



Category Analysis Regulatory Information Notice

Basis of Preparation

2013/14

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Glossary of Terms

AER	Australian Energy Regulator
BOM	Bureau of Meteorology
CT	Current Transformer
DNSP	Distribution Network Service Provider
FTE	Full time equivalent
GIS	Gas Insulated Switchgear
GWh	Gigawatt hours
HR	Human Resources
kV	kilovolt
MD	Maximum Demand
MDP	Meter Data Provider
MVA	Mega volt ampere
MVA_r	Megavar
MW	Megawatt
NCC	Normal Cyclic Capacity
NEM	National Electricity Market
ODAF	Oil directed air forced
ODAN	Oil directed air natural
ONAF	Oil natural air filled
ONAN	Oil natural air natural
OPGW	Optical Ground Wire
OSTRAC	Powerlink's outage management system
POE	Probability of Exceedence
RIN	Category Analysis RIN issued by the AER, 7 March 2014
SAP	Powerlink's corporate enterprise resource planning database
SCADA	Supervisory Control and Data Acquisition
SVC	Static Var Compensator
TAPR	Transmission Annual Planning Report
TNDB	Transmission Network Database
VT	Voltage Transformer

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Overarching Comments

For clarification, Powerlink has adopted the following general approaches in a number of tables across the Category Analysis RIN templates. Where relevant, these have generally been identified in the Basis of Preparation for the specific sheet and/or table.

Regulatory Financial Statements

Where applicable, all costs have been reconciled to Powerlink's historic Regulatory Financial Statements.

Actual and Estimated Data

Where the preparation of data met the AER's definition of actual information, this data has been identified as actual.

All data which did not meet the AER's definition of actual information has been identified as estimated. This includes information whose presentation *is materially dependent* on historical accounting or other business records and *is contingent* on judgments, assumptions, allocation methodologies or other adjustments for the purposes of responding to the Category Analysis RIN.

Where data has been estimated, Powerlink considers these to be its best estimates in the time available.

Capital Project Information

The AER's Information Guidelines (which relate to preparation of the Regulatory Financial Statements) require that individual capital projects be categorised in total according to the primary reason for investment. For example, the primary reason or driver for a capital project may have been replacement due to age, condition or obsolescence. However, this project may also contain some minor augmentation components. The entire project has been categorised as replacement.

Process to Unburden Corporate Overheads from Costs

The Category Analysis RIN requires that all capex and opex costs reported in the templates exclude (or unburden) allocated overheads¹. Powerlink allocates overheads using its AER approved Cost Allocation Methodology as published on Powerlink's website. To unburden capex and opex costs, Powerlink derived an indicative corporate overhead rate from the employee activity rate when applied to the time charged to activities. Further details about the process are provided in the methodology section in relation to Table 2.2.1 (Repex) of the Basis of Preparation, and are noted in other areas throughout the document where relevant.

Real and Nominal Conversions

Given that the RIN requires current year data, conversions are not required.

¹ Category Analysis RIN, pp39-40.

Sheet: 2.1 Expenditure Summary

Table: 2.1 Cost summary and reconciliation

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 2 and 3) and Appendix F of the Category Analysis RIN.

Table 2.1.1 has been populated with estimated data. The reasons why estimates were required and how they were produced are explained in the relevant sections of the Basis of Preparation.

Source

The data has been sourced from sheets 2.2 (Repex) to 2.9 (Overheads), Powerlink's Regulatory Financial Statements and Powerlink's financial systems.

Methodology and assumptions

In accordance with the Category Analysis RIN, Powerlink has reconciled the Total Capex and Opex expenditure for each service classification in Tables 2.1.1 to 2.1.2 to the total expenditure reported in sheets 2.2 to 2.8 (refer attached Reconciliation Tables in Appendix A).

The balancing items used to reconcile the expenditure are as follows:

Corporate Overhead: as expenditure reported in sheets 2.2 (Repex) to 2.8 (Maintenance) must be direct cost only Powerlink has removed Corporate Overhead Expenditure using the methodology to unburden corporate overheads (including procurement overheads) from the cost data using the processes described in section 2.2.1 of the Basis of Preparation.

Capex

- **Post commissioning costs:** consistent with Accounting Standards, Powerlink defines "project close" as the year in which the asset is ready for use, i.e. the year in which the asset was capitalised. As a result, any post commissioning costs have not been reported as part of the project costs reported in sheets 2.2 (Repex) to 2.5. These post commissioning costs have therefore been included in this balancing item;
- **As incurred:** as capex and associated data reported in sheets 2.2 (Repex) to 2.6 (Non-Network) must be reported against the Regulatory Year on a "project close" basis and Table 2.1.1 must be reported on an "as-incurred" basis, this balancing item reconciles the timing difference between "as-incurred" capex and "project close" capex for Category Analysis RIN purposes;

CAPEX not reported in the RIN: certain easements², security/compliance and other projects that did not meet the Category Analysis RIN definitions are not reported

• ² This only includes easements for this where there is no associated augex project.

elsewhere in the sheets 2.2 to 2.6, and are included as a balancing item for the purposes of reconciling to the Regulatory Financial Statements.

Sheet: 2.2 Repex

Table: 2.2.1 Replacement Expenditure, Volumes and Asset Failures by Asset Category

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 3 and 5) and Appendix F of the Category Analysis RIN.

Table 2.2.1 has been populated with both actual and estimated data. Actual data has been used for asset replacement and failure volumes. All financial data has been estimated.

As required by the RIN³, Powerlink has identified transmission tower refurbishment projects separately within the transmission towers asset group and reported these against the “Other” category⁴. Consistent with Powerlink’s capitalisation policy and Final Determination⁵, refurbishment information contained in this table reflects life extensions only (defined by the AER as line refits in Powerlink’s Final Determination).

Consistent with the RIN⁶, Powerlink has also added the following asset groups to Table 2.2.1:

- Buildings – which include control buildings; and
- Site Infrastructure – which include all roads, drainage, lighting, fences and amenities buildings.

Source

Financial data has been sourced from Powerlink’s Regulatory Financial Statements and Powerlink’s corporate enterprise resource planning database (SAP) Project Module and capitalisation data.

For each project, Powerlink’s internal Project Scope documents were used to provide the high level technical scope of the project and to identify some of the technical asset information required in the templates.

Historical transmission asset outage data from Powerlink’s internal network operating systems was used to source the number of asset failures per annum. Powerlink’s corporate enterprise resource planning database (SAP) Plant Maintenance Module was used to source asset details for categorisation of asset replacements and asset failures.

Powerlink has sourced ratings data from its internal Transmission Network Ratings Database.

³ Category Analysis RIN, Appendix E, 5.1(b).

⁴ AER Networks DMS – RIN development – CA TNSP – list of fixes in template, contained in email AER to Powerlink, 4 September 2013 – Revised CA RIN template 2013-14.

⁵ AER (2012), Powerlink Transmission Determination 2012/13 to 2016/17, Final Decision, April.

⁶ Category Analysis RIN, Appendix E, 5.1(c)

Methodology and assumptions

Financial Data

Consistent with Accounting Standards, Powerlink defines 'project close' as the year in which the asset is ready for use, ie. year in which the asset was capitalised. As a result, any post commissioning costs have not been reported as part of the project costs. These costs have been included as a balancing item in Table 2.1.1 of sheet 2.1 Cost Summary and Reconciliation of the templates.

