2 Cost Metrics

(a)	**Compliance with the requirements of the RIN**

The information provided about Augex Project Data in *Table 2.3.3.1 – Descriptor metrics* and *Table 2.3.3.2 – Cost metrics* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the variables reported by Aurora are based on reliable and objective data sources;
- no information relating to gifted assets has been included;
- expenditure related to land purchases and easements has not been included as direct expenditure on augmentation;
- information regarding augmentation (capital) expenditure has been reported on an as incurred basis and in nominal dollars; and
- information regarding the circuit line lengths of HV and LV feeders and the number of substations added during the back-cast period has been provided on a project close basis.

(b)	**Information sources**

The data reported in Tables 2.3.3.1 and 2.3.3.2 has been sourced from Aurora's program-of-work management system (WASP – Works, Assets, Solutions and People) and Aurora's Finance System (Navision).

The numbers of circuit kilometres and distribution transformers added during the back-cast period have been obtained from Aurora's program-of-work management system and Aurora's Finance System.

(c)	**Methodology and assumptions**

The number of units added and details of Aurora's augmentation expenditure have been extracted from Aurora's program-of-work management and finance systems on a project-by-project basis, and then aggregated into their respective network segments for the purposes of Worksheet 2.3.

New assets are set up in the Navision finance system as capital projects. These jobs sit in a *capital work in progress* account until the completion of the job, at which time the cost is capitalised and becomes part of property plant and equipment on Aurora's balance sheet. Depreciation commences from the completion date of the job. This has enabled information regarding the feeders and substations added during the back-cast period to be provided on a project close basis without manipulation.

The units recorded in Table 2.3.3.1 as having been added during the back-cast period include only those HV feeders, LV feeders and substations that were added as part of projects which were completed prior to 1 July 2013.

However, the direct expenditure reported in Table 2.3.3.2 comprises expenditure incurred on augmentation during the back-cast period, including expenditure on projects which were not yet complete at 30 June 2013. The assets added or in service as an outcome of projects that were not complete as at 30 June 2013 have not been included in the totals reported in Table 2.3.3.1.

The cost thresholds used to delineate between material and non-material HV and LV feeder augmentation projects of $0.5 million and $50,000 respectively have been applied based on total cumulative expenditure over the life of the project, inclusive of indirect costs/overheads. However, the cost metrics reported in Table 2.3.3.2 do not include overheads.

(d)	**Estimated information**

a. Rationale including why it was it not possible to use actual information

No estimates have been used by Aurora in completing Tables 2.3.3.1 and 2.3.3.2.

2.3.6 Augex Data - Total Expenditure

(a)	**Compliance with the requirements of the RIN**

The information provided about Total Augex Expenditure in *Table 2.3.6 – Augex Data – Total Expenditure* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the augmentation expenditure reported by Aurora is based on reliable and objective data sources;
- expenditure data in Table 2.3.6 has been reported on an 'as incurred' basis and in nominal dollars;
- expenditure relating to land purchases and easements associated with augmentation works on HV feeders, LV feeders and distribution substations has only been provided in Table 2.3.6, and has not been reported in Table 2.3; and
- the expenditure recorded in the 'Land and easements' rows of Table 2.3.6 has not been included in the augmentation expenditure reported in relation to the corresponding asset groups in the same table.

(b)	**Information sources**

The expenditure data reported in Table 2.3.6 has been sourced from Aurora's program-of-work management system (WASP – Works, Assets, Solutions and People) and Aurora's Finance System (Navision).

(c) Methodology and assumptions

Details of Aurora's augmentation expenditure during the back-cast period (including land acquisition and easement costs) have been extracted from Aurora's program-of-work management system and Aurora's finance system on a project-by-project basis, and then aggregated into the corresponding asset groups for the purposes of Table 2.3.6. The estimated costs of land purchases and easements have then been stripped out of those expenditure totals and reported separately on the 'Land and easements' rows of Table 2.3.6.

The expenditure reported in Table 2.3.6 in relation to Subtransmission Substations, Switching Stations, Zone Substations and Subtransmission Lines will not reconcile with the expenditure reported in relation to the same asset types in Table 2.3.1 and 2.3.2 because Table 2.3.6 has been completed on an as incurred basis, whereas Tables 2.3.1. and 2.3.2 have been completed on a project close basis.

(d) Estimated information

a. Rationale

Land purchases and easements

The costs associated with purchasing land and obtaining easements in relation to augmentation projects are not separated from other augmentation expenditure in Aurora's finance system. The proportion of augmentation costs relating to land purchases and easements is, therefore, required to be estimated for the purposes of Table 2.3.6.

b. Derivation

Land purchases and easements

The proportion of augmentation project costs attributable to land and easements has been derived on the basis of managerial estimate.

No empirical data is available that provides a more objective basis on which to estimate the extent to which augmentation expenditure is contributed to by the costs of purchasing land and obtaining easements.

2.5 Connections

2.5.1 Descriptor Metrics

Residential Connections

(a)	Compliance with the requirements of the RIN

The information provided about connections volumes in *Table 2.5.1 – Descriptor metrics* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated; and
- the connections metrics presented by Aurora include both actual and estimated components, all of which are based on reliable and objective data sources gathered from records used in the normal course of business.

(b)	Information sources

Connection volumes

All annual residential connection volumes provided in Table 2.5.1 were sourced from Aurora's Meter Data Management System (MDMS), Gentrack.

Connection volumes by connection density

New connections commissioned during the back-cast period were able to be attributed between the CBD, Urban, Rural Short and Rural Long categories defined by the AER on the basis of information stored in Aurora's geographic information system (GTech).

Underground and overhead connection volumes

The volumes of underground and overhead connections were determined on the basis of information stored in Aurora's MDMS.

Mean days to connect residential customer with LV single phase connection

The mean days taken to connect residential customers requiring a LV single phase connection was derived using a combination of service order information originating from Aurora's Service Order Management system and performance data captured in the field using the TVD CSC system and stored in Aurora's MDMS.

(c)	Methodology and assumptions

Connection volumes

The annual connection volumes for residential, commercial/industrial and embedded generation customers presented in Table 2.5.1 were sourced directly from Aurora's MDMS.

Connection volumes by connection density

Connection volumes by connection density have been derived by using Aurora's GIS to identify the feeder supplying each new connection (identified by NMI) recorded in Aurora's MDMS. Aurora's GIS records the AER connection density category for each feeder, enabling the connection density for each new connection/NMI to be identified on the basis of the feeder with which it is associated.

Overhead/Underground connection volumes

The information captured in Aurora's MDMS regarding individual installations includes a field which identifies whether a connection is overhead or underground. There are, however, installations for which this field has not been populated.

In the cases of residential, commercial/industrial and embedded generation connections, those connections for which the type of connection has not been recorded have been allocated between the underground and overhead connection volumes reported in Table 2.5.1 in line with the ratio of underground to overhead connections observed amongst connections for which this feature has been recorded.

Mean days to connect residential customer with LV single phase connection

The average time taken to provide residential customers with a low voltage single phase connection has been derived using MDMS records of the date on which service orders for connections of this type are received in the field and the corresponding job completion dates. The service orders are generated by Aurora's Service Order Management system and exported into Aurora's field tool, which is also used to gather the completion date for each job as part of standard operating procedure, before both dates are uploaded to Aurora's MDMS.

However, service order and completion dates for new connections have only been recorded in the MDMS since 14 February 2011. For the back-cast period prior to that date, the mean days taken to provide LV single phase residential connections has been based on an extrapolation of the average completion times calculated for connections which have service order and completion dates recorded in Aurora's MDMS.

(d)	Estimated information

a. Rationale

Mean days to connect residential customer with LV single phase connection

Average connection times were calculated on the basis of actual data for 2012-13, 2011-12 and 2010-11 (part year). However, because service order and completion dates have only been recorded in Aurora's MDMS since 14 February 2011, actual data was not available for the remainder of the back-cast period, meaning that an estimate of the mean days taken to provide LV single phase connections to residential customers was required for 2008-09 and 2009-10.

No other estimates were required in order to provide a response to Table 2.5.1, on the basis that all other connections metrics compiled by Aurora are materially dependent on records used in the normal course of business, and neither contingent on judgments nor assumptions.

b. Derivation

Because service order and completion dates have only been recorded in Aurora's MDMS since 14 February 2011, for the remainder of the back-cast period the mean days taken to provide LV single phase connections were developed by applying the average completion times calculated for connection services subsequent to that date, for which service order and completion dates are available.

The average number of days taken to connect calculated for connection services provided during the period 14 February 2011 to 30 June 2011 was applied to the 2010-11 regulatory year as a whole, on the basis that Aurora's performance during that 4½ month period was considered likely to be indicative of the business' performance for the remainder of that year.

For the 2008-09 and 2009-10 regulatory years, the mean days to connect was based on an extrapolation (reversal) of the upward trend evident in mean days to connect observed in the ensuing three years.

It is assumed that the increase in the mean days to connect observed over the period 2010-11 to 2012-13 was a continuation of an upward trend that also applied to the 2008-09 and 2009-10 regulatory years.

The method used to back-cast mean days to connect for 2008-09 and 2009-10 was preferred on the basis that it was informed by objective data sources used by Aurora in the normal course of business.

GSL Breaches and Payments relating to Residential Connections

(a)	Compliance with the requirements of the RIN

The information provided about connection service related GSL breaches and payments in *Table 2.5.1 – Descriptor metrics* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the data refers to the voluntary 'GSL' payments made under Aurora's Customer Charter to customers who received a standard of service below that set out in the charter in relation to connection services;
- the data provided pertains to Customer Charter payments made to residential customers only; and
- the variables, including any estimated components, are based on reliable and objective data sources.

(b)	Information sources

The volumes and values of payments made under Aurora's electricity network distribution charter in 2011-12 and 2012-13 to customers who received a standard of service below that set out in the charter have been derived from records kept in Aurora's Charter Payment Tool, which was introduced in March 2011 as part of the Distribution Business' customer complaint management system.

Prior to that date, connection-related customer charter payments were delivered via Aurora's Energy Business as an offset against customers' accounts, rather than a direct payment. The number and value of 'payments' made to customers from 2008-09 to 2009-10 are based on records of the payment instructions given by Aurora's Distribution Business to the Energy Business. The payments made in 2010-11, however, represent a combination of payments made under both arrangements, given that the Customer Payment Tool was introduced mid-way through that regulatory year.

(c)	Methodology and assumptions

The data sources which record the customers who have received payments under Aurora's customer charter do not consistently contain NMIs throughout the back-cast period, or any other information that enables residential customers to be identified with absolute certainty. For example, records of the payments made under the customer charter prior to March 2011 include the relevant customers' retail customer number, rather than the relevant NMI.

In order to apportion customer charter payments between residential and non-residential customers, a sample of approximately 200 general charter payment recipients for whom NMIs were recorded has been cross-referenced with the network tariff history stored for those NMIs in Aurora's distribution billing system in order to identify the primary network tariff (and customer status) applying at the time each payment was made. The findings from this analysis have then been applied to the connection-

related customer charter payments made during the back-cast period, with the result that 85 per cent of payments, both by value and number, have been apportioned to residential customers.

(d)	Estimated information

a. Rationale

The volumes and values of payments made under Aurora's electricity network distribution charter in 2011-12 and 2012-13 to customers who received a standard of service below that set out in the charter have been derived from records kept in Aurora's Charter Payment tool (which was introduced in March-2011 as part of the Distribution Business' customer complaint management system).

Prior to the introduction of the Charter Payment Tool in 2011-12, connection-related customer charter payments were delivered to customers via Aurora's Energy Business as an offset against customers' accounts, rather than a direct payment. The number and value of customer charter 'payments' made to customers from 2008-09 to 2009-10 are, therefore, based on records of the payment instructions given by Aurora's Distribution Business to the Energy Business, as are the charter payments made in 2010-11 to the end of February 2011.

Neither the Customer Charter Tool nor the previous records of payment instructions include information enabling Aurora to readily and reliably identify those Customer Charter payments which were made to residential customers.

b. Derivation

In the absence of information that enables the systematic and reliable identification of the customer charter payments which were made to residential customers, a sample of payment recipients for which NMIs have been recorded has been cross referenced with network tariff histories stored in the distribution network billing system in order to determine the primary network tariff which applied at the time each charter payment was made. On this basis it is possible to identify residential customers that received a payment. The proportion of residential payment recipients identified in the sample has been applied to the connection related customer charter payments made across the back-cast period, in order to determine the extent to which they were made to residential customers.

In order to apportion Customer Charter payments between residential and non-residential customers it has been assumed that the number and value of payments made to residential customers in the sample of charter payments recipients is representative of the charter payments made across the back-cast period, including those payments relating to connection services.

The methodology was chosen because it was based on objective data sources.

HV & LV Augmentation Data – All Connection Sub-Categories

(a)	Compliance with the requirements of the RIN

The information provided about connections in *Tables 2.5.1* and *2.5.2* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated; and
- the data reported by Aurora is materially dependent on information recorded in reliable and

objective records used in the normal course of Aurora's business.

(b)	Information sources

Data was sourced from WASP and Navision.

(c)	Methodology and assumptions

Note: Data for 2008-09 is limited or not available due to a Navision database upgrade in 2009, where transactions where consolidated and balances brought forward, so materials quantities cannot be determined.

The years after 2008-09 were calculated using WASP Project data on Connections - taking actuals from Navision for the materials.

2.5.1 Descriptor Metrics - Volumes

Residential (Queries 100 – 105)

- All Projects under the following work categories "DESDB & SOLCI & SOLCP & SOPOR & SOPOC & SUPOR" and when associated work packs are completed before 1 July 2013.
- To determine HV and LV Conductor lengths we have extracted from WASP Estimates values for 1 phase (2 wire) or 3 phase (3 wire) unit assemblies, then divided the Navision quantity by 1000 for km and then by a value to allow for single phase or 3 phase lines.
- HV & LV Projects defined by Work Category Description & Project Title.

Commercial/Industrial (Queries 110-115)

- All Projects under the following work categories "SOIRR and SOIRC and SOGSI and SOGSC and SOMPR and SUGSI and SUMPR and SUSCA and SUSUB" and when associated work packs are completed before 1 July2013.
- To determine the HV and LV Conductor lengths we have extracted from WASP Estimates values for 1 phase (2 wire) or 3 phase (3 wire) unit assemblies, then divided the Navision quantity by 1000 for km and then by a value to allow for single phase or 3 phase lines.
- HV & LV Projects defined by Work Category Description & Project Title.

Subdivision (Queries 120 - 125)

- All Projects under the following work categories "SUSBD and SOSDI and SOSDC" and when associated work packs are completed before 1 July 2013.
- To determine the HV and LV Conductor lengths we have extracted from WASP Estimates values for 1 phase (2 wire) or 3 phase (3 wire) unit assemblies, then divided the Navision quantity by 1,000 for km and then by a value to allow for single phase or 3 phase lines.
- HV & LV Projects defined by HV & LV Conductors in the Navision Extract and Estimate data.

Embedded Generation

- No projects have been identified by the relevant Asset Manager.

2.5.2 Cost Metrics by Connection - Volumes

Residential – (queries 100)

- Sum of Projects where the defined HV or LV assets in Navision per Financial Year.

Commercial/Industrial (queries 110 – 113)

- All Projects under the following work categories "SOIRR & SOIRC & SOGSI & SOGSC & SOMPR & SUGSI & SUMPR & SUSCA & SUSUB" and when associated work packs are completed before 1 July 2013.
- We are only reporting projects for combined "Complex Connection HV (Customer Connected at LV, Minor HV Works" and "Complex Connection HV (Customer Connected at LV, Upstream Asset Works". These have been combined because we cannot determine criteria to separate projects in these two groups.
- We have assumed all commercial projects are three phase.
- We have excluded projects under "Complex Connections HV (Customer Connected at HV)", which are 166826 & 142186 and "Complex Connection HV Sub-Transmission" - projects 145185, 140681, 137024 & 136930 because duplication.
- Also "Simple Connection LV" projects have been excluded on the basis where the total project cost is less than $5,000.
- HV & LV Project types determined from the 1) Work Category description, 2) 'Design Project Type'.

Subdivisions (queries 120 – 123)

- All Projects under the following work categories "SUSBD and SOSDI and SOSDC" and where associated work packs are completed before 1 July 2013.
- We are combining projects for both "Complex Connection HV (No Upstream Asset Works)" and "Complex Connection HV (with upstream asset works)". These have been combined because we cannot determine criteria to separate projects in these two groups.

Of the total projects the HV projects have been selected where they have HV equipment in the Navision data extract. The remaining projects have been determined to be "Complex Connection LV".

2.5.2 Cost Metrics by Connection Classification

Expenditure

(a)	Compliance with the requirements of the RIN

The expenditure data provided in relation to the provision of connection services in *Table 2.5.2 – Cost metrics by connection classification* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the expenditure on connections reported by Aurora is materially dependent on information recorded in Aurora's finance system;
- Aurora Energy has reported expenditure data as gross amounts, and has not subtracted customer contributions from the connections expenditure data;
- Aurora has applied the definitions of complex connections in Appendix F of the RIN to provide guidance on the type of work which is to be reported as connection services for the purposes of Table 2.5.2, as opposed to augmentation (reported under template 2.3);
- Only augmentation expenditure relating to connections provided in response to customer connection requests has been reported in regulatory template 2.5; and
- Aurora Energy has only reported data in relation to non-contestable, regulated connection services and

has not included data in relation to gifted assets, negotiated connection services or connection services which have been classified as contestable.

From: Irlam, Lawrence [Lawrence.Irlam@aer.gov.au]
Sent: Wednesday, 26 March 2014 5:00 PM
To: Leigh Mayne
Cc: Expenditure; John Sayers; Kim Rosinski; Chantal Hopwood; Hooper, Max
Subject: RE: Category Analysis RIN [SEC=UNCLASSIFIED]

Hi Leigh, responses in red below, let us know if you have any follow up questions or clarifications.

Regards
Lawrence

Connection Services

There is a requirement to provide substation installation volumes & associated expenditure in both the augex and connections templates. Are these templates mutually exclusive and should the volumes and dollars only be reported in one template and if so which one?

The augex and connections templates are mutually exclusive and expenditures on activities for each of these templates must not be reported twice.

We crafted a definition of *connections expenditure* to distinguish connections-related expenditure from augex (ie. augex due to demand growth). The definition (see p. 47 of the category analysis RIN) provides broad guidance that connections expenditure is related to the request of the connecting customer and in relation to connection assets only. The definitions for connections expenditure is cited below:

> ***Connections expenditure***
> *The expenditure required to establish new connection assets and upgrades to existing connections assets necessary to meet customer connection requests. This excludes alterations to existing connection assets ie. the relocation of connection assets.*

Finally, to the extent that augmentations and substation installations can be attributed to the connecting customer, these items should be included in the connections category in as much as identified in the definitions of complex connections listed on pp. 46–47 of the category analysis RIN. As an example, the following definition is a particular complex connection where we expect upstream asset works and installation of a substation, and where we require those works to be reported as part of connections expenditure:

> ***Complex commercial/industrial connection high voltage (customer connected at LV, major HV works – ie. upstream asset works)***
>
> *Multi-phase customer connections which are not simple connections or Complex type connection high voltage and, as an example, may involve the following:*
> - *large extension or augmentation, overhead and/or underground, of the HV feeder;*
> - *installation of a distribution substation (pole mounted, ground types or indoor types).*
>
> *Notes: Upstream shared asset alterations expected to be required. This also includes the reconfiguration of HV network assets as a result of specific requests for connection*

(b)	Information sources

The costs associated with the provision of connection services have been sourced from Aurora's Finance System (Navision).

(c)	Methodology and assumptions

In relation to the provision of connection services, Aurora's finance system does not distinguish between the connection classifications used in the RIN (i.e. simple and complex LV or HV connections).

In order to report the costs associated with each type of connection classification stipulated in Table 2.5.2, the total cost of providing connection services in any given year of the back-cast period has been apportioned between the classifications in Table 2.5.2 on the basis of unit rates developed specifically for the purposes of weighting the connection volumes reported in Table 2.5.2.

2.6 Non-Network Expenditure

2.6.1 Non-Network Expenditure

(a)	Compliance with the requirements of the RIN

IT & COMMUNICATIONS

Client Device Expenditure:

Expenditure that relates to a hardware device that accesses services made available by a server. Client Devices Expenditure includes hardware involved in providing desktop computers, laptops, tablets and thin client interfaces and handheld end user computing devices including smart phones, tablets and laptops.

Recurrent Expenditure:

Recurrent expenditure is expenditure that returns time after time with respect to the particular category of expenditure. Costs associated with Software have been included in this category.

Non-Recurrent Expenditure:

Non-recurrent expenditure is all IT & Communications Expenditure that is Non-recurrent Expenditure excluding any expenditure reported under IT & Communications Expenditure – Client Devices Expenditure.

Motor Vehicles:

Expenditure is defined as all expenditure directly attributable to Motor Vehicles including: purchase, replacement, operation and maintenance of motor vehicles assets registered for use on public roads, excluding mobile plant and equipment.

Cars:

Cars are motor vehicles other than those that comply with the definition of Light commercial vehicle (LCV), Heavy commercial vehicle, Elevated work platform or Elevated work platform (HCV).

Light Commercial Vehicles:

Are Motor Vehicles that are registered for use on public roads excluding elevated work platforms that: are rigid trucks or load carrying vans or utilities having a gross vehicle mass greater than 1.5 tonnes but not exceeding 4.5 tonnes or have cab-chassis construction and a gross vehicle mass greater than 1.5 tonnes but not exceeding 4.5 tonnes.

Heavy Commercial Vehicles (HCV):

Are Motor Vehicles that are registered for use on public roads excluding Elevated Work Platforms that: have a gross vehicle mass greater than 4.5 tonnes or are articulated vehicles or are buses with a gross vehicle mass exceeding 4.5 tonnes.

Elevated Work Platforms (HCV):

Are Motor Vehicles that have permanently attached elevating work platforms that would be HCV's but for the exclusion of the elevated platforms from the definition of HCV.

Elevated Work Platforms (LCV):

Are Motor Vehicles that have permanently attached elevating work platforms that are not Elevated work platform (HCV).

Buildings and Property:

Expenditure directly attributable to non-network buildings and property assets including: the replacement, installation, operation and maintenance of non-network buildings, fittings and fixtures.

Non-Network Other Expenditure:

Is expenditure directly attributable to the replacement, installation, maintenance and operation of Non-Network assets, excluding Motor Vehicle assets, Building and Property assets and IT and Communication assets and includes: Non road registered motor vehicles: non road motor vehicles (e.g. forklift trucks, boats etc.), mobile plant and equipment: tools: trailers (road registered or not), elevating work platforms not permanently mounted on motor vehicles and mobile generators.

(b) Information sources

The information in *Table 2.6.1 Non-Network Expenditure* was sourced from Aurora's financial accounting system Navision.

(c) Methodology and assumptions

Client Device Expenditure:

Expenditure that relates to a hardware device that accesses services made available by a server. Items included in this category are the costs associated with our IT service provider, plus all capital expenditure associated with the purchase of desktop computers, laptops, tablets etc.

Recurrent Expenditure:

Expenditure included in this category are items that occur on a regular on-going basis and would include the operating labour costs of the IT department, plus all costs associated with landlines, mobile phone charges, software, data communications etc.

(d) Estimated information

a. Rationale

The Accounting system was upgraded at the end of 2008-09 with a whole new Chart of Accounts in place from 2009-10 which has meant that the breakdown of actual costs for 2008-09 is not readily available. The total cost by category for 2008-09 has been apportioned using the same actual apportions as those in 2009-10 for both IT & Communications operating costs and Motor Vehicles operating costs.

Motor vehicles operating costs per vehicle is not recorded and maintained so estimates of cost re-allocation have had to be made.

b. Derivation

2008-09 IT & COMMUNICATIONS

The total cost by category for 2008-09 has been apportioned (i.e. Client V Recurrent) using the same actual apportions as those in 2009-10.

Motor Vehicles Opex

The total operating costs are available but not by vehicle and the total costs have been divided by the number of vehicles and weighted towards the Heavy Commercial Vehicles and EWP units which cost more to maintain.

2008-09 IT & COMMUNICATIONS

It is assumed that the apportionments of costs in 2008-09 were the same as in 2009-10.

Motor Vehicles Opex

The weightings applied to the different categories are the same each year.

The costs by category are reasonably consistent across the years.

2.6.2 Annual Descriptor Metrics - IT & Communications Expenditure

(a)	Compliance with the requirements of the RIN

IT AND COMMUNICATIONS

Employee Numbers:

The average number of employees engaged in standard control services work over the year scaled for time spent on standard control services work (i.e. an employee spending 50% of their time on standard control services work equating to 0.5 ASL's for the purpose of the labour metrics would be 0.5 employees). This metric **does not** include labour engaged under labour hire agreements.

User Numbers:

Active IT system log in accounts used for standard control services work scaled for standard control services use (i.e. an account used 50% of the time for standard control services work equals 0.5 active IT log in accounts).

Number of Devices:

The number of client devices used to provide standard control services scaled for standard control services use (i.e. a device used 50% of their time on standard control services work equals 0.5 devices). Client Devices are hardware devices that accesses services made available by a server and may include desktop computers, laptops and thin client interfaces and handheld end user computing devices including smart phones, tablets and laptops.

(b)	Information sources

Aurora's Human Resources system Peoplesoft at the time of the Financial Year End. Numbers used are as per the Aurora published accounts.

(c)	Methodology and assumptions

Employee Numbers:

The figures used are the total Aurora employee numbers minus the Retail division taken from the annual published accounts.

User Numbers:

Historical data of user numbers is not available and is not maintained. Therefore the current ratio of users/employee numbers has been used for the five years.

Number of Devices:

Again historical data of devices is not available and not maintained. Similar to the user numbers calculation the current ratio of devices/employee numbers has been used to determine the history of user numbers.

(d)	Estimated information

a. Rationale

User Numbers:
The past numbers of system user numbers is an estimate as historical data of system user numbers is not kept.

No of Devices:
The past device numbers is an estimate as historical data of device numbers is not kept. For years 2008-09 and 2009-10 the current quantities for Tablets and Smart Devices have been excluded from the calculation as these would not have been around then.

b. Derivation

The current numbers of users as a proportion of employee numbers has been used for all the five years.

I has been assumed that the current ratio of user numbers to employee numbers is the same for the five years of the back-cast period.

The methodology was chosen because it was thought to be the only available option.

2.6.3 Annual Descriptor Metrics - Motor Vehicles

(a)	Compliance with the requirements of the RIN

MOTOR VEHICLES

Average Kilometres Travelled:

- The average kilometres travelled per vehicle in the fleet for that category of vehicle due to standard control services work. The vehicle fleet includes all vehicles that have been used for standard control services work (in relation to historic data), or are expected to be used for standard control services work (in relation to forecast data) for that category of vehicle.
- The total number of kilometres travelled in each category divided by the number of vehicles in that category to arrive at the average kilometres travelled.

Number Purchased:

- The number of vehicles in the fleet purchased in that year for that category of vehicle scaled for standard control services use (e.g. a vehicle purchased that is expected to be used 50% of the time

for standard control services work would equal 0.5 vehicles). The vehicle fleet includes all vehicles that have been used for standard control services work (in relation to historic data), or are expected to be used for standard control services work (in relation to forecast data) for that category of vehicle.

- The total number of vehicles purchased in each category for each financial year.

Number Leased:

- The average number of vehicles leased in the fleet for that year for that category of vehicle scaled for standard control services use (e.g. a vehicle purchased that is expected to be used 50% of the time for standard control services work would equal 0.5 vehicles). The vehicle fleet includes all vehicles that have been used for standard control services work (in relation to Historic data), or are expected to be used for standard control services work (in relation to forecast data) for that category of vehicle.
- The number of leased vehicles by category which we have none.

Number in Fleet:

- The number in fleet is the average number of vehicles in the fleet in that year for that category of vehicle scaled for standard control services use (e.g. a vehicle in the fleet used 50% of the time for standard control services work would equal 0.50 vehicles). The vehicle fleet includes all vehicles that have been used for standard control services work (in relation to historic data), or are expected to be used for standard control services work (in relation to forecast data) for that category of vehicle.
- The total number of vehicles in the fleet by each category.

Proportion of Total

- The proportion of total fleet expenditure (capex and opex) for that category of vehicle allocated as standard control services expenditure. The vehicle fleet includes all vehicles that have been used for standard control services work (in relation to historic data), or are expected to be used for standard control services work (in relation to forecast data) for that category of vehicle.
- The proportion of the costs allocated to the Distribution Business as per the Ring Fenced Accounts for each of the five years.

(b)	Information sources

Aurora's Fleet Management System and Aurora's Financial System Navision.

(c)	Methodology and assumptions

- Kilometres travelled – the opening and closing odometer readings for each vehicle was used to calculate the kilometres travelled for each financial year which was then sorted by category of vehicle.
- Number purchased – information taken from the Aurora Fleet Management system.
- Number in fleet – information taken from the same above system.

2.7 Vegetation Management

(a)	Compliance with the requirements of the RIN

Under paragraph 12.1 in section 12 of Appendix E to the RIN (Principles and Requirements), Aurora is required to nominate one or more vegetation management zones across the geographical area of Aurora Energy's network.

Aurora has nominated two vegetation management 'zones' in accordance with Appendix E. In doing so, Aurora has taken into consideration the areas where bushfire mitigation costs are imposed by legislation, regulation or ministerial order, as well as areas of the network where other recognised drivers affect the costs of performing vegetation management work.

Aurora is required to provide, on separate A4 sheets, maps showing each vegetation management zone and the total network area with the borders of each vegetation management zone. Those maps have been provided as required, and are also reproduced below.

For each vegetation management zone identified, Aurora has provided details of regulations that impose a material cost on performing vegetation management works, including, but not limited to, bushfire mitigation regulations (see below).

Details of the self-imposed standards from Aurora Energy's vegetation management program which apply to each nominated vegetation management zone have also been provided as part of this Basis of Preparation document (see below).

Aurora's self-imposed standards with regard to bushfire mitigation in Zone 1a were only developed in 2012 and 2013-14 will be the first regulatory year in which the impact on the cost of performing vegetation management work associated with those self-imposed standards will be able to be separately quantified.

(b)	Information sources

Not applicable.

(c)	Methodology and assumptions

Operationally, Aurora's entire network is managed as a single vegetation management zone (Zone 1), which reflects the fact that the entire distribution network is covered by Aurora's normal trimming cycle. The split between Zones 1 and 1A has been used purely to identify, for the purposes of the RIN, the area of Aurora's network where bushfire mitigation is a recognised driver of the costs of performing vegetation management work.

Aurora Energy carries out an annual pre-summer vegetation inspection and cutting program in Zone 1A to ensure required clearances are achieved prior to the onset of each annual bushfire season.