Removal of Corporate Overhead Expenditure

The RIN⁷ requires that direct capex and opex costs reported in the templates exclude any allocated overhead. Powerlink allocates overheads using its AER approved Cost Allocation Methodology as published on Powerlink's web site.

Corporate Overhead

A portion of Powerlink's corporate overhead expenditure has been included in employee activity rates and allocated on a *Labour Time Charged* basis. The resultant charge appears as a single cost element in the reported results. Once charged to an activity, the individual cost components cannot be separately identified in Powerlink's financial systems.

To comply with the requirements of the RIN Powerlink derived an indicative corporate overhead rate which enabled the unburdening (or exclusion) of the corporate overhead from the employee activity rate when applied to the *Labour Time Charged* to activities. To derive the indicative rate Powerlink:

1. Identified the value of corporate overhead expenditure that was allocated to the labour activity charge in the RIN reporting year.
2. This value was then divided by the total costs allocated to activities on a *Labour Time Charged* basis.
3. The resulting percentage (the Burdened Percentage) represents an annual weighted average corporate overhead charged to activities on a *Labour Time Charged* basis.

To unburden the corporate overheads the derived Burdened Percentage was applied to total expenditure via the *Labour Time Charged* method to each activity (both operational and capital).

Procurement Overhead

Costs associated with Powerlink's procurement function were separately identified and allocated as an on-cost to external purchases for goods and services. To comply with the requirements of the RIN⁸ Powerlink removed these costs using a pro-rata rate adjustment to the non-labour cost components costed to each activity (both operational and capital activities).

⁷ Category Analysis RIN, definition of direct costs, p39.

⁸ Category Analysis RIN, p39-40.

Estimated Costs

Why estimates are required

Where Powerlink's asset categories were similar to the AER's RIN categories (ie. cables, transformers, reactive plant and SCADA, Communication and Protection Systems), the capitalised value of the asset, inclusive of procurement, design and installation was initially identified. However, given that the RIN requires that corporate overheads (including procurement overheads) be excluded from all reported costs and, Powerlink has derived and applied a methodology for unburdening overheads, all reported costs are considered to be estimates.

Further, Powerlink's systems do not record asset expenditure information to the category required by the AER for the following equipment types:

- Transmission Towers;
- Conductors;
- OPGW;
- Circuit breakers;
- Isolator/earth switches;
- Voltage Transformers (VTs); and
- Current Transformers (CTs).

For the categories identified above, Powerlink has estimated values for these equipment types based on a proportion of the high level asset value capitalised to each project (more information below).

How the estimate has been produced

To estimate the **towers/conductor/OPGW** expenditure for each project, Powerlink applied the following approach:

1. Identified four general types of lines projects⁹ – 132kV cyclonic, 275kV cyclonic, 132kV non-cyclonic and 275kV non-cyclonic;
2. Developed the tower, conductor and OPGW cost to total cost proportion for each of these four general types of lines projects from Powerlink's estimating system; and
3. Estimated the tower, conductor and OPGW costs for each project to populate the templates by applying the relevant line project percentage to the total built section value recorded in Powerlink's financial systems.

To estimate the **circuit breakers, isolator/earth switches, VT's and CT's** expenditure for each project, Powerlink applied the following approach:

1. Identified two general types of switching bay asset – 275kV and 132kV;
2. Developed the circuit breaker (live tank)¹⁰, isolator/earth switch, VT and CT cost to total cost proportion for each of these two general types of projects from Powerlink's estimating system; and

⁹ This categorisation is consistent with the categorisation used for augex.

¹⁰ Where Powerlink has installed circuit breakers of a dead tank design (ie. CT integrated) the CB and CT proportions are added together.

3. Estimated the equipment costs for each project to populate the templates by applying the relevant percentage to the total switching bay value recorded in Powerlink's financial systems.

'Other' Asset Category

Powerlink has included assets and equipment in the "Other" category. For previous years, this expenditure was included in the balancing item row. Expenditure in this category includes:

- expenditure that relates to replacement of a sub-component of an asset;
- expenditure that relates to increasing the functionality of the asset; and
- expenditure that relates to the relocation of an asset.

Technical Data

Asset Replacements

Powerlink adopted the following approach to the preparation of specific technical data:

1. The number of assets replaced has been sourced from Powerlink's SAP Project System/Plant Maintenance System and individual project scope documents.
2. The number of towers replaced also includes poles if poles are also replaced.
3. The number of Circuit Breakers and Isolators/earth switches are counted as 1 for each 3-phase set.
4. The number of VT's and CT's are counted as 3 for each 3-phase set.
5. The rating value identified is the summer normal rating and has been sourced from Powerlink's ratings database. Ratings have been estimated.

Ratings Information

Why estimates are required

Equipment ratings are calculated using a rating methodology which requires judgments to be made on a number of input assumptions and criteria and choice of methodology which relate to the operation of Powerlink assets. The resulting rating is therefore dependent on the judgments made by Powerlink in regards to rating its assets.

How the estimate has been produced

1. The cyclic transformer ratings, *Normal* and *Emergency*, are calculated based on season (summer, winter, shoulder), load profile (site specific), ambient temperature (Southern, Central and Northern) and cooling mode (ONAN, ONAF, ODAN, ODAF).
2. **Normal cyclic** refers to the normal cyclic summer rating. Powerlink identifies 'normal conditions' as per the Australian Standard¹¹.

Asset Failures

Powerlink adopted the following approach to the preparation of specific technical data:

¹¹ AS 2374.7 -1997, Power Transformers, Part 7: Loading Guide for Oil-Immersed Power Transformers.

1. Each replacement capital project record was assessed against the RIN definition for repex asset failures.
2. Where the replacement capital project was as a result of asset failure, the associated record was included in the count for the number of asset failures.
3. Asset group and asset category details of the asset failure were identified, and the number of asset failures for each asset group and asset category has been summated for each financial year.

Project Specific Information

Powerlink has built one transmission line that has been designed to be energised at a dual voltage (e.g. 275kV and 132KV) but is currently energised at the lower design voltage. As such this has been reported by identifying in the templates:

- towers as "> 132 kV & < = 275 kV ; MULTIPLE CIRCUIT"; and
- the conductor as "> 66 kV & < = 132 kV ; > 100 MVA & < = 400 MVA".

Table: 2.2.2 Selected Asset Characteristics

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 3 and 5) and Appendix F of the Category Analysis RIN.

Table 2.2.2 has been populated with actual data.

Source

Table 2.2.2 has been populated by data sourced from Powerlink's corporate enterprise resource planning database (SAP) Project Module, Plant Maintenance data and capitalisation data.

Replacement projects have been identified from Powerlink's Regulatory Financial Statements.

Methodology and assumptions

Conductor asset volumes and asset replacement values are identified by circuit lengths (km).

Consistent with the AER's required approach to preparation of the Regulatory Financial Statements, individual capital projects are categorised in total according to the primary reason for investment. Therefore, replex projects may include minor augex components.

Sheet: 2.3 Augex Projects

Table: 2.3.1 Augex Asset Data - Substations

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 3 and 7) and Appendix F of the Category Analysis RIN.

Table 2.3.1 has been populated with actual and estimated data. With the exception of ratings, all technical data is actual. Years incurred and labour volumes are actual. All financial expenditure information is estimated.

Source

Financial data has been sourced from Powerlink's Regulatory Financial Statements and Powerlink's corporate enterprise resource planning database (SAP) Project Module.

For each project, Powerlink's internal Project Scope documents were used to provide the high level technical scope of the project and to identify some of the technical project summary and equipment information required in the templates.

Plant data has been sourced from Powerlink's SAP Plant Maintenance Module and Transmission Network Ratings Database.

Methodology and assumptions

General

Powerlink has identified projects where project expenditure meets the requirements of Appendix E sections 7.2(a) and 7.2(b), which largely relate to the materiality of augex project expenditure.

- **Substation and Project Summary** – specific items:
 - consistent with the RIN, the use of 'Other – specify' in the 'Substation type' and 'Project type' for each relevant project is explained under the projects specific information heading of the Basis of Preparation below;
 - where a single augex project involved works at more than one substation, Powerlink has included a separate row for each substation; and
 - where a single augex project involved works on more than one transmission line, Powerlink has included a separate row for each transmission line.
- **Plant and equipment expenditure and volume** - Powerlink has identified plant and equipment procured by Powerlink only. Plant and equipment which formed part of a supply contract has been included under 'all non related party contracts'.
- **'Installation (labour) Expenditure'** – reflects Powerlink labour and estimated contract labour.

- **‘Installation (labour) Volume’** – Powerlink is unable to estimate the Installation (Labour) Volume for the estimated contract proportion that meets the AER’s review and declaration requirements and has left this field null.
- **Other expenditure** – the RIN requires disaggregation into ‘civil works’ and ‘other direct’.
 - ‘Civil works’ reflect Powerlink labour and estimated Contractor civil works. .
 - ‘Other direct’ reflects all other expenditure on the project not elsewhere included in Table 2.3.1.
- Land and easements – where land or easement acquisitions formed part of an augex project, these costs are identified in the same row as the relevant augex project. Where land or easement acquisitions were undertaken as a separate project, these are identified separately in the templates.

Financial

Powerlink has reported augex data on an annual basis to reconcile to capitalisations in its Regulatory Financial Statements. As a result, some projects are reported over two years.

Expenditure Information

Why an estimate is required

Powerlink’s financial systems do not record cost information in the form required under the RIN.

How the estimate has been produced

Powerlink has applied its judgment to initially allocate costs recorded in its financial systems to the categories required under the RIN.

Reported expenditure estimates were also derived using the methodology to unburden corporate overheads (including procurement overheads) from the cost data using the processes described in relation to Table 2.2.1 (Repex) of the Basis of Preparation.

Non related party contract expenditure allocation to ‘Plant and equipment expenditure and volume’ and ‘Other expenditure’ columns.

Why estimates are required

The RIN¹² requires that non related party contract costs be allocated to the appropriate ‘Plant and equipment and volume’ and ‘Other expenditure’ columns.

Powerlink’s systems do not record the labour and civil component of substation contracts as required by the RIN. As a result an estimate for the contribution of contract labour and contract civil work has been developed.

¹² Category Analysis RIN, Appendix E, section 7.1(d)(ii).

How the estimate has been produced

To estimate the labour and civil expenditure for each project, Powerlink applied the following approach:

1. Identified two general types of switching bay asset – 275kV and 132kV;
2. Developed the labour and civil cost to total cost proportion for each of these two general types of substation projects from Powerlink's estimating system; and
3. Estimated the labour and civil costs for each project to populate the templates by applying the relevant percentage to the total contract costs attributed to the substation in Powerlink's RIN template.
4. The remaining expenditure was allocated to 'Other Expenditure'

Project Close

Consistent with Accounting Standards, Powerlink defines 'project close' as the year in which the asset is ready for use, ie. year in which the asset was capitalised. As a result, any post commissioning costs have not been reported as part of the project costs. These costs have been included as a balancing item in Table 2.1.1 of sheet 2.1 Cost Summary and Reconciliation of the templates.

Specific financial data for the Augex sheet has been prepared using the following method:

1. All project specific expenditure data was extracted from Powerlink's SAP Project System module.
2. The extracted data was filtered as per the RIN requirements to identify plant procurement, labour, contract and all other expenditure categories and used to populate the augex templates.

Technical

Ratings Information

Why an estimate is required

Equipment ratings are calculated using a rating methodology which requires judgments to be made on a number of input assumptions and criteria and choice of methodology which relate to the operation of Powerlink assets. The resulting rating is therefore dependent on the judgments made by Powerlink in regards to rating of its assets.

How the estimate has been produced

Powerlink adopted the following approach to the preparation of specific technical data:

1. Substation ratings were calculated using transformer ratings sourced from Powerlink's ratings database.
2. The cyclic transformer ratings, Normal and Emergency, are calculated based on season (summer, winter, shoulder), load profile (site specific), ambient temperature (Southern, Central and Northern) and cooling mode (ONAN, ONAF, ODAN, ODAF)
3. Normal cyclic refers to the normal cyclic summer rating. Powerlink identifies 'normal conditions' as per the Australian Standard¹³.
4. Substation rating is determined by:
 - a. identifying the highest voltage level transformers in the sub-station; and
 - b. summing the normal cyclic summer ratings for these identified transformers.
5. Substation N-1 emergency rating is:
 - a. the sum of the emergency summer ratings for each of the highest voltage level transformers identified in the sub-station;
 - b. minus the emergency rating of the largest transformer in that substation.

Units added and Switchgear

The number of units added has been sourced from Powerlink's SAP PS system.

Switchgear refers to circuit breakers and isolators/disconnectors.

Project Specific Information

As per the RIN¹⁴, Powerlink has included separate land and easement projects in this table in the non-material section. These easements are strategic in nature and do not have associated augex projects. .

¹³ AS 2374.7 -1997, Power Transformers, Part 7: Loading Guide for Oil-Immersed Power Transformers.

¹⁴ Category Analysis RIN, Appendix E, section 7.2(n).

Table: 2.3.2 Augex Asset Data - Lines

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 3 and 7) and Appendix F of the Category Analysis RIN.

Table 2.3.2 has been populated with actual and estimated data. With the exception of ratings, all technical data is actual. Years incurred and labour volumes are actual. All financial expenditure information is estimated.

Source

Financial data has been sourced from Powerlink's Regulatory Financial Statements and Powerlink's corporate enterprise resource planning database (SAP) Project module.

For each project, Powerlink's internal Project Scope documents were used to provide the high level technical scope of the project and to identify some of the technical project summary and equipment information required in the templates.

Plant data has been sourced from Powerlink's SAP Plant Maintenance module and Transmission Network Ratings Database.

Methodology and assumptions

General

Powerlink has identified projects where project expenditure data meets requirements as per Appendix E 7.3(a) and 7.3(b) of the RIN, which largely relate to the materiality of augex project expenditure.

- Line and Project Summary – specific items:
 - consistent with the RIN, the use of 'Other – specify' in the 'Project type' for each relevant project is explained under the Project Specific Information heading of the Basis of Preparation below.
- Plant and equipment expenditure and volume - Powerlink has identified plant and equipment procured by Powerlink only. Plant and equipment which formed part of a supply contract has been included under 'all non related party contracts', with the exception of towers/poles expenditure (see financial section below):
 - 'installation (labour) Expenditure' - reflects Powerlink labour and estimated contract labour.
 - **'Installation (labour) Volume'** – Powerlink is unable to estimate the Installation (Labour) Volume for the estimated contract proportion to meet the AER's review and declaration requirements and has left this field null.
- Other expenditure – the RIN requires disaggregation into 'civil works' and 'other direct':
 - 'civil works' - reflects Powerlink labour and estimated contractor civil works.';

- 'other direct' – reflects all other expenditure on the project not elsewhere included in Table 2.3.2.
- Land and easements – where land or easement acquisitions formed part of an augex project, these costs are identified in the same row as the relevant augex project. Where land or easement acquisitions were undertaken as a separate project, these are identified as such in the templates.