The definition of Zone 1A is flexible, however, and can change from year to year, in that Aurora has the option to extend the High Bushfire Loss Consequence Areas area covered by its pre-summer inspection and cutting program if conditions leading into the bushfire season pose sufficient risk to warrant additional work being undertaken. Such risks and additions to the program are developed in consultation with the Tasmania Fire Service and the Bureau of Meteorology.

The Zone 1A polygon, as shown on the map below, has been used to back-cast vegetation management expenditure and descriptive metrics in this zone for the entire back-cast period. It is noted, however, that Zone 1A as it is currently defined does not necessarily correspond with the bushfire areas defined by Aurora prior to 2012 as an outcome of new (current) Bushfire Mitigation Strategy, meaning that the descriptor and expenditure metrics reported in template 2.7 in relation to Zone 1A are potentially understated, given that Zone 1A is currently smaller than was previously the case.

Legislation with a material impact on Aurora's vegetation management work

The following legislation requires Aurora to implement programs relating to vegetation management:

- *Electricity Supply Industry Act 1995* (ESI Act);
- *Electricity Industry Safety and Administration Act 1997* (ESI&A Act); and
- The *Tasmanian Electricity Code* (TEC).

Electricity Supply Industry (ESI) Act 1995

The ESI Act exists to:

- promote efficiency and competition in the electricity supply industry;
- establish and maintain a safe and efficient system of electricity generation, transmission, distribution and supply;
- establish and enforce proper standards of safety, security, reliability and quality in the electricity supply industry; and
- protect the interests of consumers of electricity.

The ESI Act covers safety aspects at a fairly high level and is implicit regarding vegetation management risks.

Electricity Industry Safety and Administration Act 1997

The Electricity Industry Safety and Administration (EIS&A) Act exists to establish safety standards for electrical articles, to provide for the investigation of accidents in the electricity industry and for related purposes.

The ESI&A Act covers:

- Powers of entry and inspection;
- Powers to order rectification;
- Powers to order disconnection; and
- Emergency powers relevant to Aurora's vegetation management activities.

Tasmanian Electricity Code (TEC)

The TEC provides, inter alia, a statement of the relevant technical standards of the electricity supply industry, an access regime to facilitate new entry, guidance on price setting methodologies, a means of resolving disputes, and establishes advisory committees to assist the Regulator. There has been on-going development and refinement of the TEC to ensure that it best meets the needs of the Tasmanian electricity supply industry and customers.

Chapter 8A of the TEC includes a framework for the management of vegetation around distribution powerlines. This framework is explicit regarding works requirements and practices in various fire hazard categories.

Aurora has the regulatory responsibility to manage trees growing near power lines and mitigate risks associated with trees coming into contact with power lines. The minimum standard to which Aurora must achieve is compliance with Chapter 8A of the TEC.

Self-imposed Vegetation Management Standards

Zone 1A

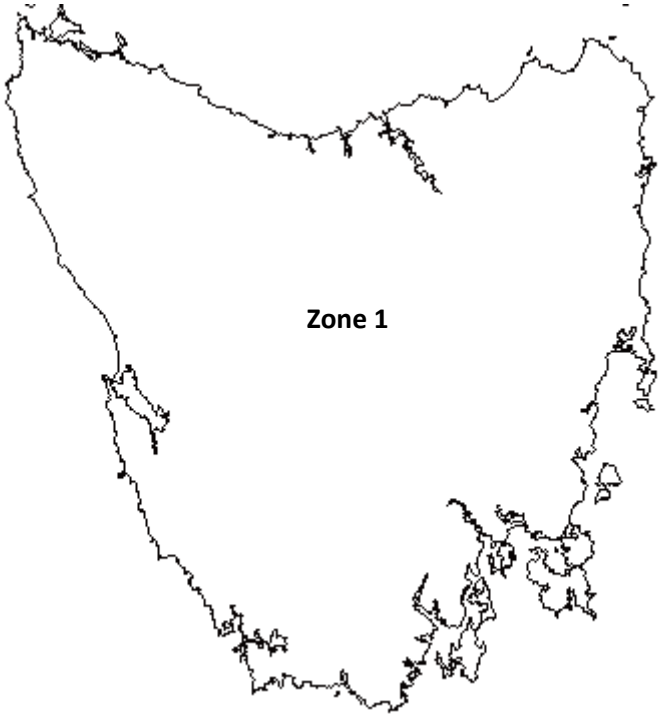
Aurora Energy carries out an annual pre-summer vegetation inspection and cutting program in High Bushfire Loss Consequence Areas to ensure required clearances are achieved prior to the onset of each annual bushfire season.

Bushfire risk has been determined based upon the number of maintenance spans located in the bushfire loss consequence areas.

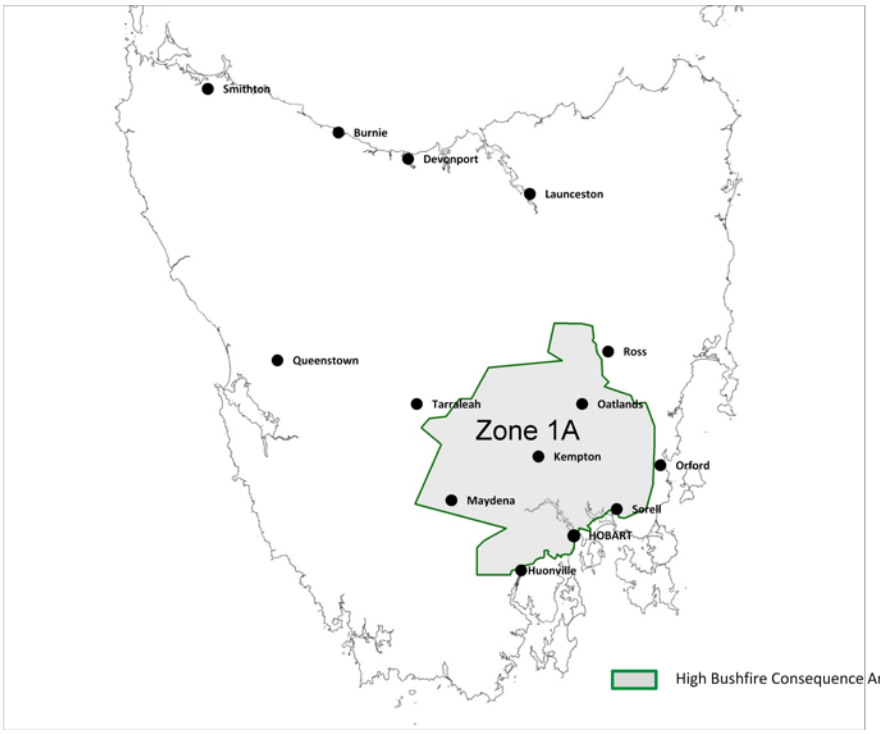
The bushfire loss consequence area was developed as part of Aurora's 2012 Bushfire Mitigation Strategy, where Aurora engaged leading expert Kevin Tolhurst of Melbourne University and David Taylor from the Tasmanian Parks and Wildlife Service (in consultation with the Tasmanian Fire Service) to utilise the industry accepted Phoenix Rapid-fire modelling tool to determine areas of fire loss consequence. This methodology has been utilised by other DNSPs following the VBRC.

Aurora has the option to extend the area covered by the pre-summer vegetation inspection and cutting program if conditions leading into the bushfire season pose sufficient risk to warrant additional work to be undertaken. Such risks and additions to the program are discussed in liaison with Tasmania Fire Service and the Bureau of Meteorology.

Vegetation Management Zone 1



Vegetation Management Zone 1A



2.7.1 Descriptor Metrics by Zone

Route Line Length within Zone 1

(a)	Compliance with the requirements of the RIN

Total network route length of Aurora owned HV network where the length of each span is only considered once Distribution line route length classified as short rural or long rural / total network route length.

(b)	Information sources

- Spatial Data Warehouse (SDW).
- AER feeder classification.

(c)	Methodology and assumptions

See (d) Estimated information (below)

(d)	Estimated information

a. Rationale

Aurora does not have an overhead and underground HV and LV span model, thus could not calculate actual route length based on network data.

b. Derivation

Geomedia was used to create spatial buffers of five metres around Aurora owned overhead and underground circuits from the SDW and merge these buffers where they overlapped e.g. circuits running in parallel.

Geomedia cannot calculate a centreline for these buffers but can calculate the total perimeter in metres so network route length in km were estimated using the following formula:

Route length=(((Total Sum of perimeter lengths)–(Count of number of buffers x 10))/2)/1000

A correction factor of count of buffers x 10 and division by 2 was applied to compensate for the buffering.

It was found route length for overhead LV was greater than circuit length for overhead LV so DPA0101 was used instead. This was determined to be an accurate reflection of the overhead LV network where there are minimal parallel circuits.

Overhead and underground LV conductors were spatially attributed to a feeder using Geomedia by buffering the circuits and returning the feeder number of the transformer that that the circuits touched. This allowed for categorisation of the circuits into feeder types. Circuits that returned '#N/A', 'Not applicable' or 'subtransmission' were apportioned across urban and rural feeder categories.

Actual overhead and underground HV circuit lengths by feeder category were extracted from the SDW. Because these values are total circuit length instead of route length, they were split into percentage

network composition and then this percentage was applied to the estimated route length figures from Geomedia to return estimated network route length by feeder category.

DOEF0301 is the sum of these estimated Geomedia route lengths.

DOEF0201 is the sum of estimated rural route lengths / total estimated route length.

The applied correction factor in the estimated route line lengths is appropriate.
Network feeder composition based on total circuits is an appropriate proxy for route length.

This methodology was applied using a smaller buffer size of one meter against actual circuit lengths and the results were found to be within two per cent.

Route Line Length within Zone 1a

(a)	**Compliance with the requirements of the RIN**

Total network route length of Aurora owned HV network where the length of each span is only considered once Distribution line route length classified as short rural or long rural / total network route length within the High Bushfire Consequence Area polygon (Zone 1A).

(b)	**Information sources**

- Spatial Data Warehouse (SDW).
- AER feeder classification.

(c)	**Methodology and assumptions**

See (d) Estimated information (below).

(d)	**Estimated information**

a. Rationale

Aurora does not have an overhead and underground HV and LV span model, thus could not calculate actual route length based on network data.

b. Derivation

Geomedia was used to create spatial buffers of five metres around Aurora owned overhead and underground circuits from the SDW and merge these buffers where they overlapped, e.g. circuits running in parallel.

Geomedia cannot calculate a centreline for these buffers but can calculate the total perimeter in metres so network route length in km were estimated by:

Route length=(((Total Sum of perimeter lengths)–(Count of number of buffers x 10))/2)/1000

A correction factor of count of buffers x 10 and division by 2 was applied to compensate for the buffering.

It was found route length for overhead LV was greater than circuit length for overhead LV so DPA0101 was used instead. This was determined to be an accurate reflection of the overhead LV network where there are minimal parallel circuits.

Overhead and underground LV conductors were spatially attributed to a feeder using Geomedia by buffering the circuits and returning the feeder number of the transformer that that the circuits touched. This allowed for categorisation of the circuits into feeder types. Circuits that returned '#N/A', 'Not applicable' or 'subtransmission' were apportioned across urban and rural feeder categories.

Actual overhead and underground HV circuit lengths by feeder category were extracted from the SDW. Because these values are total circuit length instead of route length, they were split into percentage network composition and then this percentage was applied to the estimated route length figures from Geomedia to return estimated network route length by feeder category.

DOEF0301 is the sum of these estimated Geomedia route lengths.

DOEF0201 is the sum of estimated rural route lengths / total estimated route length.

The applied correction factor in the estimated route line lengths is appropriate.

Network feeder composition based on total circuits is an appropriate proxy for route length.

This methodology was applied using a smaller buffer size of one metre against actual circuit lengths and the results were found to be within two per cent.

Number of Maintenance Spans – Zone 1

(a)	**Compliance with the requirements of the RIN**

In accordance with the instructions and definitions the data provided refers only to maintenance spans where active vegetation management has occurred.

(b)	**Information sources**

The source for determining the number of Maintenance Spans was to extract data from contractor timesheets held in Aurora Document management system (DM) for the period July 2012 to June 2013.

(c)	**Methodology and assumptions**

The Work Details listed below were entered into Database by feeder number and date.

The work details entered were:

- Work Date;
- Crew/Timesheet Number;
- Feeder Number;

- Number of Spans Cut;
- Number trees trimmed and Cut by size; and
- Qty Scrub Cleared.

From the number of spans cut was able to summarise and determine the number of Maintenance Spans from the timesheet data entered. This was done by summing Spans cut by Feeder Classification Urban / Rural, giving Maintenance Spans for Urban and Rural.

(d)	Estimated information

a. Rationale

For the 2009, 2010, 2011 and 2012 regulatory years, the figures have been adjusted/reduced by percentage difference from 2013 in Route line length.

Number of Maintenance Spans – Zone 1a

(a)	Compliance with the requirements of the RIN

In accordance with the instructions and definitions the data provided refers only to maintenance spans where active vegetation management has occurred.

(b)	Information sources

The source for determining the number of Maintenance Spans was to extract data from contractor timesheets held in Aurora Document management system (DM) for the period July 2012 to June 2013.

(c)	Methodology and assumptions

The Work Details listed below were entered into Database by feeder number and date.

The work details entered were:

- Work Date;
- Crew/Timesheet Number;
- Feeder Number;
- Number of Spans Cut;
- Number trees trimmed and Cut by size; and
- Qty Scrub Cleared.

From the number of spans cut was able to summarise and determine the number of Maintenance Spans from the timesheet data entered. This was done by summing Spans cut by Feeder Classification Urban / Rural, giving Maintenance Spans for Urban and Rural feeders attributed as in a High Bushfire Consequence Area (HBCA).

(d)	Estimated information

a. Rationale
For the 2009, 2010, 2011 and 2012 regulatory years the figures have been adjusted/reduced by percentage difference from 2013 in Route line length.

Total Length of Maintenance Spans – Zone 1

(a)	Compliance with the requirements of the RIN
In accordance with the instructions and definitions the data provided refers only to maintenance spans where active vegetation management has occurred.	

(b)	Information sources
The source for determining the total length of Maintenance Spans was to extract data from contractor timesheets held in Aurora Document management system (DM) for the period July 2012 to June 2013 to determine number of maintenance spans to be used in the following calculation (see Section C).	

(c)	Methodology and assumptions
Once determining the number of Maintenance Spans per Feeders and knowing the total length and total number of Span for those feeders the average span length can be calculated and then that average span length can be used to calculate total length of Maintenance Spans by multiplying by the number of Maintenance Spans. **Total Length Maintenance Spans** = (A/B)*C Where: A= Total Length of Feeder B = Total Number of Spans C = Number of Maintenance Spans	

(d)	Estimated information
a. Rationale	
For the 2009, 2010, 2011 and 2012 regulatory years, the figures have been adjusted/reduced by percentage difference from 2013 in Route line length.	

Total Length of Maintenance Spans – Zone 1a

(a)	Compliance with the requirements of the RIN
In accordance with the instructions and definitions the data provided refers only to maintenance spans where active vegetation management has occurred.	

(b)	Information sources

The source for determining the total length of Maintenance Spans was to extract data from contractor timesheets held in Aurora Document management system (DM) for the period July 2012 to June 2013, in order to determine number of maintenance spans to be used in the following calculation (Section C).

(c)	Methodology and assumptions

Once determining the number of Maintenance Spans per Feeders in High Bushfire Consequence Areas (HBCA) and knowing the total length and total number of Span for those feeders the average span length can be calculated and then that average span length can be used to calculate total length of Maintenance Spans by multiplying by the number of Maintenance Spans.