Financial

Powerlink has reported augex data on an annual basis to reconcile to capitalisations in its Regulatory Financial Statements. As a result, some projects are reported over two years.

Expenditure Information

Why an estimate is required

Powerlink's financial systems do not record cost information in the form required under the RIN.

How the estimate has been produced

Powerlink has applied its judgment to initially allocate costs recorded in its financial systems to the categories required under the RIN.

Reported expenditure estimates were also derived using the methodology to unburden corporate overheads (including procurement overheads) from the cost data using the processes described in relation to Table 2.2.1 (Repex) of the Basis of Preparation.

Towers/Poles Expenditure

Why an estimate is required

Powerlink does not directly procure individual transmission line towers. Towers are supplied as part of a contract to supply and construct lines in built sections. As a result, Powerlink's financial systems record the value of the overall built section line assets¹⁵. Powerlink has therefore developed an estimate of each tower value from the capitalised value of the built section.

How the estimate has been produced

To estimate the towers/poles expenditure for each project, Powerlink applied the following approach:

1. Identified four general types of lines projects – 132kV cyclonic, 275kV cyclonic, 132kV non-cyclonic and 275kV non-cyclonic;
2. Developed the tower cost to total cost proportion for each of these four general types of lines projects from Powerlink's estimating system; and
3. Estimated the tower costs for each project to populate the templates by applying the relevant line project tower percentage to the total built section value recorded in Powerlink's financial systems.

Non related party contract expenditure allocation to 'Plant and equipment expenditure and volume' and 'Other expenditure' columns.

The RIN¹⁶ requires that non related party contract costs be allocated to the appropriate 'Plant and equipment and volume' and 'Other expenditure' columns.

Why an estimate is required

Powerlink's systems do not record the labour and civil component of lines contracts as required by the RIN. As a result an estimate for the contribution of contract labour and contract civil work has been developed.

How the estimate has been produced

To estimate the labour and civil expenditure for each project, Powerlink applied the following approach:

1. Identified four general types of lines projects – 132kV cyclonic, 275kV cyclonic, 132kV non-cyclonic and 275kV non-cyclonic;
2. Developed the labour and civil cost to total cost proportion for each of these four general types of lines projects from Powerlink's estimating system; and
3. Estimated the labour and civil costs for each project to populate the templates by applying the relevant percentage to the estimated contract costs recorded in Powerlink's RIN template.
4. The remaining expenditure was allocated to 'Other Expenditure'

Project Close

Consistent with Accounting Standards, Powerlink defines 'project close' as the year in which the asset is ready for use, i.e. year in which the asset was capitalised. As a result, any post commissioning costs have not been reported as part of the project costs. These costs have been included as a balancing item in Table 2.1.1 of sheet 2.1 Cost Summary and Reconciliation of the templates.

Specific financial data for the Augex sheet has been prepared using the following method:

1. All project specific expenditure data has been extracted from Powerlink's SAP Project System module.
2. This data was filtered as per the RIN requirements to identify plant procurement, labour, contract and all other expenditure and used to populate the augex templates.

Technical

Ratings Information

Why an estimate is required

Equipment ratings are calculated using a rating methodology which requires judgments to be made on a number of input assumptions and criteria and choice of methodology which relate to the operation of Powerlink's assets. The resulting rating is therefore dependent on the judgments made by Powerlink in regards to rating its assets.

¹⁶ Category Analysis RIN, Appendix E, section 7.1(d)(ii).

How the estimate has been produced

Powerlink adopted the following approach to the preparation of specific technical data:

1. Line ratings have been sourced by using Powerlink's ratings database.
2. The **static overhead transmission line ratings, Normal and Emergency**, are calculated based on ambient temperature, wind speed and applicable solar radiation. The temperature varies with season (summer, winter and shoulder) and geological zone (A-Costal, B-Intermediate, C-Central Western and D-Far Western). The wind varies with zone only. The solar radiation is calculated based on GPS coordinates or using summer noon solar radiation.
3. **Normal cyclic** refers to the normal cyclic summer rating. This is the rating value that Powerlink applies under pre-contingent or steady state conditions.
4. **N-1 emergency** rating refers to the N-1 emergency summer rating. The emergency rating is calculated based on 1m/s wind speed and the applicable ambient temperature and solar radiation for each circuit.
5. **N-1 values** for lines - have been calculated excluding any existing lines that may be considered in parallel with the newly augmented line. Therefore for a single circuit, or multiple circuits that has been connected to form one electrical circuit, the N-1 value will be 0 MVA.

Circuits and Structures

Route lengths, circuit lengths and number of structures have been determined using Powerlink's SAP Plant Maintenance module.

Circuit km added is identified as per the RIN definition of circuit line length. Where a circuit has been constructed with multiple circuits that have been bridged, paralleled or bonded together and operated as a single electrical circuit, the circuit length is considered to be the aggregated length of each circuit.

Project Specific Information

'New Line on new route - Other' has been chosen in the drop down list in the 'Project Type' heading for the following projects:

Project	Details
CP.01705 Calvale - Stanwell 275kV DCST Line	This project was a new dual circuit line constructed on an existing route.
CP.02022 Columboola to Western Downs Easement Acquisition	This is an easement acquisition project.
CP.02412 Lilyvale to Blackwater 3rd Circuit	This project required the removal of electrical bridges on an existing dual circuit constructed line.

'Other' has been chosen in the drop down list in the '**Voltage(kV)**' heading for the following project:

Project	Details
CP.02022 Columboola to Western Downs Easement Acquisition	This project is an easement acquisition project and does not have a voltage.

'Other' has been chosen in the drop down list in the '**Tower/Pole Configuration**' heading for the following project:

Project	Details
CP.02022 Columboola to Western Downs Easement Acquisition	This project is an easement acquisition project.
CP.02412 Lilyvale to Blackwater 3rd Circuit	This project required the removal of electrical bridges on an existing dual circuit constructed line. It required a single circuit concrete pole

As per the RIN¹⁷, Powerlink has included separate land and easement projects in this table. The relationship is:

Easement Project	Associated Augmentation Project
CP.02022	CP.02031

Specific Project Comments

CP.01705 Calvale - Stanwell 275kV DCST Line included the decommissioning and pull down of 100km of existing 132kV transmission line.

Non-material projects: Powerlink was unable to enter data into the Total direct expenditure cells (Y200, Y201 and Y202) due to the cells being protected. Powerlink created a new line ID called 'Non-material projects' to address the template protection issue and included the associated expenditure values in this row.

As per the RIN¹⁸, Powerlink has included separate land and easement projects in this table in the non-material section. This expenditure does not have associated augmentations.

¹⁷ Category Analysis RIN, Appendix E, 7.3(q).

¹⁸ Category Analysis RIN, Appendix E, section 7.2(n).

Table: 2.3.3 Augex Data – Total Expenditure

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 3 and 7) and Appendix F of the Category Analysis RIN.

Table 2.3.3 has been populated with estimated data.

Source

Template 2.12 Input subsection Augex.

Methodology and assumptions

Powerlink has adopted the following methodology to complete Table 2.12.

Why an estimate is required

Powerlink does not record asset data at the level required by the RIN.

How the estimate has been produced

Powerlink has utilised the “as incurred” data contained in RIN Template 2.12 Input (Augex) to populate Table 2.3.3 (Refer Basis of Preparation for 2.12 Input).

Sheet: 2.5 Connections Expenditure

Table: 2.5.1 Expenditure of connection projects

RIN requirements

This section has been completed in accordance with Appendix E (sections 1 and 3) and Appendix F of the Category Analysis RIN.

Table 2.5.1 has been populated with estimated data.

Source

The data has been sourced from Powerlink's Regulatory Financial Statements and Powerlink's financial systems.

Methodology and assumptions

Financial Data

Expenditure data reported in Table 2.5.1 reflect capitalisations and reconcile to Powerlink's Regulatory Financial Statements. Consistent with the RIN¹⁹ direct materials costs exclude materials under external party contracts and direct labour costs exclude expenditure under contracts other than labour hire contracts.

Why an estimate is required

Powerlink's financial systems do not record cost information in the form required under the RIN.

How the estimate has been produced

Expenditure estimates were derived using the methodology to unburden corporate overheads (including procurement overheads) from the cost data using the processes described in relation to Table 2.2.1 (Repex) of the Basis of Preparation.

Project Close

Consistent with Accounting Standards, Powerlink defines "project close" as the year in which the asset is ready for use, i.e. year in which the asset was capitalised. As a result, any post commissioning costs have not been reported as part of the project cost. These costs have been included as a balancing item in Table 2.1.1 of sheet 2.1 Cost Summary and Reconciliation of the templates.

¹⁹ Category Analysis RIN, pp39-40

Table: 2.4.2 Description of connection projects

RIN requirements

This section has been completed in accordance with Appendix F of the Category Analysis RIN.

Table 2.5.2 has been populated with actual and estimated data. Ratings are estimated. All other information is actual.

Source

The connection rating and voltage data has been sourced from Powerlink's Enterprise Resource Planning system (SAP).

Project scope reports were used to identify the line construction.

Methodology and assumptions

Financial

Project Close

Consistent with Accounting Standards, Powerlink defines "project close" as the year in which the asset is ready for use, i.e. year in which the asset was capitalised. As a result, any post commissioning costs have not been reported as part of the project cost. These costs have been included as a balancing item in Table 2.1.1 of sheet 2.1 Cost Summary and Reconciliation of the templates.

The year of connection project completion is as provided in Powerlink's Regulatory Financial Statements.

Technical

Ratings Information

Why an estimate is required

Equipment ratings are calculated using a rating methodology which requires judgments to be made on a number of input assumptions and criteria and choice of methodology which relate to the operation of Powerlink assets. The resulting rating is therefore dependent on the judgments made by Powerlink in regards to rating of its assets.

How the estimate has been produced

Ratings for substation equipment has been produced on the same basis and from the same source as described under Table 2.3.1 Augex asset data – substations. Ratings for transmissions lines has been produced on the same basis and from the same source as described under Table 2.3.2 Augex asset data – lines.

Consistent with the RIN requirements²⁰, Powerlink has reported a description of the connection projects as follows:

- Connection rating* – summer day normal cyclic capacity at the Transmission Network Connection Point.

* Depending on the electrical configuration of the connection point, the connection point rating was calculated for the relevant connection project by one of the following methods:

1. Transformer terminals connection - where the Customer transmission network connection point is at the low voltage terminals of a transformer(s) owned by Powerlink, the connection rating is the combined Normal Cyclic Capacity (NCC) ratings or limiting bay ratings of the step down transformers;
2. Feeder bay connection – where the Customer transmission network connection point is at the line side of a feeder bay owned by Powerlink (i.e. the Customer owns a feeder that connects to Powerlink’s network), the connection rating is the combined NCC ratings of the feeder bays; and
3. Feeder connection – where the prescribed connection assets include all or part of a feeder(s), the connection rating is the combined NCC of the feeders, or the feeder bays, depending on what is most limiting;
4. Works ancillary to the connection – where the project created assets that were ancillary to the connection (e.g metering and secondary systems works), the connection rating, connection voltage and overhead/underground classification have been left blank as these projects do not affect these parameters.

For clarification, the table below indicates which method was applied to each connection point.

Connection Project	Method Type(s)
CP.1748 Ashgrove West Transformer replacement	1
CP.1758 Pioneer Valley Transformer replacement	1

Connection Point Voltage and Underground/Overhead

Connection Voltage – is the nominal connection voltage at the Transmission Network Connection Point.

Underground/overhead – has been identified where applicable.

²⁰ Category Analysis RIN, pp39-40.

Sheet: 2.6 Non-network Expenditure

Table: 2.6.1 Non-network Expenditure

RIN requirements

This section has been completed in accordance with Appendix E (sections 1 and 3) and Appendix F of the Category Analysis RIN.

Table 2.6.1 has been populated with estimated data.

Source

The data has been sourced from Powerlink's Regulatory Financial Statements and its Financial Systems.

Methodology and assumptions

Financial Data

Why an estimate is required

Powerlink's financial systems do not record cost information in the form required under the RIN.

How the estimate has been produced

Powerlink has applied judgment in the allocation of expenditure to the categories required by the AER under the RIN.

Expenditure estimates were derived using the methodology to unburden corporate overheads (including procurement overheads) from the cost data using the processes described in relation to Table 2.2.1 (Repex) of the Basis of Preparation.

Project Close Basis

Consistent with Accounting Standards, Powerlink defines 'project close' as the year in which the asset is ready for use, i.e. year in which the asset was capitalised. As a result, any post commissioning costs have not been reported as part of the project costs. These costs have been included as a balancing item in Table 2.1.1 of sheet 2.1 Cost Summary and Reconciliation of the templates.

Capex and Opex Reported on a Whole of Business Basis

Non-network operating expenditure and non-financial metrics have been reported on a whole of business basis. That is values have not been disaggregated and are inclusive of prescribed, negotiated and non-regulated measures.

IT and Communications

Capital expenditure is reported on a Project Close basis and has been allocated between the RIN categories in line with the RIN definitions.

Motor Vehicles

Capital expenditure related to Motor Vehicles was directly allocated to the RIN classification.

The majority of operating expenditure related to Motor Vehicles was directly allocated to the RIN classification. Operating expenditure that could not be directly allocated to the RIN classifications was apportioned across each category in the following manner

$$(Direct\ Operating\ Expenditure\ per\ Category / Total\ Direct\ Operating\ Expenditure) * Total\ Indirect\ Operating\ Expenditure$$

The resulting data is therefore considered to be an estimate.

Building and Property

Powerlink allocated its Property and Buildings data into the RIN classification for both Opex and Capex.

Other

Motor Vehicle Operating and Capital expenditure included in the Other asset category represents expenditure incurred on the following:

- Trailer;
- Work Platforms;
- Forklifts;
- Miscellaneous; and
- All terrain vehicles.

In line with the methodology described in the Motor Vehicle section above, both Operating and Capital expenditure data is considered to be estimates.

Powerlink has nominated an additional Other asset category which includes all remaining tools and equipment expenditure

Table: 2.6.2 Annual Descriptor metrics – IT & Communications Expenditure

RIN requirements

This section has been completed in accordance with Appendix E (sections 1 and 3) and Appendix F of the Category Analysis RIN.

Table 2.6.2 has been populated with estimated data.

Source

The data has been sourced from Powerlink's Corporate Information systems.

Why an estimate is required

Powerlink's financial systems do not record cost information in the form required under the RIN.

How the estimate has been produced

Powerlink has applied judgment in the allocation of expenditure to the categories required by the AER under the RIN.

Methodology and assumptions

Employee Numbers

Powerlink has derived Average Staffing Level numbers using the methodology required under Template 2.11 to populate this table.