Total Length Maintenance Spans = (A/B)*C

Where: A= Total Length of Feeder

B = Total Number of Spans

C = Number of Maintenance Spans

(d)	Estimated information

a. Rationale

For regulatory years 2008-09, 2009-10, 2010-11 and 2011-12 the figures have been adjusted/reduced by percentage difference from 2013 in Route line length.

Length of Vegetation Corridors – Zone 1

(a)	Compliance with the requirements of the RIN

Aurora has applied a methodology in accordance with the instructions and information by using a recognised and modelled vegetation data set overlaid to the network span model using spatial analysis.

(b)	Information sources

Data about the vegetation communities in Zone 1 was sourced from the Tasmanian Government Department of Primary Industries, Parks, Water and Environment's TasVeg system, which provides the most consistent and comprehensive digital map available of Tasmania's vegetation and depicts the extent of more than 150 vegetation communities around the State.

The network data was Aurora's span data – created in 2013 and stored within the GIS (Spatial Data Warehouse).

The tree density data was provided to the consultants engaged to undertake the analysis to provide tree density for each vegetation type.

From this, each span within each feeder was assigned a tree density, and then for each feeder type.

(c)	Methodology and assumptions

For its vegetation modelling, Aurora has utilised vegetation data from DPIPWE's TasVeg system.

To calculate the Vegetation Corridor from information provided by the consultants engaged to undertake the analysis to provide tree density for each vegetation type, the following rules were used:

- The hectares covered for Veg Type (Veg Code) on all feeders were multiplied by 10,000 to give the square meters covered by vegetation type for all feeders;
- This was then divided by 12 to give length by vegetation type, as the width of the area in the calculation in order to determine the hectares covered by the Veg Type was 12 Meters; and
- The total length of Veg Types where the Veg Type had a Tree Count Greater than zero was then deemed to be the total length of the Vegetation Corridor.

(d)	Estimated information

a. Rationale including why it was it not possible to use actual information?

For the 2009, 2010, 2011 and 2012 regulatory years the figures have been adjusted/reduced by percentage difference from 2013 in Route line length.

It should be noted that the data sourced from DPIPWE – namely TasVeg, which provided the vegetation communities, returned a Tree Count of Zero for Urban areas. Volumes for Urban areas within the Descriptor Metrics are therefore zero. Whilst this figure does not seem intuitively consistent with field inspections, zero was used to ensure process consistency.

An alternative methodology (if required) could be to replicate the Total Length of Maintenance Spans within Urban areas for this field under the assumption that a high percentage of trees actioned within the Urban areas are trimmed (not removed) and therefore corridors remain relatively consistent from year to year within this category.

Length of Vegetation Corridors – Zone 1a

(a)	Compliance with the requirements of the RIN

Aurora has applied a methodology in accordance with the instructions and information by using a recognised and modelled vegetation data set overlaid to the network span model using spatial analysis.

(b)	Information sources

Data about vegetation communities was sourced from DPIPWE's TasVeg system, which provides the most consistent and comprehensive digital map of Tasmania's vegetation available, through its depiction of the extent of more than 150 vegetation communities around the State.

The network data was Aurora's span data – created in 2013 and stored within the GIS (Spatial Data Warehouse).

The tree density data was provided to the consultants engaged to undertake the analysis to provide tree density for each vegetation type.

From this, each span within each feeder was assigned a tree density, and then for each feeder type.

(c)	Methodology and assumptions

For the vegetation modelling, Aurora utilised the vegetation data from TasVeg.

To calculate the Vegetation Corridor from information provided by the consultants engaged to undertake the analysis to provide tree density for each vegetation type, the following rules were used:

- The Hectare covered for Veg Type (Veg Code) on all Feeders multiplied by 10000 to give square meters covered by Veg Type for all Feeders;
- This was then Divided by 12 to give length by Veg Type as the width of the area in the calc to determine Hectares covered by the Veg Type was 12 Meters ;
- Then total Length of Veg Types where the Veg Type had a Tree Count greater than 0 was deemed to be the total length of the Vegetation Corridor;
- The total length of the Vegetation Corridor (listed in Zone 1) was multiplied by the percentage of Aurora's network inside the Zone 1A polygon for Rural areas; and
- Total length of vegetation corridors in Urban areas has been calculated as zero due to annual pre-summer vegetation program only including Rural areas. (i.e. bushfire risk is not relevant to urban areas).

(d)	Estimated information

a. Rationale

For the 2009, 2010, 2011 and 2012 regulatory years the figures have been adjusted/reduced by percentage difference from 2013 in Route line length.

Average Number of Trees per Maintenance Span – Zone 1

(a)	Compliance with the requirements of the RIN

Aurora has applied a methodology in accordance with the instructions and information by using a recognised and modelled vegetation data set overlaid to the network span model using spatial analysis.

(b)	Information sources

The data was sourced from DPIPWE – namely TasVeg, which provided the vegetation communities.

The network data was Aurora's span data – created in 2013 and stored within the GIS (Spatial Data Warehouse).

The tree density data was provided to the consultants engaged to undertake the analysis to provide tree density for each vegetation type.

From this, each span within each feeder was assigned a tree density, and then for each feeder type, an average was determined.

(c)	Methodology and assumptions

For the vegetation modelling, Aurora has utilised most consistent Tasmanian state-wide vegetation data being TasVeg - provided by the Tasmanian Government Department of Primary Industries, Parks, Water and Environment (DPIPWE). This was a comprehensive digital map of Tasmania's vegetation depicting the extent of more than 150 vegetation communities.

The most practical option for deriving an estimate of trees per power line span was to determine a typical tree density for each TasVeg vegetation type.

Each span for each feeder had a tree density assigned.

The average tree density was determined for each span, and then determined for each feeder category.

(d)	Estimated information

a. Rationale

For the 2009, 2010, 2011 and 2012 regulatory years, the figures have not been adjusted/reduced by percentage difference from 2013 in Route line length. Rather, the figures have remained the same, based on the assumption that changes to the Average number of trees per maintenance span would not be materially different in prior years.

Average Number of Trees per Maintenance Span – Zone 1a

(a)	Compliance with the requirements of the RIN

Aurora has applied a methodology in accordance with the instructions and information by using a recognised and modelled vegetation data set overlaid to the network span model using spatial analysis.

(b)	Information sources

The data relating to the average number of trees per maintenance span in Zone 1a is sourced from Aurora's annual bushfire mitigation vegetation reports.

Contractor time sheets have been used as a source of information about tree volumes cut and the number of spans actioned.

(c)	Methodology and assumptions

For Zone 1A, Aurora carries out an annual pre-summer vegetation inspection and cutting program in High Bushfire Loss Consequence Areas to ensure vegetation that has experienced greater than expected growth rates (as estimated during cyclic cutting) is cleared (and will remain clear) prior to the onset of the bushfire season.

The annual pre-bushfire vegetation management program is conducted to a reduced scope than that of the cyclic programmed cut, and a reduced numbers of trees per span (isolated instances) are actioned as a result of the reduction in scope.

Due to the reduced scope of this program, the average number of trees actioned per maintenance span is significantly less than that for the cyclic program.

Average number of trees per maintenance span = 1.
(d) Estimated information
a. Rationale
For the 2009, 2010, 2011 and 2012 regulatory years, the figures have not been adjusted/reduced as the scope has not materially changed during this period.

Average Frequency of Cutting Cycle – Zone 1

(a) Compliance with the requirements of the RIN
Relates to the actual cycle achieved for the feeders where close out / sign off data is available. It is assumed that all spans within the feeder have been attended.
(b) Information sources
The source for determining the number of Maintenance Span Cycle was to extract data Feeder Sign off Sheets held in Aurora Document management system (DM) and previous information collected and held in a spreadsheet which had been collected from monthly Reports provided by Network Services.
(c) Methodology and assumptions
The Details listed below were entered into a database: • Feeder Number; • Cut Type; • Last Cut Date (Completion Date for Feeder); and • Source for Information (Sign off Sheets or Monthly Report). From the last cut date for a feeder was able to calculate the period of time in days since the feeder was last cut, This was then used to calculate and average cycle in years for a feeder classification i.e. Rural/Urban, and deemed to be related at a span level. Note: For Zone 1, this is the same methodology that was used by Aurora for the 2013 Economic Benchmarking RIN response.

Average Frequency of Cutting Cycle – Zone 1a

(a) Compliance with the requirements of the RIN
Relates to the actual cycle achieved for the feeders where close out/sign off data is available. It is assumed that all spans within the feeder have been attended.

(b)	Information sources
The data is sourced from Aurora's annual bushfire mitigation vegetation reports.	
(c)	**Methodology and assumptions**
The pre summer vegetation program operates annually prior to each bushfire period (September to December). The frequency of cutting cycle is therefore annual.	

2.7.2 Cost Metrics by Zone

(a)	Compliance with the requirements of the RIN
The information provided about vegetation management costs in *Table 2.7.2 – Cost metrics by zone* is consistent with the requirements of the Category Analysis RIN, in that: • all relevant input cells in the template have been populated; and • the costs associated with vegetation management work have been reported for each of Aurora's two nominated vegetation management zones.	
(b)	**Information sources**
Expenditure data reported in Table 2.7.2 has been sourced from Aurora's Finance System (Navision), which recognises each vegetation management zone as a separate vegetation management cost centre.	
(c)	**Methodology and assumptions**
Cyclic cutting costs have been apportioned between Tree Trimming and Vegetation Corridor Clearance based on the length of vegetation corridors in each zone as a percentage of the rural route line length recorded for each zone. Zone 1a is classified by Aurora as a high bushfire consequence area. While cyclic clearing is undertaken across Aurora's entire network, additional pre-bushfire season vegetation clearance is also undertaken in zone 1a. Therefore, the costs associated with pre-summer bushfire vegetation clearance have been only allocated against zone 1a, and have been apportioned between Tree Trimming and Vegetation Corridor Clearance on the same basis as cyclic cutting costs. Aurora does not identify trees as hazards to be treated differently from any other trees located in the vicinity of power lines and the cells in Table 2.7.2 relating to hazard tree clearance have, therefore, been shaded black hazard, as instructed. Ground clearance works are not recorded separately and are included in tree trimming expenditure. The cells relating to expenditure on ground clearance have been shaded black as instructed. Aurora does not record expenditure on inspections of vegetation separately and has shaded the relevant cells in Table 2.7.2 black, as instructed. Aurora does not record expenditure on audits of vegetation management work separately and has	

shaded the relevant cells in Table 2.7.2 black, as instructed.

Contractor Liaison Expenditure has been sourced from Aurora's finance system and reflects the number of FTEs specifically engaged in managing Aurora's vegetation management programme, in terms of the associated labour costs, labour on-costs and vehicle costs.

Aurora has reported no tree replacement costs because trees near powerlines which are removed as part of vegetation management work are not replaced with more appropriate species.

2.7.3 Descriptor Metrics Across All Zones - Unplanned Vegetation Events

Table 2.7.3 – Descriptor Metrics Across All Zones – Unplanned Vegetation Events has been shaded dark orange by the AER and is not required to be completed by Aurora Energy.

2.8 Maintenance

2.8.1 Descriptor Metrics for Routine and Non-Routine Maintenance

Service Line Maintenance

Public lighting maintenance

(a)	Compliance with the requirements of the RIN
This information was compiled using the definitions contained in the AER instructions and definitions for the RIN.	
(b)	**Information sources**
• The volume of overhead service wires installed as at March 2014 were sourced from the Aurora asset management system (GTech). • The volume of service wires installed and removed annually was sourced from the Aurora service order management system (SOM). • The volume of service wires inspected was estimated and based on financial data sourced from the Aurora finance system (Navision). • Aurora does not maintain records of installation dates for service wires and so the age data for poles was used to estimate the service age as per the AER definitions.	
(c)	**Methodology and assumptions**
• The volume of services was obtained for the current financial year. Volumes for previous years were calculated by adding new services installed and old services removed for each financial year. • Aurora has no specific inspection cycle for service wires. Rather, these assets are visually inspected as part of the general overhead asset inspection cycle. • The inspections included in the data are associated with a statistical sampling audit regime used to assess asset condition. This is not a cyclic regime. • Aurora has no maintenance cycle for service wires and these assets are not maintained. Rather, they are replaced upon failure or at the end of their useful life. • Aurora has limited data relating to the installation date of individual lights. Age data for lights with no install date was estimated using procurement records or by interviewing employees involved historically with the installation of lighting assets. • Inspection and maintenance cycles are both four years for major and minor lights based on the average expected life of lamp and PE cell.	
(d)	**Estimated information**
a.	Rationale
• Aurora does not maintain records of installation dates for service wires and so the age data for	

poles was used to estimate the service age as per the AER definitions.
- Aurora does not maintain historical records of the volume of service wire inspections completed. The volume of inspections was calculated by dividing the actual costs incurred by the average unit rate for service inspections.
- Aurora does not historically record install date for public lights.

b.	Derivation

- Complete data for where installation dates exists.
- Proportion other lights equally to all years that records indicate when particular lights were purchased.
- Average age calculated for 2011.
- Same estimate used for other years as Aurora has no records of the age of individual lights that have been replaced before or after 2011.
- It has been assumed that the volumes of lights installed and/or replaced annually is consistent.
- This approach has been adopted because no other valid data was available on which to base estimates.

Poletop & Overhead Line Maintenance

Pole Inspection and Treatment

Overhead Asset Inspection

(c)	Methodology and assumptions

Pole Count

- Extracted by taking a count of poles from Auroras GIS (GTech) system, filtering on date installed and grouped by different pole owners.
- The data was collected on a calendar year basis due to limitations in installation data – currently only year of installation is recorded and not the exact day.
- The pole count (pole ids) and pole owners were extracted from the Pole_Asset table in the SDW.
- The pole installation dates were extracted from the Pole_Asset_Wasp table in the SDW.
- The Pole_Asset and Pole_Asset_Wasp table were joined using the wasp_asset_id field.

Pole Inspections

- Extracted by taking a count of completed work tasks from Auroras WASP system, filtering on date completed (to return only inspections in a particular year).
- Only includes work tasks classified as Pole Inspect (DAIS) (Task Code 1PID) and Inspect Pole Special Inspections (Task Code 5OP7).
- Only includes work tasks with a status of Closed (C) or Completed (Z).
- The pole owners were extracted from the Pole_Asset table in the SDW.
- The work tasks were taken from the WASP Work_Tasks table.

- The Pole_Asset and Work_Tasks were joined on the asset_id field.

Average Pole Age

- Extracted by taking a count of poles from Auroras GIS (GTech) system, filtering on date installed and grouped by different pole owners and year installed date.
- An extract is taken for each calendar year and the average age is based on the average year of install - excluding any poles without installation dates.
- The average age data is calculated on a calendar year basis due to limitations in installation data – currently only the year of installation is recorded and not the exact day.

Line Patrolled

Conductor and cable line length data was extracted from Aurora's GIS.

Where available, the installation date field was used to identify when conductors/cables were installed in the network. All records with null dates were counted for all years.

HV lines are only those classified as being owned by Aurora.

LV lines are all LV spans and cables and ownership data has not been validated.

Note – installation data prior to 2009/2010 is patchy.

The line patrolled value was calculated by multiplying the value of conductor length by the number of poles inspected divided by the total number of poles.

Inspection and Maintenance Cycle

In 2009, 2010 and 2011 it was Aurora's practice to inspect poles on a 3½ year cycle. For 2012 and 2013 poles were inspected on a five yearly cycle.