User Numbers

User numbers include Powerlink staff, contract staff and contingent staff.

Powerlink does not retain historic user number statistics and has therefore provided an estimate. The estimate utilises the current ratio of active system users over employee numbers which has then been applied to historic employee numbers provided in the RIN.

Number of Devices

Powerlink has included the following equipment in the Client Device statistics:

- Desktop Computers;
- Laptop Computers;
- Smart Phones;
- Smart Devices; and
- Thin Client devices.

Devices issued to direct Powerlink staff, contractors and contingent staff have been included along with computers used in training facilities, substations and common areas within

Powerlink. Those devices which have been decommissioned but are awaiting final disposal have been removed from the final Client Device numbers reported.

Table: 2.6.3 Annual Descriptor metrics – Motor Vehicles

RIN requirements

This section has been completed in accordance with Appendix E (sections 1 and 3) and Appendix F of the Category Analysis RIN.

Table 2.6.3 has been populated with estimated data.

Source

The data has been sourced from Powerlink's Financial Systems and its fleet management service provider.

Methodology and assumptions

Powerlink developed estimates for all motor vehicle descriptor metrics.

Why an estimate is required

Powerlink's systems do not record the vehicle information in the form required under the RIN.

How the estimate has been produced

Powerlink has applied its judgment to develop, apportion or allocate on the bases described below.

Average Kilometres travelled (000's)

Powerlink's motor vehicle fleet changes annually as vehicles are retired and replaced. In calculating the Average Kilometres Travelled, vehicles less than 2 months in age were removed from the calculation as the low distances travelled by these vehicles was found to distort the data.

Number Leased

Not applicable as Powerlink does not lease vehicles.

Proportion of total fleet expenditure allocated as regulatory expenditure (000's)

The allocation methodology used to apportion the usage of Regulated expenditure was based on Labour Time Charged by employees to Regulated activities.

Sheet: 2.7 Vegetation Management

Table: 2.7.1 Descriptor Metrics by Zone

RIN requirements

This section has been completed in accordance with Appendices E and F of the Category Analysis RIN.

Table 2.7.1 has been populated with actual and estimated data. Specifically, for 2014:

- route line length within zone (km) is actual data;
- number of maintenance spans is estimated data;
- length of maintenance spans is estimated data;
- length of vegetation corridors (km) is estimated data;
- average width of vegetation corridors (metres) is estimated data; and
- average frequency of cutting cycle (years) is estimated data.

Source

Data for Table 2.7.1 was sourced from Powerlink's corporate enterprise resource planning database, SAP. However, in relation to vegetation corridors, Powerlink also sourced data from its spatial database.

Methodology and assumptions

Zones

In determining its standard of vegetation management the primary legislation with which Powerlink must comply are the *Queensland Electrical Safety Act 2002* and the *Queensland Safety Regulation 2013* which impose obligations for ensuring public safety. The regulations include setting exclusion zone distances from electrical apparatus and section 216 specifically refers to trimming of trees near overhead electric lines. These obligations are taken into account when setting vegetation management activities and maintenance intervals.

Powerlink has adopted three vegetation management zones – urban, rural and tropical - based on material differences in recognised cost drivers. Powerlink categorised each built section into one of the above zones based on geographical location.

The tropical, rural and urban zones are based on vegetation growth rates and tree pruning requirements in capital / provisional cities. These requirements are reflected in different vegetation cycles and costs. The categorisation of lines into these zones are illustrated in the map included in Appendix B. Urban typically represents urban populated areas, tropical generally includes coastal lines north of Mackay and rural the remainder of the state.

Powerlink applies different strategies for vegetation management in the three defined zones due to:

- accelerated vegetation growth rates in tropical areas;
- restrictions on ground access and field work during the six month tropical wet season;

- urban corridors containing more landholders and linked stakeholders restricting ground access and field work; and
- increased tree pruning maintenance in urban areas to meet statutory safety requirements.

These have imposed a material cost difference on performing vegetation management and hence resulted in Powerlink's three vegetation zones.

This zone information applies across all vegetation tables in the templates.

Route Line Length within Zone (km)

A list of all built sections, spans, their commissioning dates and lengths was retrieved from SAP. This information was sorted into zones and separated into regulated only based on built section.

Number of Maintenance Spans

Why an estimate is required

Powerlink manages its easements by built section and not by individual spans. As Powerlink's systems do not collect information on which individual spans had maintenance performed, an estimate is required.

How the estimate has been produced

A list of work orders relating to vegetation maintenance was retrieved from SAP. Each work order was inspected to determine if relevant according to chapter 8, section 8.1 of the Explanatory Statement – final regulatory information notices to collect information for category analysis. Where a specific ground span has not been specified, an estimate of which spans were affected by the work order was made based on the description of the maintenance activity. Where more than one maintenance activity occurs on a span, the duplicates are removed so each maintenance span is only counted once.

Total Length of Maintenance Spans

Why an estimate is required

Powerlink manages its easements by built section and not by individual spans. As Powerlink's systems do not collect information on which individual spans had maintenance performed, an estimate is required. As such the number of maintenance spans and the total length of maintenance spans is an estimate.

How the estimate has been produced

The span count from "Number of Maintenance Spans" was split by vegetation management zone and built section. The average span length for the zone was multiplied by the number of maintenance spans in the zone to determine the total.

Average Number of Trees per Maintenance Span (0's)

Powerlink has not previously calculated this variable or collected data at this finite level. Powerlink has reviewed the methodologies for calculating the average number of trees per maintenance span adopted by other TNSPs and notes the spread in the average number of trees per maintenance span varies between 16 and 2,331.

Powerlink has again reviewed its available data, and has not developed a methodology that would result in an estimate that would meet the AER's RIN review and declaration requirements. As a result, Powerlink has entered an input of zero for 2013/14.

Length of Vegetation Corridors (km)

Why an estimate is required

Powerlink manages its easements by built section and not by individual spans. As Powerlink inspects all spans of each built section during a patrol, the entire built section is considered a vegetation corridor.

How the estimate has been produced

An estimate of the length of vegetation corridors is established by dividing the route line length in the vegetation zone by Powerlink's asset management policy cycle time for the particular vegetation zone.

Average Width of Vegetation Corridors (m)

Why an estimate is required

Powerlink manages its easements by built section and not by individual spans. As Powerlink's systems do not collect information on which individual spans had maintenance performed, an estimate is required.

How the estimate has been produced

A list of all built sections, spans, and lengths was retrieved from Powerlink's spatial database. This information was sorted into zones based on built section.

The attributes associated with each span identified the width to the left and the right of the centre of the span where maintenance is performed. These were added together to get an overall width of vegetation corridor per span. The data was first separated by zone and an average was calculated using the span width to identify the average width per vegetation management zone.

As Powerlink only has information on vegetation maintenance per built section and not per span, Powerlink has assumed that maintenance is performed on all spans in a built section.

Powerlink considers that this methodology provides its best estimate of the average width of vegetation corridors.

Average Frequency of Cutting Cycle (Years)

Why an estimate is required

Powerlink manages its easements by built section and not by individual spans. As Powerlink's systems do not collect information on which individual spans had maintenance performed, an estimate is required.

How the estimate has been produced

An estimate of the average frequency of cutting cycles is based on Powerlink's asset management policy cycle time²¹ for the particular vegetation zone. That is:

- Urban – average cutting cycle every year;
- Tropical – average cutting cycle every 2 years; and
- Rural – average cutting cycle every 3 years.