Pole Tops

- Data was assumed to be the same as the data for poles. Currently, pole tops and poles are inspected at the same time.

Network underground cable by voltage

Network underground cable by location

Distribution substation equipment and Property maintenance

Zone substation equipment maintenance

Zone substation property maintenance Customers

(a)	Compliance with the requirements of the RIN

The information provided is consistent with the requirements of the Category Analysis RIN, in that:

- All relevant input cells in the template have been populated; and
- Asset in formation has been sourced from asset records via Aurora's spatial data warehouse.

(b) Information sources

All asset data has been sourced from:

- Aurora's spatial data warehouse (an array of databases containing live asset records for Aurora's network).
- Aurora's spatial data warehouse.
- Zone Substation Asset Management Plans.
- Distribution Substation Asset management Plans.
- NW-#30604475-Cable RIN DATA Mar 2014.
- NW-#30604673-Zone sub data for Mar 2014 RIN.

(c) Methodology and assumptions

Cables:

Average age and lengths were calculated using document NW-#30604475-Cable RIN DATA Mar 2014

Distributions subs:

Data sourced using NW-#30203362-Ground Mounted Substations - Live Asset Records. This document extracts live asset data from the spatial data warehouse.

Assets inspected/maintained: Volumes / maintenance frequency.

Average age:

By applying filters for the year, the numbers of items can be sourced, and in combination with the age, the average age is calculated. i.e. sum of ages / volume.

Inspection and maintenance cycles: Frequency sourced from the management plan. Where varying frequencies exist, the population and frequency is used to determine an average frequency for the category.

For the switchgear maintenance cycle the numbers below were used:

Switchgear Maintenance Cycle [Years]	Number of Subs
3	1
4	490
6	518
8	766
No maintenance (e.g. HV Links)	123

For the property inspection cycle the numbers below were used:

Inspection Cycle [Years]	Number of Subs
1	387
2	1511

For the property maintenance cycle the numbers below were used:

Inspection Cycle [Years]	Number of Subs

0.33 (fence types)	166
No maintenance (other)	1732

Zone substations:

Volumes recorded in asset management plan NW-#30508702-DRAFT NA P ZS 01 Rev 1 Management Plan: Zone Substations (2014/2015).

Maintenance frequencies sourced from asset management plan NW-#30508702-DRAFT NA P ZS 01 Rev 1 Management Plan: Zone Substations (2014/2015).

Assets inspected/maintained: Volumes / maintenance frequency.

Calculations for average age done using NW-#30604673-Zone sub data for Mar 2014 RIN.

Average age of transformer = total age for all transformers / number of items.

(d)	Estimated information

No estimates were used. Values were either directly sourced from asset records or calculated using asset records.

SCADA & Network Control Maintenance

Protection Systems Maintenance

(a)	Compliance with the requirements of the RIN

The information provided is consistent with the requirements of the Category Analysis RIN, in that:

- All relevant input cells in the template have been populated;
- Asset information has been sourced from live asset records via Aurora's spatial data warehouse (SDW) where possible; and
- In cases where it has not been possible to source asset information via Aurora's SDW, that information has been derived from documentary records, such as asset management plans or estimated based on issued work.

(b)	Information sources

Distribution substation (with protection) extract from SDW, *NW-#30608875-SDW Live Data Query for Distribution Substations with Protection for Reporting.*

Recloser, Load Break Switch (LBS) and Sectionaliser (with remote communications) Data extract from SDW, *NW-#30611469-SDW Recloser LBS & Sectionaliser List with Installation Dates for Reporting.*

Zone substation protection asset information summary (not in SDW), *NW-#30625258-Zone Substation Installation & Age Data for Reporting.*

NW-#239732-Technical Specification: Zone Substation Protection, SCADA and DC Equipment Maintenance and Fault Response.

RIN template submitted, *NW-#30599802-Category RIN SCADA & Network Control Maintenance Information from P & C Thread March 2014.*

Protection and control management plan, *NW-#30508706-NA P PC 01 Rev 1 Management Plan: Protection and Control (2014/2015).*

(c)	Methodology and assumptions

- Zone substation asset data is not stored in the SDW, but the above zone substation protection asset spreadsheet contains the necessary asset information based on the over-arching management plan. Maintenance information can be sourced from the corresponding maintenance contract specification. The most frequent maintenance period has been shown in this report. Zone substations have both protection and SCADA maintenance regimes so appear twice in the Table 2.8.1.
- Zone substation age profiles are based on the age of the most recent protection upgrade at the station, and so will differ from those of corresponding switchgears.
- Transend Terminal substations (which Aurora protection panels in situ) have not been included separately, as they are regarded as part of the corresponding zone substation's protection system.
- Recloser, LBSs and sectionaliser devices with remote communications have asset data available in the SDW. This data has been reconciled with data pertaining to the Telstra mobile phone accounts which enable remote communications. See Summary page in corresponding Recloser, Load Break Switch (LBS) and Sectionaliser spreadsheet.
- Where recloser, LBSs and sectionaliser device installation dates are unavailable in the SDW, the "date active" data (date commissioned in the geospatial system) was used. As a consequence the asset age derived quantities are not an entirely accurate representation of the actual installation dates.
- Reclosers, LBSs and sectionalisers with remote communications undergo 5-yearly maintenance on their batteries, which forms part of the protection system. This program was introduced in 2012-13, and as a consequence only 1/5th of the asset fleet has been subjected to the maintenance regime (1/5th of the asset fleet is maintained every year in accordance with the regime). This is shown in the recloser, LBS and sectionaliser spreadsheet.
- Distribution substation asset data is stored in the SDW. Over the past two years, battery systems have been incrementally upgraded to newer ones, whilst being transitioned to a four-year Capex-based battery replacement program (no longer requiring battery maintenance). The remaining systems on the original regime have been maintained at the 6-monthly interval. The exact dates of when the battery systems changed to the new maintenance regime are unknown so it has been assumed that the dates correspond with the year in which the scope of work was submitted.
- Distribution substation protection maintenance tests are also carried out at the same time as the corresponding switchgear maintenance (3, 4, 6, 8-yearly intervals), and as such have already been covered in the ground-mounted substation reporting section.

(d)	Estimated information

a. Rationale

Distribution substations which continue to require battery maintenance have been estimated based on when the scope of work was submitted to upgrade the battery systems, as per Section 3.

b. Derivation
The following distribution substation volumes were issued to have battery systems upgraded: • 2008-09 – 20 substations; • 202009-10 – 22 substations; • 2010-11 – 29 substations; • 2011-12 – 30 substations; and • 2012-13 – 20 substations. In the absence of more accurate data, it has been assumed that the substation battery systems were successfully upgraded in the year in which they were issued.

2.8.2 Cost Metrics for Routine and Non-Routine Maintenance

(a)	Compliance with the requirements of the RIN
The information provided about maintenance expenditure in *Table 2.8.2* is consistent with the requirements of the Category Analysis RIN, in that: • all relevant input cells in the template have been populated; and • the expenditure on maintenance activities reported by Aurora is materially dependent on information recorded in Aurora's finance system.	
(b)	**Information sources**
The expenditure data reported in Table 2.3.6 has been sourced from Aurora's program-of-work management system (WASP – Works, Assets, Solutions and People) and Aurora's Finance System (Navision).	
(c)	**Methodology and assumptions**
The routine and non-routine maintenance expenditure reported in Table 2.8.2 has been extracted on the basis of work category codes, and apportioned between asset categories based on asset volumes.	

2.9 Emergency Response

2.9.1 Emergency Response Expenditure

(a)	Compliance with the requirements of the RIN

The information provided in *Table 2.9.1 – Emergency Response Expenditure* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the data has been gathered from reliable and objective data sources which are used in the normal course of Aurora's business;
- emergency response expenditure attributable to major events has been identified using a specific cost code for major events; and
- emergency response expenditure attributable to major event days has been compiled by identifying the daily operating expenditure incurred on each MED and summing the expenditure for each event.

(b)	Information sources

The data reported in *Table 2.9.1* has been sourced from Aurora's program-of-work management system (WASP – Works, Assets, Solutions and People) and Aurora's Finance System (Navision).

Aurora's Regulatory Accounts have been used to reconcile the data sourced from Navision and WASP.

(c)	Methodology and assumptions

Major Event Days throughout the back-cast period have been identified with reference to MED System Average Interruption Duration Index thresholds calculated using the method prescribed by the AER.

The MED's identified by Aurora during the back-cast period do not include any major storm activity, as defined in the Category Analysis RIN, on the basis that Aurora's distribution network has not been subject to any tropical cyclones of Category 1 or above (as classified by the Australian Bureau of Meteorology).

Aurora's emergency response expenditure includes expenditure captured in Aurora's finance system in relation to the following types of emergency response activities:

- Emergency & Unscheduled Power System Response & repairs (EMRES);
- Emergency Management - Customer damage to Aurora Asset (EMDAA); and
- Emergency Response - Major Event (EMMAJ).

The emergency response expenditure shown in *Table 2.9.1* under **(b)** includes expenditure incurred in responding to all faults that occur on MEDs. The emergency response expenditure totals shown in *Table 2.9.1* under **(c)**, however, include only the costs relating to emergency responses to major events on major event days (EMMAJ).

It should be noted that the EMMAJ code was not in use in 2008-09 and 2009-10, meaning that all costs incurred on MEDs in those years have been reported as Major event day O&M expenditure under **(c)**.

None of the costs of responding to faults and emergencies reported in *Table 2.9.1* include the costs associated with the standing down of field crews, as far as they relate to events involving faults and

damaged Aurora assets.

The information contained in *Table 2.9.1* has been filtered by work category code and cross referenced against the Major Event Days table. In the interests of accuracy, emergency response expenditure data has been extracted with reference to transaction dates (i.e. 'document dates'), which correspond to MEDs, rather than the posting dates recorded in Aurora's finance system.

Aurora's Regulatory Accounts have been used to reconcile the data sourced from both Navision data and WASP. The Regulatory Accounts only reconcile against total emergency response expenditure, however, because they include expenditure on emergency responses incurred in relation to events that do not necessarily meet the MED threshold set under the AER's prescribed methodology, but which still required emergency responses from Aurora.

Therefore, once the total emergency response expenditure recorded in Aurora's regulatory accounts has been reconciled with the total emergency response expenditure recorded in Navision, emergency response expenditure is extracted from Aurora's finance system on the basis of the aforementioned activity codes, in order to isolate only those costs required to be reported under the AER's Regulatory Information Notice.

For the purposes of populating *Table 2.9.1*, this process generated two main report tables, 0809 Event costs and 0913 Major outage data. (For simplicity and to preserve linkages between worksheets, the pivot tables for "Pivot of MED 09 to 13"and "Pivot of MED 0809" and a copy of "Total Emergency Response data" have been placed into the "Summary Sheet". All links to TAB "2.9 Emergency Response" are via the Summary Sheet.)

(d)	**Estimated information**

a. Rationale

No estimates were required in order to provide a response to Table 2.9.1, on the basis that the expenditure data compiled by Aurora has been derived from reliable and objective records used in the normal course of business, and are neither contingent on judgments nor assumptions.

2.10 Overheads

2.10.1 Network Overheads Expenditure

2.10.2 Corporate Overheads Expenditure

(a)	Compliance with the requirements of the RIN

Template 2.10 Overheads has been prepared in accordance with Regulatory Information Notice under Division 4 of Part 3 of the National Electricity law section 14, specifically paragraphs 14.1-14.4 of Appendix E – Principles and Requirements. On this basis, the information provided in *Table 2.10* regarding overheads is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the data has been gathered from reliable and objective data sources which are used in the normal course of Aurora's business;
- Aurora's network operating costs have been disaggregated into the six subcategories set out in paragraph 14.2 of Appendix E, and any network operating costs which are not included in those subcategories but which Aurora has previously reported in its Regulatory Accounting Statements have been reported separately; and
- explanations have been provided in this Basis of Preparation for the capitalisation of overhead expenditure.

It is noted that there have been no material changes in reported expenditures as a result of changes in Aurora's capitalisation policy.

(b)	Information sources

Aurora has used the following data sources to populate *Table 2.10*:

- Financial System (Navision - Network ledger and Network Services ledger); and
- Regulated Accounts.

Network Overheads Expenditure – to all services (total costs including capitalised portion)

This information has been derived on the basis of a combination of Network Management costs and Network Services costs.

- Network Management costs have been populated from the regulatory accounts for the years 2008-09 to 2011-12 and from the Aurora's RIN reporting for 2012-13 (see file document "Network Management NW Div 0809 to 1213 based on Reg Accts.XLS").
- Network Services costs have been populated for the years 2008-09 to 2011-12 with data sourced from the Network Services general ledger for overhead applied, plus any end of year adjustments (e.g. true up to actual costs incurred), and reflect the overheads that have been recovered against field work (see file document "NS 0809 to 1213 OH's booked to billable jobs by work category.XLS"). These overheads have been linked to file document "Network Services Div actual recovery 0809 to 1213.XLS" which allocates the figures to the forms of control. 2012-13 opex data was sourced from the annual reporting RIN for that year and all field workers' time has been classified as 100% direct costs. For the other years in the back-cast period, a portion of field workers' time has been treated as an overhead.

Network Overheads Expenditure – to capitalised overheads for only Standard Control form of control

This information has been derived on the basis of an aggregate of relevant Network Management costs and Network Services costs.

- Network Management costs that have been allocated to capital works have been extracted from the financial system for all years of the back cast period (see file document "capitalised network management overheads by work category.xlsx"); and
- Network Services costs that have been allocated to capital works (capex jobs only) have been drawn from the financial system for all years (see file document "NS 0809 to 1213 OH's booked to billable jobs by work category.XLS").

Corporate Overheads Expenditure – to all services (total costs including capitalised portion) & capitalised overheads for Standard Control Services

Corporate Overheads costs have been populated using the actual costs allocated to the Distribution Business by Aurora's Corporate Finance section for all years and Network's portion is reconciled to the regulatory accounts.

(c)	Methodology and assumptions

Network Overheads Expenditure – allocation to all services (total costs including capitalised portion)

Network operating costs reported in Aurora's regulatory accounts under Network Management costs (relates to Network's portion) have been allocated between the six subcategories of overhead expenditure set out in Table 2.10.1 based on the type of work performed, and then allocated to the forms of control as per below.

The Network operating costs attributed to Network Services in each year were extracted from Aurora's financial system General Ledger Overheads Applied code by work category code, and then allocated to the forms of control as per below. These were then allocated to the six subcategories based on the actual % spend of all the overheads departments from the financial system, based on the type of work performed.

Allocation to forms of control

The allocation of Network Overheads between the different forms of control has been based on two methodologies, both of which are in accordance with Aurora's approved Cost Allocation Methodology (CAM):

- Network Management costs have been allocated between the forms of control based on percentage spend of total Program of Work costs driver of forms of control; and
- Network Services costs have been automatically allocated between forms of control according to the type of work (e.g. work category code), with each type of work allocated directly in Aurora's ledger to the relevant form of control.

Network Overheads Expenditure – to capitalised overheads for only Standard Control form of control

Network operating costs relating to Network Management amounts that have been capitalised have been allocated to the six subcategories based on the allocation of departmental overheads in the regulatory accounts. Then allocated to the forms of control based on actual % to only Capital jobs and the split of type of work performed.

Network operating costs relating to Network Services cost recovery against jobs were sourced from Aurora's financial system and based on costs that were coded to the General Ledger Overheads Applied

code, which were then broken down in each year by work category code to the allocated forms of control as per below. The costs allocated to each form of control were then allocated between the six subcategories in template 2.10 based on the actual % spend of all the overheads departments on each type of work performed.

Corporate Overheads Expenditure – to all services (total costs including capitalised portion)

The allocation of Corporate Overheads has been split between Network Management and Network Services by Aurora's Corporate Finance team on the basis of actual spend, and then allocated to a subcategory. The allocation of expenditure within each subcategory between the forms of control has been undertaken using different methodologies for Network Management and Network Services in accordance with the same allocation as above in Network Expenditure.

Corporate Overheads Expenditure – to capitalised overheads for only Standard Control form of control

Corporate overheads expenditure has been calculated on the same basis as the network operating costs relating to Network Services.

(d)	**Estimated information**

a. Rationale

Network Operating costs for portion of Fault related costs that has been capitalised.

(See file document "NS 0809 to 1213 OH's booked to billable jobs by work category.XLS"). Network Services costs are identified in Aurora's Network Services ledger in the financial system as "opex" and when costs are transferred to the Network ledger a portion of fault related costs are capitalised, based on a unit rate method, and then reported in the regulatory accounts as capex. This means that, overall, a portion of fault costs are capitalised due to the associated improvements in assets.

b. Derivation

Work categories for Fault work were identified in the Network Services ledger. The amount of fault related costs recorded as opex in the regulated accounts was compared to the total fault-related costs recorded in the Network Services ledger in order to identify the proportion of fault-related costs that have been capitalised and extract the overheads portion only.

The unit rates that have been used each year to capitalise a portion of fault-related operating costs in the Network ledger were estimates. Accordingly, taking the regulatory accounts figures for Fault and Response Opex and working backwards was the best estimate because it ensured that the estimated amount used to capitalise fault-related opex is more accurate, and that the amount of reported as Opex Fault and Response balances with the regulatory accounts.

2.11 Labour

2.11.1 Cost Metrics Per Annum

2.11.2 Extra Descriptor Metrics for Current Year

(a)	Compliance with the requirements of the RIN

The labour data reported in *Table 2.11* has been prepared in accordance with the Regulatory Information Notice under Division 4 of Part 3 of the National Electricity law specifically paragraphs 4.1-4.8 of Appendix E – Principles and Requirements. On this basis, the information provided in *Table 2.11* regarding labour is consistent with the requirements of the Category Analysis RIN, in that:

- only labour costs allocated to the provision of standard control services have been reported;
- labour used in the provision of contracts has not been reported;
- labour data has been broken down into the Classification Levels in template 2.11 and an explanation of how workers have been grouped into these Classification Levels has been provided;
- Aurora has not reported separately labour sourced through labour hire contracts;
- labour quantities, expenditure, and stand down periods have not been reported across multiple labour tables, except in cases where labour data has been split between corporate and network overheads;
- Average Staffing Levels (ASLs) for each Classification Level reflect the average Paid FTEs for each Classification Level over the course of a given year;
- 'Per ASL' values are average values for each Classification Level; and
- stand down periods have been reported against the relevant classification level in the table containing the relevant labour.

Additionally:

- all relevant input cells in the template have been populated; and
- the data has been gathered from reliable and objective data sources which are used in the normal course of Aurora's business.

(b)	Information sources

Aurora has used the following data sources to populate Table 2.11:

- Financial System (Navision); and
- Payroll System (PeopleSoft).

(c)	Methodology and assumptions

<u>Corporate overheads internal labour costs</u>

Average Staffing Levels (ASLs)

Total FTE numbers are as per HR data at 30th June in the relevant year, as provided in PeopleSoft report.

Employee job titles as per PeopleSoft (Aurora classification) were categorised into the AER's required classifications as per the RIN instructions.

To determine the ASL per labour classification level the FTE numbers in each RIN labour category were multiplied by the relevant Standard Control percentage. In accordance with Aurora's CAM, in the case of Network Services, the Standard Control percentage was based on hours worked across the forms of control. For Network, the allocation percentage was based on total spending across the forms of control.

Allocation to standard control services- forms of control

The allocation of corporate overheads internal labour to standard control services has been based on percentage spend driver, which is consistent with Cost allocation methodology (CAM).

Total Labour costs

Total labour costs are reflective of the actual corporate labour costs that have been charged to the Distribution Business plus the labour costs associated with the corporate functions undertaken within the DB, i.e. the finance and regulatory functions.

Productive work hours

The productive work hours for Corporate employees (office based staff) has been determined using the available working days per year, adjusted for assumptions developed for budgeting purposes regarding average leave taken on an FTE basis during the year. Office based staff do not complete timesheets to capture actual worked hours, therefore this level of detail is not costed into the finance system. It is assumed that each employee works a standard week (i.e. 37.5 hours).

Network Overheads Internal labour costs

Allocation to SCS form of control

As much as possible, labour cost data has been directly categorised between the forms of control. However, in the case of some labour classification types which are not allocated against jobs or activities on the basis of timesheets, labour costs are automatically allocated against standard control services within Aurora's finance system. In order to allocate those labour costs more appropriately for the purposes of the RIN, a percentage allocator was developed based on total hours worked across the forms of control, consistent with Aurora's cost allocation methodology (CAM). This was applied to the costs and hours reported in relation to Executive Management, Managers, Professional and Semi-Professional employees, Senior Managers, Support Staff and Interns, junior staff and non-field apprentices.

ASL

Average ASLs for each labour classification type have been determined using actual FTE data, multiplied by the Standard Control Service (SCS) percentage applicable for that year. The allocator used reflects the proportion of combined opex and capex within the Distribution Business which relates to Standard Control Services. This is in accordance with the Cost Allocation Methodology (CAM) used by Aurora for allocating Network Management costs to the forms of control.

Total Labour costs

Total labour costs are reflective of the actual labour costs that have been charged against individual network services and network jobs within Aurora's job ledger. The SCS portion has been derived from multiplying total labour costs by the percentage spend applicable to SCS.

Productive work hours

Productive work hours for Network employees (office based staff) have been determined using the available working days per each reporting year, adjusted for assumptions (developed for budgeting purposes) regarding the average leave taken during the course of a year. This is because office based

staff do not complete timesheets to capture actual worked hours, meaning that this level of data is not costed into the finance system. It is assumed each employee works a standard 37.5 hour week.

Network Direct Internal Labour Costs

Allocation to SCS form of control

The allocation of Network internal labour to SCS services has been based on percentage spend driver for Network Management costs, which is consistent with Aurora's Cost allocation methodology (CAM).

ASL

The ASL for each labour classification type that has been allocated to SCS services has been determined by multiplying the actual number of FTEs per each classification type by the percentage of actual labour hours worked on SCS services.

Total Labour costs

Allocated to SCS based on actual labour costs captured against SCS categories as per costing in the financial system for each year. This has been captured for all FTEs according to their allocated labour classification type.

The direct internal labour costs associated with skilled and non-skilled electrical workers, apprentices and unskilled workers, have been grossed up to include a proportion of the costs associated with unbillable time, with the allocation of those costs to standard control services based on the percentage of total hours worked across each form of control.

Productive work hours

Productive work hours for an average ASL in each of the labour classification levels has been derived from total actual hours costed to SCS services for each of the FTEs allocated to that labour classification type.

Extra description Metrics for Current Year (2012-13) Table

Average productive work hours per ASL – Ordinary time

The labour data was categorised into normal time and overtime.

Average productive work hours per ASL – Over time

The labour data was categorised into normal time and overtime.

Average productive work hourly rate – Ordinary time

The average productive normal time hourly rate has been determined by taking actual labour costed to Standard Control services and dividing that cost by the actual labour hours that have been worked for Standard Control Services.

Average productive work hourly rate – overtime

The average productive overtime hourly rate reflects the average of the hourly overtime rates applied to each labour class of employees.

(d)	Estimated information
a.	Rationale

Productive work hours

The costs of Office based staff are not allocated to jobs (or across the forms of control) on the basis of timesheet entries, but are automatically costed by journal entry on a fortnightly basis instead. The labour data to support the journal entry is generated by Aurora's payroll system, and is at an aggregated level, e.g. not costed daily. In turn, this means that the actual hours worked for each of these employees cannot be determined on an actual basis and has had to be estimated.

Estimates have, therefore, been provided for the number of productive labour hours that have been worked for Corporate overhead internal labour and Network overhead internal labour sections. These employee groups are office based staff.

b. Derivation

Productive work hours for office-based workers have been determined using the available working days per year, adjusted for assumptions developed for budgeting purposes about the average amount of leave (Annual, sick leave and public holidays) taken per FTE.

Office based employees have been assumed to work a standard week (37.5 hours) and working hours annually, reduced by estimated leave per FTE, as follows:

- Average of 20 days annual leave taken per FTE;
- Average of 5 days sick leave per FTE; and
- Actual Public holidays per annum – 10.

In the absence of a record of actual productive hours worked by office based employees, this approach is deemed a reasonable estimate and is consistent with the basis for determining internal budget estimates.

The estimates for leave taken have been based on historic high level trends of leave taken.

2.12 Input tables

(a)	Compliance with the requirements of the RIN

The information provided in *Table 2.12* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated; and
- the data has been gathered from reliable and objective data sources which are used in the normal course of Aurora's business.

(b)	Information sources

The costs reported in Table 2.12 has been drawn from templates 2.2 – 2.9 and 4.1 – 4.3.

The original sources of the cost data were Aurora's works management system (WASP) and Aurora's financial and procurement system (Navision).

(c)	Methodology and assumptions
In the main, actual job costs are directly captured in Aurora's financial system as labour, materials, contract costs and/or 'other' costs, in line with Template 2.12. However, in cases where unit rates have been used to allocate costs to a job, for the purposes of Table 2.12, the associated expenditure on those jobs has been apportioned between the above cost categories based on the expenditure in each category recorded in the Network Services ledger as a percentage of the total.	

4. Alternative control services

4.1 Public Lighting

4.1.1 Descriptor Metrics over Current Year

4.1.2 Descriptor Metrics Annually (Expenditure)

4.1.3 Cost Metrics

(a)	Compliance with the requirements of the RIN

Public lighting volumes and costs have been recorded on an as incurred basis, consistent with the requirements of the RIN.

Lighting types have been reported in a manner consistent with the RIN definitions of major and minor lighting.

(b)	Information sources

Lighting volumes have been sourced from Aurora's Billing systems.

Cost data has been sourced from Aurora's financial systems and reconciled to Aurora's Regulatory Accounts.

(c)	Methodology and assumptions

Table 4.1.1 - Descriptor metrics over current year

Current Population Of Lights
Lighting volumes reported are consistent with the volumes used for the purposes of retailer billing and are consistent with the volumes assumed for the purposes of asset management.

Table 4.1.2 - Descriptor metrics annually (Volumes)

Installed, replaced and maintained lighting volumes have been sourced from Aurora's financial systems (Navision). Cost capture has been based on Aurora's work category structure. Where work categories relate to multiple tasks, Aurora's public lighting asset manager has provided an allocation methodology.

Table 4.1.3 - Cost metrics (Average cost)

Aurora captures cost data in a manner which is inconsistent with the requirements of the Category Analysis RIN. Aurora's public lighting costs are captured for the entire lighting suite, rather than specific to particular lighting types.

To complete *Table 4.1.2* asset volumes for light installation, light replacement and light maintenance have been sourced from Aurora's financial systems (Navision). These volumes combined with calculated unit rates have been used as an allocative mechanism to derive average cost by lighting type.

4.1.2 Descriptor Metrics Annually (Volume of works)

(a)	Compliance with the requirements of the RIN

This information was compiled using the definitions contained in the AER instructions and definitions for the RIN.

(b)	Information sources

- Volumes of public lighting materials for lamps and luminaires installed were sourced from the Aurora finance system (Navision). The lamp and luminaire data is saved in the following document in DM NW-#30599905-Public lighting RIN data.
- Volumes of dedicated public lighting poles were sourced from the Aurora asset management system (Gtech). The pole data is saved in the following document in DM NW-#30608895-Public Lighting Pole data.
- Public lighting fault data was sourced from the Aurora scheduling system (WASP). The fault data is saved in the following document in DM NW-#30609751-RIN public light fault data.

(c)	Methodology and assumptions

- Materials are classified into major / minor public light categories according to the type of asset.
- When materials are issued from the warehouse they are assigned to a work pack that corresponds to the type of task being performed e.g. install new light, fault or replacement.
- Some suspect data has been omitted from the reporting. This relates to a small number of faults where the completed date is before the reported date and we have no way to identify which date is incorrect.

Quality of Supply

(a)	Compliance with the requirements of the RIN

The information provided about GSL breaches and payments in *Table 2.5.1 – Descriptor metrics* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the data describes the voluntary 'GSL' payments made in relation to public lighting under Aurora's Customer Charter; and
- the variables are based on reliable and objective data sources.

(b)	Information sources

The volumes and values of payments made in relation to public lighting under Aurora's electricity network distribution charter in 2011-12 and 2012-13 to customers who received a standard of service

below that set out in the charter have been derived from records kept in the Charter Payment Tool, which was introduced in March 2011 as part of the Distribution Business' customer complaint management systems.

Prior to that date, public lighting-related customer charter payments were delivered to customers via Aurora's Energy Business as an offset against customers' accounts, rather than a direct payment. The number and value of 'payments' made to customers from 2008-09 to 2009-10 are, therefore, based on records of the payment instructions given by Aurora's Distribution Business to the Energy Business.

The street-lighting related charter payments made in 2010-12 represent an amalgam of the payments made under both processes, given that the Charter Payment Tool was introduced mid-way through the 2010-11 regulatory year, in March 2011.

For mean days to rectify and replace, Public lighting fault data was sourced from the Aurora scheduling system (WASP). The fault data is saved in the following document in DM NW-#30609751-RIN public light fault data.

Data relating to complaints from customers about public lighting was sourced from the Distribution Business' complaint management system, known as the Customer Advocacy Tool (CAT). However, the CAT system was introduced at the beginning of September 2011, meaning that data was only available for 2011-12 (part-year) and 2012-13. In the three years prior to 2011-12, customer complaints were recorded using a system operated by Aurora's Energy Business (called *InTouch*), which has since been retired. While it may have been technically possible to recover and interrogate the archived InTouch databases (using applications other than InTouch itself), it was considered that the effort and potential cost involved in doing so could not be justified, given the small volume of customer complaints that were likely to have been recorded. Consequently, Aurora has elected to back-cast the volume of public lighting complaints for 2008-09 to 2010-11 based on the number of complaints received in 2011-12 and 2012-13, on the grounds that doing so offered a more cost-effective methodology without a significant loss of accuracy.

4.2 Metering

Aurora's metering services have only been regulated as alternative control services since the 2012-13 Regulatory Year, having previously been regulated by OTTER, meaning that prior to 2012-13, Aurora had only prescribed and unregulated metering services. Aurora has treated metering in the previous financial years, i.e. those years regulated by OTTER, as alternative control services.

4.2.1 Metering Descriptor Metrics

(a)	Compliance with the requirements of the RIN

The information provided in *Table 4.2.1 – Metering Descriptor Metrics* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the information was compiled using the definitions contained in the AER's instructions and definitions for the RIN; and
- the data has been gathered from reliable and objective data sources which are used in the normal course of Aurora's business.

(b)	Information sources

- Installed meter populations were sourced from Aurora metering assets management plans for the relevant year in the table.
- The installed meter populations are in turn sourced from the Aurora market data management system (Gentrack).