²¹ Cycle times may vary within vegetation zones depending on local factors.

Table: 2.7.2 Expenditure Metrics by Zone

RIN requirements

This section has been completed in accordance with Appendices E and F of the Category Analysis RIN.

Table 2.7.2 has been populated with estimated data.

Source

The data has been sourced from Powerlink's corporate enterprise resource planning database, SAP.

Methodology and assumptions

Powerlink adopted the following approach to preparation of the data for this table.

Tree trimming, Vegetation corridor clearance, contractor liaison expenditure, Other vegetation management costs not specified

Why an estimate is required

Powerlink captures routine vegetation management costs against the activities of tree trimming, chemical treatment, mechanical clearing, vegetation inspection, land costs and vehicle washing. From this information costs have been redistributed to meet the AER's RIN cost categories. For this reason all costs in Table 2.7.2 are considered estimates.

Powerlink is unable to separate costs between audit and contractor liaison at this time. For the purposes of reporting in response to this Category Analysis RIN, these costs are combined under contractor liaison expenditure and audit is left blank.

How the estimate has been produced

Vegetation costs were retrieved from SAP and combined to meet each service subcategory as required in Table 2.7.2. The cost information was aggregated into zones and the regulated portion was extracted based on built section.

Further, expenditure estimates were derived using the methodology to unburden corporate overheads (including procurement overheads) from the cost data using the processes described in relation to Table 2.2.1 (Repex) of the Basis of Preparation document.

Audit Costs

Powerlink's systems do not separately record audit costs. As permitted under the RIN²², this line has been left blank in Table 2.7.2 of the template.

Other vegetation management costs not specified

²² Category Analysis RIN, section 1.2(e), p17. Also AER Networks DMS – RIN development – CA TNSP – list of fixes in template, contained in email AER to Powerlink, 4 September 2013 – Revised CA RIN template 2013-14.

For clarification, other vegetation management costs not specified include: monitoring of vegetation in spans with known bushfire risk, undergrowth vegetation control to mitigate bushfire hazard, vegetation management in and around structures, identification, assessment, monitoring and control of regulated declared/ noxious weed areas in corridor and specialist vegetation management work using alternate control methods.

Table: 2.7.3 Descriptor Metrics across all Zones – Unplanned Vegetation Events

RIN requirements

This section has been completed in accordance with Appendices E (sections 1, 3 and 11) and F of the Category Analysis RIN.

Table 2.7.3 has been populated with actual data.

Source

Data has been sourced from Powerlink’s internal network operating systems associated with recording the unplanned system outages caused by either vegetation grow-ins or vegetation blow-ins/fall-ins. The records include the occurrence of system outages caused by either vegetation grow-ins or vegetation blow-ins/fall-ins, resulting in an unplanned outage of the transmission network.

Methodology and assumptions

The unplanned system outages of Powerlink network assets which were caused by either vegetation grow-ins or vegetation blow-ins/fall-ins are included in the count for the number of events irrespective of whether there was a loss of supply²³.

Force Majeure²⁴ events are excluded in the count for the number of events.

The methodology applied for the *system outages* caused by either vegetation grow-ins or vegetation blow-ins/fall-ins is as follows:

- Powerlink assessed the cause of each unplanned outage event record against the definition of either vegetation grow-ins or vegetation blow-ins/fall-ins.
- Where an unplanned outage event was caused by either vegetation grow-ins or vegetation blow-ins/fall-ins, the associated record was included in the count for the number of events.
- The number of unplanned outage events caused by either vegetation grow-ins or vegetation blow-ins/fall-ins was summated for each financial year.

The methodology applied for the *fire starts* caused by either vegetation grow-ins or vegetation blow-ins/fall-ins is as follows:

- Powerlink assessed each unplanned outage event record against the definition of fire starts caused by either vegetation grow-ins or vegetation blow-ins/fall-ins.

²³ RIN definition for vegetation grow-ins and vegetation blow-ins/fall-ins refers to “an interruption to supply”. However, Powerlink has assumed that the unplanned vegetation events refers to system outages of Powerlink’s network assets and shall be counted irrespective of whether there was a loss of supply to customers.

²⁴ As defined in Australian Energy Regulator (2012). Final Decision – Electricity Transmission Network Service Providers Service Target Performance Incentive Scheme, December, p38.

- Where a fire start was caused by either vegetation grow-ins or vegetation blow-ins/fall-ins, the associated record was included in the count for the number of events.
- The number of fire starts caused by either vegetation grow-ins or vegetation blow-ins/fall-ins was summated for each financial year.

Sheet: 2.8 Maintenance

Section: 2.8.1 Descriptor Metrics for Routine and Non-Routine Maintenance

RIN requirements

This section has been completed in accordance with Appendices E and F of the Category Analysis RIN.

Table 2.8.1 has been populated with both actual and estimated data. The 'Asset Quantity - At Year End' for 2013/14 is actual data. All other data is estimated.

Source

All asset quantity data has been sourced from Powerlink's corporate enterprise resource planning database, SAP, with non-regulated assets having been removed.

Powerlink has used as commissioned dates for all entries except Communications Equipment and Protection Systems, which use asset capitalisation dates.

Methodology and assumptions

Powerlink has adopted the following methodologies and assumptions in relation to the maintenance asset categories and quantities identified in the templates.

General

For all maintenance asset categories except 'Substation – Power Transformers, only inspection activities apply. Powerlink determines its maintenance activities on the basis of condition assessment. As a result, maintenance cycles are not applicable.

The 'Asset Quantity Inspected/Maintained' reflects the total number of assets subjected to a maintenance or inspection action in that specific year²⁵.

As required by the RIN²⁶, where multiple inspection and maintenance activities exist, Powerlink has reported the cycle that reflects the highest cost activity.

Why an estimate is required

Powerlink's systems do not record information in the form required under the RIN categories.

How the estimate has been produced

Powerlink has applied judgment to allocate the activities sourced from its internal records to the activities and categories required by the AER under the RIN.

²⁵ Category Analysis RIN, section 10.9, p31.

²⁶ Category Analysis RIN, section 10.7, p31.

Estimates were derived using the following methodologies:

- Inspection and maintenance activities have been allocated following a review of work orders for the asset category as well as routine inspection cycles.
- The average age of the assets is based on the average age of the current population installed at a point in time by reference to the installation dates recorded for current assets in SAP.
- Inspection and Maintenance cycles are the highest cost activity based on frequency, work units and total annual associated cost.

Transmission Lines Maintenance

Transmission Towers

A list of all regulated transmission tower structures and their commissioning date was retrieved from SAP.

Multiple inspection activities exist for this asset group. The highest cost activity is the annual patrol (inspection) which includes both ground and aerial patrols.

Transmission Tower Support Structures

Consistent with the RIN²⁷, the highest value (ie. highest replacement cost) asset type in this asset category is insulator strings. Powerlink has separated cycle information in Table 2.8.1 by tower support structures and insulator strings (the latter is shown in the additional asset subcategory row identified as 'Transmission Tower Support Structures – Insulator Strings' (see more information on this below).

As support structures are on all towers, the asset quantities at year end for both towers and support structures are the same.

Multiple inspection activities exist for this asset group. The highest cost activity identified is the annual patrol which includes both ground and aerial patrols (inspection).

Conductors

The route length of all Powerlink conductors was sourced from Powerlink's corporate enterprise resource planning database, SAP, with non-regulated assets having been removed.

Multiple inspection activities exist for this asset group. The highest cost activity identified is the annual patrol which includes both ground and aerial patrols (inspection).