(c)	Methodology and assumptions

- Asset management plans are updated annually with a count of the installed meter populations for each type of meter.
- Volume data from Gentrack is correct as at the date the query is run on the data.
- Asset management plans contain the date the queries were run to populate the table in the plan.

4.2.2 Cost Metrics

Expenditure

(a)	Compliance with the requirements of the RIN

The information provided about metering costs in *Table 4.2.2 – Cost metrics* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;

- the variables reported by Aurora are based on reliable and objective data sources; and
- Aurora has provided expenditure incurred in relation to all non-contestable, regulated metering services.

(b)	Information sources

- Aurora has sourced the expenditure data in Table 4.2.2 from its financial system (Navision) for the entire back-cast period.
- The Work Category Codes used to extract metering costs from Aurora's financial system capture the cost associated with: Meter Reads (MDSMR), Meter Replacement, (MEREP) Meter Testing (AIMET) and Meter Maintenance and Investigations (ARMER).

(c)	Methodology and assumptions

- Wherever possible, actual expenditure sourced from Aurora's financial system, in the form of job analysis reports, has been used to derive the total final expenditure on metering.
- Overhead costs from the labour pool and ring-fenced adjustments have been excluded from the total expenditure.
- The costs of purchasing meters in each year of the back-cast period have been determined by applying the unit rate applicable to the year of purchase against the volumes of meters purchased, which were sourced from Aurora's Meter Data Management System (Gentrack).
- Meter Reads split costing is based on individual job numbers that capture special and scheduled reads on the Network Services side as other labour costs applied after intercompany transfer have apportioned labour and overhead costs based on the actual in Network Services.
- Aurora does not currently capture the cost of conducting metering investigations, with metering investigation costs captured under the broader expenditure category of Meter Maintenance and Investigations. In order to provide the requested metering investigation costs, expenditure on meter maintenance has been apportioned between Meter Investigations and Meter Maintenance on the basis of a 20/80 percentage split. The split between meter maintenance and investigations represents an estimate by the relevant Asset Manager that seeks to average the significant variation in investigative effort involved across a wide range of meter maintenance jobs.
- For the period 2008-09 to 2011-12, Aurora's expenditure on metering installations has been estimated.

(d)	Estimated information

a. Rationale

For the period 2008-09 to 2011-12, expenditure on meter installations and other fee-based services were captured and reported together. In the first instance, this is because the installation of a meter is usually undertaken as a component of a larger service (like the provision of a new connection) which also involves other tasks/elements, such as the installation of a service wire, and the various elements of these services were not costed or charged out separately. But there was also no regulatory requirement to identify the costs specifically associated with metering services or any business imperative to do so, given that prior to 1 July 2012, customers were not charged for basic connection services.

Therefore, in order to isolate the costs directly attributable to meter installations for the purposes of the

RIN, the extent to which the costs of providing fee-based services between 2008-09 and 2011-12 were attributable to the installation of meters have had to be estimated.
b. Derivation
• Work Category code - MENIN • A unit rate split provided by the relevant Asset Manager has been applied to an average of volumes for the separate work tasks completed in installing services and other tasks captured in Aurora's systems under the installation work category code. • Once the proportion of unit rates under each volume has been identified, this proportion has been applied to the actual expenditure incurred in Meter Installations, giving a split of what should be included in other areas of expenditure. Assumptions made are the splits based on the unit rate as provided by the asset manager on time/cost taken to complete each task. Data such as volumes and actual unit rates are not available to complete an accurate account of expenditure incurred.

Volume

(a)	**Compliance with the requirements of the RIN**
The information provided about meter reading and new meter installation volumes in *Table 4.2.2 – Cost Metrics Service Subcategory* is consistent with the requirements of the Category Analysis RIN, in that: • all relevant input cells in the template have been populated; • the meter reading volumes provided by Aurora are actual data; and • the data is gathered from records used in the normal course of Aurora's business.	
(b)	**Information sources**
• All meter reading data provided in response to Table 4.2.2 has been sourced from Aurora's Meter Data Management System (MDMS), Gentrack. • In the case of special meter readings (including monthly meter reads), which are instigated on the basis of service orders rather than as part of the meter reading rounds generated by Aurora's MDMS, Aurora's Service Order Management System (SOM) has been utilised to corroborate the volume of meter readings recorded in Aurora's MDMS.	
(c)	**Methodology and assumptions**

No estimates were required in order to provide a response to Table 4.2.2, on the basis that the meter reading statistics compiled by Aurora are derived from reliable and objective records used in the normal course of business, and neither contingent on judgments nor assumptions.

It is noted that monthly meter reads (as opposed to the standard quarterly readings) have been reported as special meter readings, on the basis that monthly meter reads are not included as part of the meter reading rounds generated by Aurora's MDMS and are instigated on the basis of service orders.

4.3 Ancillary Services - Fee Based Services

4.3.1 Cost Metrics for Fee-Based Services

Expenditure

(a)	Compliance with the requirements of the RIN

The information about expenditure incurred by Aurora in providing fee-based services reported in *Table 4.3.1* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated; and
- the reported expenditure on the provision of fee-based services is materially dependent on information recorded in Aurora's finance system.

(b)	Information sources

The cost data associated with the provision of fee-based services have been sourced from Aurora's Finance System (Navision).

(c)	Methodology and assumptions

All costs incurred in the provision of fee-based service are captured against the same cost code in Aurora's finance system. For the purposes of Table 4.3.1, total fee-based service costs have been apportioned between individual fee-based services on the basis of charge-out rates and volumes.

Some expenditure on the provision of fee-based services is also recorded against other types of services within Aurora's financial system, in cases where a fee-based service, such as energisation, is performed as part of another service that involves multiple elements. The costs associated with the fee-based service component of providing those services have been apportioned to fee-based services on the basis of managerial estimates.

Volume

(a)	Compliance with the requirements of the RIN

The information provided about fee-based service volumes in *Table 4.3.1 – Cost Metrics for Fee Based Services* is consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated;
- the energisation, de-energisation and re-energisation volumes provided by Aurora are actual data, gathered from reliable and objective data sources used by Aurora during the normal course of business; and
- the volumes relating to miscellaneous fee-based services include both actual data and estimates;
- any estimates of miscellaneous fee-based service volumes are based on records used in the normal course of business.

(b) Information sources

Common fee-bases services

The volumes of common fee-based services activities presented in Table 4.3.1 have been sourced from Aurora's Meter Data Management System (MDMS), Gentrack.

Miscellaneous fee-based services

The volumes of miscellaneous fee-based services presented in Table 4.3.1 draw on a combination of actual data and estimates informed by actual data sourced from several iterations of Aurora's Service Order Management System (SOM).

(c) Methodology and assumptions

Common fee-bases services

- The volume of energisations has been based on the number of new connections recorded in Aurora's MDMS, on the basis that all new connections are energised as part of the connection process.

Miscellaneous fee-based services

- For the 2011-12 and 2012-13 regulatory years, the volumes of miscellaneous fee-based services presented in Table 4.3.1 summarise data recorded in Aurora's SOM system, which has been in service since February 2011.
- For the 2010-11 regulatory year, therefore, actual service volumes are only available from Aurora's current SOM system for the 5 month period February – June 2011, meaning that Aurora has had to rely on alternative data sources to extract service volumes for the seven months prior.
- For some miscellaneous fee-based services, that volume data has been sourced from the Service Order Management System which was superseded in February 2011. However, for other fee-based services, however, Aurora has been required to develop estimates of service volumes for the period July 2010 to January 2011, inclusive.
- While service-volume data is available in relation to the 2009-10 and 2008-09 regulatory years, a combination of regulatory, industry and IT system changes in the intervening period – and the resultant changes to business processes, record keeping systems and reporting – mean that the services that were provided in 2009-10 and 2008-09 are not directly comparable with the services types and work categorisations which are currently applied by Aurora, or reported in the Category Analysis RIN. Aurora has, therefore, relied on estimates of service volumes for the miscellaneous fee-based services reported in Table 4.3.1.

(d) Estimated information

a. Rationale

Some estimates of fee-based service volumes were required on the basis that actual data was not available in relation to some services and/or some regulatory years.

b. Derivation

Miscellaneous fee-based services

For those fee-based services for which volume data was not available for the period July 2010 to January 2011, but was available for the period February – June 2011, the number of services provided in the first seven months of the 2010-11 regulatory year were derived by applying the monthly arithmetic mean of service volumes recorded in Aurora's SOM system between February and June 2011 to the preceding 7 months.

In the case of service volumes for 2008-09 and 2009-10, the absence of compatible actual data for that period (due to the different service classifications that were being used at that time), service volumes have been back-cast for the purposes of Table 4.3.1 on the basis of the trend in fee-based service volumes observed in the three year period spanning 2010-11 to 2012-13 for which actual service volumes are available.

It has been assumed that the average number of each fee-based service provided during the period February to June 2011 is likely to be a reliable indicator of service volumes for the remainder of that year.

In the case of the service volumes estimated for 2008-09 and 2009-10, it has been assumed that the trends in service volumes identified on the basis of service order management data for the period 2010-11 to 2012-13 is linear.

The method used to back-cast service volumes for 2008-09 and 2009-10 was preferred on the basis that it was informed by objective data sources used by Aurora in the normal course of business during the period 2010-11 to 2012-13.

4.4 Ancillary Services - Quoted Services

4.4.1 Cost Metrics for Fee-Based Services

Expenditure

Volume

(a)	Compliance with the requirements of the RIN

The table 4.4 Ancillary Services – Quoted Services has been prepared in accordance with the Regulatory Information Notice under Division 4 of Part 3 of the National Electricity Law, section 15. The cost metrics for quoted alternative control services in Table 4.4.1 are consistent with the requirements of the RIN, in that;

- Section 15.1 states that the data provided in relation to quoted services must reconcile with internal planning models used in generating Aurora's proposed revenue requirement. The data reported for the years 2008-09 – 2011-12 have been reconciled to the models used in the pricing determination for determining the annual revenue stream and reconcile to the closing balance of the regulated asset base for 2011-12. The data provided for 2012-13 has been based on actual data and reconciles with the data provided in response to the annual Regulatory Information Notice for the same year.
- Section 15.2 is not applicable to Aurora as quoted services are not listed in the annual tariff proposal.
- Section 15.3 requires Aurora to provide a description of each quoted service listed in regulatory template 4.4 that explains the purpose of each service and details the activities which comprise each service. That information is provided in the following table;

Service	Purpose	Activities
Relocation/Removal - Poles	To capture expenditure on customer driven pole relocations/removals	Pole relocation and removal in its entirety
Relocation/Removal - Substations	To capture expenditure on customer driven substations relocations/removals	Relocation and removal of substation in entirety or components, eg door way removed or building design mortifications
Relocation/Removal - Transformers	To capture expenditure on customer driven transformers relocations/removals	Transformers removal and relocation in its entirety
Relocation/Removal - Overhead	To capture expenditure on customer driven overhead assets relocations/removals	Relocation or removal of overhead components including; low voltage wire, high voltage wire , service wire, fibre, conductors, switches/fuses
Relocation/Removal - Underground	To capture expenditure on customer driven underground assets relocations/removals	Relocation or removal of underground components including; low voltage cables, high voltage cable, cabinets, turrets
Services of higher standard - Substation	To capture expenditure on customer driven above standard substation works	Modifications to substation for customer needs, including; building design modifications
Services of higher standard - Transformers	To capture expenditure on customer driven above standard transformer works	Modifications to transformer design for customer needs as requested
Services of higher standard - Overhead	To capture expenditure on customer driven above standard overhead asset works	Modifications to overhead asset design for customer needs, including; overhead wires both low voltage and high voltage, service wire, conductors etc
Services of a non standard nature - Connections	To capture expenditure on customer driven service connection and metering works	Disconnects, reconnections, metering upgrades, new mains connections
Services of a non standard nature - Subdivisions	To capture expenditure on customer driven subdivision overhead and underground works	Could encompassed both overhead and components, looks at activities directly related to subdivisions as requested by developers

- Aurora Energy has not distinguished between standard or alternative control services when

reporting expenditure for quoted services, as per paragraph 15.4.

- Aurora Energy has not differentiated between capex and opex in relation to the expenditure reported on quoted services, as per paragraph 15.5.
- The capture of costs for quoted services provided in template 4.4 is consistent with the definition of quoted services given in appendix F of the RIN.

(b)	Information sources

Aurora has used two different data sources to populate Table 4.4, both of which are reliable and objective data sources that are used in the normal course of Aurora's business. For the year 2012-13, information has been sourced directly from Aurora's financial system (Navision) and reconciled to the Annual Regulatory Accounts. For the years 2008-09 – 2011-12 information has been sourced from the regulated asset base (RAB) roll forward model.

Year end - 2012-13:

- Data has been obtained directly from Aurora's financial system for the direct work costs associated with quoted services work. The data has been stripped of overheads and reconciled back to the Opex Allocation Model v1.
- The project list was then feed into a specific WASP built report to indentify service types as defined above.
- The data obtained from Aurora's financial system was also tested against other working documents in order to exclude any incorrectly classified quoted services jobs, (such as projects containing the SOMPR work category, as these projects were translated to quoted services but were actually related to standard control) and break down any mixed projects that may have included a portion of quoted services works.
- Information related to corporate overheads and shared services costs were sourced from the annual Regulatory Information Notice.
- Information was also sourced manually from the Aurora's work management system 'WASP' as required

Year end – 2008-09 – 2011-12:

- Data has been obtained from the RAB roll forward document. The nominal actual net Capex figures in that document have been used as the base data.
- Information about the average quoted service spend percentage has also been obtained from this document. The percentage has been applied against the nominal actual net Capex figures to determine the total quoted spend for years 2008-09 – 2011-12.

(c)	Methodology and assumptions

Year end - 2012-13:

Aurora applied the following assumptions to the source data:

- The source of truth for direct costs is the Network job analysis report (e.g. if there is any mismatch in data between the Network Services or Network ledgers, Network data will prevail).
- The Network job analysis report contains overheads. The overheads were excluded based on the overheads identified in the Opex Allocation Model v1.
- In order to amalgamate the data into a consolidated table split by service types, Network Services transactional information was feed into a WASP report specifically built to determine the design project type, which provided additional information to assist in the classification process.

Three assumptions were applied to the data:

1. Where a work category links directly to a type of service, all volumes and costs are have been applied to that service e.g. the work category QUSCO can be 100% allocated to the service "Services of a non-standard nature – Connections";
2. The design project type was used to classify projects between services types e.g. where 'pole' has been recorded as the project description it was assumed the project related to pole relocation/removal; and
3. When assumptions 1 or 2 could not be applied, then information about service types were manually sourced from WASP, e.g. through customer letters, project notes or directly from the scope.

- In relation to volumes data, a one project for one service relationship was assumed in all service types except pole relocation and removal.
- For the pole relation/removal service type, volumes for projects costing over $30,000 where manually sourced by a business expert. For projects under $30,000 a unit rate has been applied to arrive at service volumes per project. The unit rate was built up by the business expert.

Year end – 2008-09 – 2011-12:

Aurora applied the following assumptions to the source data;

- The information for the period has been sourced from the RAB roll forward model. The average quoted service percentage spend stated in the model has been applied to the nominal actual net capex expenditure to arrive at the total yearly quoted services expenditure.
- The annual quoted services costs for 2008-09 to 2011-12 have been spilt over the service types based on the spending trend in 2012-13.
- Volumes for the period 2008-09 to 2011-12 have been based on an assumed unit rate for 2012-13, e.g. total annual costs divided by total annual volumes and then applied to the annual quoted services expenditure.

5. Network information

5.2 Asset Age Profile

5.2.1 Asset Age Profile

(a)	Compliance with the requirements of the RIN

The asset age profiles in *Table 5.2.1* are consistent with the requirements of the Category Analysis RIN, in that:

- all relevant input cells in the template have been populated; and
- the information has been prepared as per the AER's instructions in the Regulatory Information Notice, specifically section 6 of Appendix E – Principles and Requirements.

(b)	Information sources

Aurora has used the following data sources to populate *Table 5.2.1*:

- 2013 Annual Reporting RIN Table 7 - Asset Installation.
- 2013 Annual Reporting RIN Basis of preparation – Table 7 - Asset Installation.
- Aurora's Intergraph G-Technology GIS system.
- Aurora's Spatial Data Warehouse.
- The source data used to compile Table 5.2.1 can be viewed in Aurora's EDMS (DM) using the following document references:
  - NW-#30599905-Public lighting RIN data;
  - NW-#30608895-Public Lighting Pole data;
  - NW-#239732-Technical Specification: Zone Substation Protection, SCADA and DC Equipment Maintenance and Fault Response;
  - NW-#252680-Schedule of History/Development of Retail Supply/Distribution Branch;
  - NW-#30508706-NA P PC 01 Rev 1 Management Plan: Protection and Control (2014/2015);
  - NW-#30622208-Zone Substation Protection and Control Device Nos & Install Dates for 2014 RIN;
  - NW-#30626224-SCADA Device List following SUP audit; and
  - NW-#30173797-RIN Template.

(c)	Methodology and assumptions

The majority of this basis of preparation deals with the methodology used to translate the asset age profile data provided in Table 7 (Asset Installation) as part of Aurora's 2013 Annual Reporting RIN across into the new asset categories requested by the AER for the 2014 Category Analysis RIN.

Asset age profiles are presented on a calendar year basis, because the lack of detail in Aurora's asset records regarding the month in which many assets with recorded installation dates were actually commissioned prevents Aurora from reliably determining or modelling asset age profiles on a financial year basis. This also means that the numbers of assets commissioned in calendar year 2013 and reported in September 2013 in response to the 2013 Reporting RIN as part of the asset age profile for distribution system assets have been updated in this RIN response to reflect asset installations for the full calendar year 2013.

Poles:

Since mid-2010, the processes used by Aurora to capture pole data have undergone revision. Information about Aurora's poles was formerly captured by personnel dedicated exclusively to the gathering of pole data, which resulted in every new pole being captured within 12 months of installation.

With pole data now being captured either through in-field work processes, or by pole inspectors operating under a five year inspection cycle, delays of over 12 months may be experienced in the data capture process. Rules applying to the recording of new poles in Aurora's GIS also require that poles can only be added to the database when they have been assigned a Pole Tag ID and their installation has been confirmed. If no confirmation is received from the field of a pole having been erected, a record of the new pole may not be added until the pole is next inspected, which may not occur for another five years under Aurora's current inspection regime.

This means that there are likely to be a number of poles constructed since mid-2010 for which there is currently no record, and while Aurora's new processes are capturing more comprehensive information about individual poles than was gathered prior to the changes in Aurora's processes, the time taken to do so in some cases means that Aurora has less complete information about its poles in the shorter term, and will continue to do so until improved in field capture tools are developed.

Therefore, estimates have been made for the number of poles installed during the back-cast period for which there is no record.

An extract of pole data was taken from Aurora's GIS to allow for categorisation of poles by voltage. This distribution was then applied to the numbers reported in Table 7 for poles installed in all years other than 2013, where actual information was used.

Table 2.2 REPEX has refurbished steel and concrete poles as an asset category. A category for steel and concrete poles has been added in Table 5.2 but not for refurbished steel and concrete poles as this is not a reportable attribute in Aurora's GIS.

Transformers:

Aurora has historically captured installation dates for its distribution transformers.

An extract of transformer data was taken from Aurora's GIS to allow for categorisation of transformers by voltage, phase and construction. This distribution was then applied to the numbers reported in Table 7 for transformers for all years other than 2013, where actual information was used. Zone transformer data was also added on to these figures at the appropriate voltages.

(d)	Estimated information

a. Rationale

Aurora has not captured installation dates of some categories of assets until recently. In these circumstances, estimates have been made for the purposes of asset age profiling.

b. Derivation

HV Conductors:

Analysis of Aurora's overhead network had been recently undertaken by a contractor to provide a methodology for profiling the age of conductors installed prior to 2009. The high level outputs of this analysis were used to categorise conductors by voltage and number of phases, and then the distribution was applied to the asset numbers reported in Table 7 of Aurora's 2013 Annual Reporting RIN for

overhead conductors for all years other than 2013, where actual information was used. Conductor lengths prior to 1980 were then adjusted by an estimated percentage to account for conductor replacements and to reduce variations between Table 5.2 and those lengths reported in Aurora's 2014 Economic Benchmarking RIN.

Underground Cables:

An extract of cable data was taken from Aurora's GIS to allow for categorisation of cables by voltage. This distribution was then applied to the numbers reported in Table 7 of Aurora's 2013 Annual Reporting RIN for cables, for all years except 2010 to 2013, where actual information was used to update the 2013 figures, and because the actuals from 2010 aligned with the figures reported in Table 7.

Three new asset categories were also added to Tables 2.2 and 5.2 to account for underground joints and terminations, and underground street furniture. These figures were populated using the numbers reported in Table 7.

Service Lines:

Aurora's records of LV service lines is limited, and includes whether a line is located overhead or underground and its voltage, but does not include size, material, type or installed date.

Broad assumptions based on expert knowledge were applied to service lines reported in Table 7 in order to enable classification of LV services into the requested categories. An 85/15 split was applied to reported LV services between residential and commercial/industrial services, and all services were assumed to be simple connections.

Switchgear:

Ground mounted switchgear data is recorded as an attribute of Aurora's ground mounted substations. A spatial extract of HV cable intersections with transformers was utilised as a proxy for ground mounted sites with switchgear installed. Switchgear was classified into the required categories by Aurora's Ground Mounted Substations team and sorted into the appropriate AER categories. A new asset category was created to cover ground mounted switchgear that has a combination of switchgear that is not strictly a fuse, circuit breaker or switch.

An extract of recloser and load break switch data was extracted from Aurora's GIS and classified into the appropriate AER categories.

The extract of zone switchgear data that was used to complete Table 7 was also utilised to determine zone switchgear numbers, by assuming that circuit breaker installation dates were the same as substation installation dates, and that the number of feeders from a zone substation was indicative of the switchgear in use. These switchgear were classified into the appropriate AER categories.

An extract of overhead switchgear (fuses, air brake switches and links) was obtained from Aurora's GIS and classified into the appropriate AER categories. There is limited installation date information for these asset types so actual data was used only for 2009 to 2013. The rest of the population was evenly distributed over the period spanning from 1959 to 2009. 1959 was chosen as it is approximately around this point in time that Aurora's earliest recorded switchgear installations start.

All the figures were then summed together into a complete data set.

Public Lighting:

Historically, Aurora has not recorded installation dates for public lighting. Therefore, age data for lights with no installation date has had to be estimated using procurement records, or by interviewing employees who have been involved with the installation of lighting assets.

Luminaire data for asset age profiling was completed using the information from Aurora's Assets team that was used for the 2014 Category Analysis RIN in NW-#30599905-Public lighting RIN data.

Bracket data for asset age profiling was completed using the information provided by Aurora's Assets team that was used for the 2014 Category RIN in NW-#30608895-Public Lighting Pole data. Pole age was used as a proxy for the age of lighting brackets and no distinction was made between pole owners or between the different types of light configurations/mountings.

No age profile has been completed for lamps as Aurora classifies these items as consumables, not assets, and therefore has minimal information regarding these items as an asset class.

Public lighting pole data for asset age profiling was completed using the information from Aurora's Assets team that was used for the 2014 Category RIN in NW-#30608895-Public Lighting Pole data. Only poles owned by Aurora and dedicated to street lighting was used.

SCADA, Network Control and Protection Systems:

Field device volumes are estimated based on information recorded in Appendix D of NW-#239732-Technical Specification: Zone Substation Protection, SCADA and DC Equipment Maintenance and Fault Response. This information is outdated and is only being referred to for the purpose of providing estimates. New zone substation asset audits are currently in progress, and are being carried out in conjunction with the zone substation maintenance schedule. Partial data gathered through this audit activity will be ready for the next RIN reporting period.

Original field device installation dates are based on information recorded in NW-#252680-Schedule of History/Development of Retail Supply/Distribution Branch.

Estimates of the quantity of local network wiring assets currently in commission were based on the assumption that each field device must have a corresponding set of wiring assets. Communication network asset volumes are based on an assumption of one Remote Terminal Unit and one Ethernet switch per zone substation and an AVR per transformer at the zone substation. There are more devices in service, but exact numbers are currently unknown. Exact volumes will become available, pending the outcome of the aforementioned zone substation asset audits, which are currently in progress.

Communication network asset installation dates are based on either:

- The commissioning date of modern zone substations, which were equipped with these asset types when the substation first entered service; or
- The most recent modernisation project commissioning date for older zone substations, where these new assets were introduced. Refer to NW-#30508706-NA P PC 01 Rev 1 Management Plan: Protection and Control (2014/2015) for these dates.

Master station assets were estimated using Aurora's SCADA IP Register as at 31 March 2014. The register provided the total number of assets but not the installation dates of those assets. An age profile was estimated for these assets and the population distributed over that range. Refer to NW-#30626224-SCADA Device List following SUP audit for more detail.

Economic Life:

Economic lives for Aurora's assets are sourced from Aurora's Regulated Asset Base other than in the case of public lighting assets, where asset lives have been taken from Aurora's public lighting annuity model.

The standard deviation for the economic life of Aurora's assets has been estimated as the square root of the mean, as mentioned on page 51 of the AERs explanatory statement for the Category Analysis RIN:

> *The economic life of the asset would be the assumption that goes into this analysis of the period of effective service the NSP anticipates the replacement asset would provide. This assumption is the mean economic life, if based on historical effective service periods the NSP should be able to provide a corresponding standard deviation. Absent of this, we note in the guide to the Repex model, a proxy often used is the square root of the mean.*

5.3 Maximum Demand at Network Level

5.3.1 Raw and Weather Corrected Coincident MD at Network Level

(a)	Compliance with the requirements of the RIN

- The coincident raw system annual maximum demands are the actual unadjusted summation of actual raw demands for the transmission connection point, at the time when the summation is greatest.
- Weather correction has also been applied to unadjusted raw demand data to calculate weather corrected 50% POE and 10% POE maximum demands.
- Data is based off the September to August year in order to correctly relate to the seasons of the financial year.
- All non-scheduled embedded generation data for embedded generators over 0.5MW are included.

(b)	Information sources

- Raw demand data is sourced from Transend SCADA metering.
- Weather correction is performed using the raw demand data and Bureau of Meteorology weather data for various sites around the state.
- Raw metering data on embedded generators.

(c)	Methodology and assumptions

- The coincident raw system annual maximum demands are the actual unadjusted summation of actual raw demands for the transmission connection point, at the time when the summation is greatest.
- Aurora takes supply from two generation sites. Since they behave as a transmission connection site these are also considered in the analysis.
- Weather correction process involves temperature sensitivity analysis at each connection point to determine the demand response to a change in temperature of one degree. The process then determines the relationship between the temperature on the highest demand day and the average long term temperature at the site to determine the relativity to the 50 POE or 10 POE scenarios.
- Power factor is measured at coincident peak and applied across the whole year when converting MW to MVA.

5.4 Maximum Demand and Utilisation at Spatial Level

5.4.1 Non-Coincident & Coincident Maximum Demand

(a)	Compliance with the requirements of the RIN

- The coincident raw system annual maximum demands are the actual unadjusted summation of actual raw demands for the transmission connection point, at the time when the summation is greatest.
- Weather correction has also been applied to unadjusted raw demand data to calculate weather corrected 50% POE and 10% POE maximum demands.
- Data is based off the September to August year in order to correctly relate to the seasons of the financial year.
- All non-scheduled embedded generation data for embedded generators over 0.5MW are included.

(b)	Information sources

- Raw demand data is sourced from Transend SCADA metering.
- Weather correction is performed using the raw demand data and Bureau of Meteorology weather data for various sites around the state.
- Raw metering data on embedded generators.

(c)	Methodology and assumptions

- The coincident raw system annual maximum demands are the actual unadjusted summation of actual raw demands for the transmission connection point, at the time when the summation is greatest.
- Weather correction process involves temperature sensitivity analysis at each connection point to determine the demand response to a change in temperature of one degree. The process then determines the relationship between the temperature on the highest demand day and the average long term temperature at the site to determine the relativity to the 50 POE or 10 POE scenarios.
- Substation ratings are based on nameplate rating from the equipment manufacturer. Cyclic ratings are not currently in use at Aurora.
- Power factor is measured at coincident peak and applied across the whole year when converting MW to MVA.

6. Service & quality

6.3 Sustained Interruptions to Supply

6.3.1 Sustained interruptions to supply

(a)	Compliance with the requirements of the RIN

The information provided about sustained interruptions to supply in Table 6.3.1 is consistent with the requirements of the Category Analysis RIN, in that:

- Data for both planned and unplanned outages have been included, as per RIN paragraph 18.1
- Only interruptions of more than 1 minute have been reported, as per RIN 18.2 (modified by Issue 50 in the *Issues Register).*
- Unplanned events were classified as per RIN paragraphs 18.3 & 18.4.
- Reasons for outages were applied as per RIN paragraph 18.5.
- Data are actuals, not estimates, as defined in the RIN.

(b)	Information sources

- Aurora's program-of-work management system, WASP (WASP - Works, Assets, Solutions and People).
- Aurora's Intergraph G-Technology GIS system (GTech).

(c)	Methodology and assumptions

- Outage details were extracted from the WASP outage system.
- Customer details were extracted from the GTech (GIS) system.
- An SQL query was run to extract the appropriate data.
  - Run SQL found at N:\NWSystemPerformance\Asset Information and Performance Queries\RIN Queries\Category RIN\Table_6.3_Sustained_Interruptions.sql.
- WASP causes were translated to AER causes in the following tables in the SAM_REPORT schema in the SDW:
  - CAT_RIN_14_AER_CAUSE.
  - CAT_RIN_14_AER_CAUSE_DETAIL.
- The results were exported to Excel.
- Outages with a cause of Asset Failure were manually categorised into either LV or HV based on the system affected.
  - Outages with an affected system of TX (transformer) or SF (service fuse) have the Cause Detail field populated with LV.
  - Outages with an affected system of CS (control station) or FD (feeder) have the Cause Detail field populated with HV.
- Planned outage SAIDI is set to 0 as the SAIDI column refers to unplanned SAIDI only.
- Unplanned SAIDI is calculated as per STPIS (using kVA not customer numbers).
- Exclusions permitted under the Aurora STPIS are excluded.
- Unplanned SAIFI has been calculated on the basis of kVA interrupted, rather than the number of customers interrupted, as agreed with the AER as part of the Aurora Distribution Determination.

- Major Event Days have been identified with reference to MED System Average Interruption Duration Index thresholds calculated using the method prescribed by the AER.
- For the back-cast period, Aurora is not required to provide detailed reasons for sustained interruptions, using the list of reasons provided in Template 6.3. However, the number of interruptions caused by blow-ins, fall-ins and grow-ins for which a party other than Aurora is responsible will always be reported as nil in the case of Aurora's network, because in Tasmania, unlike other jurisdictions, local government has no responsibility for maintaining vegetation corridors.