²⁷ Category Analysis RIN, section 10.6, p31.

Transmission Cables

The route length of all regulated Powerlink underground cable feeders was sourced from Powerlink's corporate enterprise resource planning database, SAP, with non-regulated assets having been removed.

Multiple inspection activities exist for this asset group. The highest cost activity identified is the 6-monthly level 1 maintenance (inspection).

Transmission Tower Support Structures - Insulator Strings

Powerlink has added a separate row for insulator strings as they have a different expected life and inspection cycle to towers and support structures.

The highest value (ie. highest replacement cost) asset type in the Transmission Tower Support Structure asset category is insulator strings which is why it has been separated out into a new asset subcategory to provide inspection cycle data.

A list of all regulated insulator strings and their installation date was retrieved from SAP. The quantity of strings reported are individual strings as there is no grouping involved.

Multiple inspection activities exist for this asset subcategory. The highest cost activity identified is the 5-yearly insulator sampling inspection. This inspection requires 5% of the Asset Quantity for each built section to be inspected every five years. Due to the limited work order data available for the required period, Powerlink has estimated the 'Asset Quantity Inspected/Maintained' to be 1% of the 'Asset Quantity – At Year End'.

Corridor Maintenance (Non-Veg)

Powerlink has added a separate row for corridor maintenance (non-veg) as the associated data did not fit within the existing subcategories of Transmission Lines Maintenance or the definition of vegetation in relation to sheet 2.7 Vegetation Management.

A list of all easements and their commissioning dates were retrieved from SAP.

Multiple inspection activities exist for this asset subcategory. The highest cost activities identified are access inspections (inspection). This subcategory is also inspected during the land asset inspections as detailed below.

Inspections are scheduled in maintenance plans based on the following:

Tropical Land Management Inspections (corridors)

- Every 2 Years (High Growth)

Rural Land Management Inspections (corridors)

- Every 3 Years
- All – Every 1 Year (As required due to high property density, fire hazard, potential growth rates)

Urban Land Management Inspections (corridors)

All Regions:

- All – Every 1 Year (High property density and tree hazard)

Land Management Inspections (sites)

All Regions:

- All – Every 1 Year (High maintenance required)

The 'Asset Quantity Inspected/Maintained' is calculated by reviewing work orders from access maintenance plans by built section. The total route length kilometres were calculated from SAP built section records.

The 'Average Age of Asset Group' for this Asset Subcategory was based on the commissioning dates of the associated Transmission Line built sections.

Substation Equipment and Property Maintenance

Substation Switch-bays (incl. Reactive Plant)

A list of all regulated substation bays containing switching equipment was retrieved from SAP.

Multiple inspection activities exist for this asset group. The highest cost activity identified is the 6-yearly services for isolators, earth switches and circuit breakers (inspection).

Substation Power Transformers

A list of all regulated power transformers was retrieved from SAP.

Multiple inspection and maintenance activities exist for this asset group. The highest cost activities identified are:

- for inspection, the 6-monthly routine substation maintenance; and
- for maintenance, the 6-yearly power transformer tapchanger service.

Substation Property

A list of all regulated, commissioned substation sites including cable transition sites was retrieved from SAP.

Multiple inspection activities exist for this asset group. The highest cost activity identified is the 6-monthly routine substation maintenance (inspection).

SCADA & Network Control Maintenance

SCADA and Network Control Maintenance

A list of all regulated communications and control equipment assets were retrieved from SAP.

Multiple inspection activities exist for this asset group. The highest cost activity identified is the 3-yearly protection signalling service (inspection).

A list of assets included in this subcategory is provided in section 5.2 (Asset Age Profiles) of this document under 'SCADA, network control and protection systems by function'. The average age of this asset group was calculated by using the average age of the current population installed at a point in time based on the installation date.

Protection Systems Maintenance

Protection Systems Maintenance

A list of all regulated protection relays was retrieved from SAP.

Multiple inspection activities exist for this asset group. The highest cost activity identified is the 6-yearly routine protection system service (inspection).

A list of the assets included in this subcategory is provided in section 5.2 (Asset Age Profiles) of this document under 'SCADA, network control and protection systems by function'. The average age of this asset group was calculated by using the average age of the current population installed at a point in time based on the installation date.

A separate row has been added for protection systems which relates to protection systems maintenance costs in Table 2.8.2.

Table: 2.8.2 Cost Metrics for Routine and Non-Routine Maintenance

RIN requirements

This section has been completed in accordance with Appendices E and F of the Category Analysis RIN.

Table 2.8.2 has been populated with estimated data.

Source

The data has been sourced from Powerlink's Regulatory Financial Statements and its Financial Systems.

Methodology and assumptions

The direct costs reported in Table 2.8.2 include Powerlink's operating expenditure for Maintenance Service Providers, which have been categorised as attributable costs.

For the asset subcategory of 'Conductors' no routine maintenance costs apply. As Powerlink determines its inspection activities on the basis of condition assessment, costs have been categorised as non-routine completed by work order.

In Table 2.8.2, the asset subcategory 'Transmission Towers Support Structures' includes the maintenance costs for insulator strings. Consistent with the RIN²⁸, while 'Transmission Tower Support Structures – Insulator Strings' has been listed as an additional asset subcategory for inspection cycles, the RIN does not require a breakdown of the corresponding dollar expenditure in Table 2.8.2.

Maintenance expenditure has been reported in \$'000s.

Why an estimate is required

Powerlink's financial systems do not record cost information in the form required under the RIN.

How the estimate has been produced

Powerlink has applied its judgment to allocate costs to the asset categories and sub-categories required under the RIN.

Expenditure estimates were also derived using the methodology to unburden corporate overheads (including procurement overheads) from the cost data using the processes described in relation to Table 2.2.1 (Repex) of the Basis of Preparation.

²⁸ Category Analysis RIN, Explanatory Statement, section 9.2, p108.

Sheet: 2.10 Overheads

Table: 2.10.1 Network overheads expenditure

Table: 2.10.2 Corporate overheads expenditure

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 3 and 12) of the Category Analysis RIN.

Tables 2.10.1 and 2.10.2 have been populated with estimated data to reflect the required RIN adjustment²⁹ for the removal of Corporate Overheads and to meet RIN definitions.

Consistent with the RIN³⁰, the template data reflects operating and capital expenditure before any capitalisation.

Source

The data has been sourced from Powerlink's Regulatory Financial Statements and financial systems.

Methodology and assumptions

As a base, Powerlink utilised the expenditure reported in its Regulatory Financial Statements for the categories Maintenance Support, Network Monitoring and Control and Corporate Overheads. Subsequent adjustments were applied to this information to align each category with the RIN definition (refer comparative table below). Finally the allocated Corporate overhead expenditure was removed (refer methodology below).

<u>Expenditure Item</u>	<u>Regulatory Financial Statements</u>	<u>RIN</u>
IT Support	Asset Management Support	Corporate Overhead
IT Related Cost	Asset Management Support	Network Operations and Control

Removal of Corporate Overhead Expenditure

Why an Estimate is required

Powerlink's financial systems do not record cost information in the form required under the RIN.

How the estimate has been produced

As identified above, Powerlink has applied judgment to allocate its current expenditure categories into those required by the AER under the RIN.

³⁰ Category Analysis RIN, section 12.1.

Expenditure estimates were also derived using the methodology to unburden corporate overheads (including procurement overheads) from the cost data using the processes described in section 2.2.1 (Repex) of the Basis of Preparation.

Expenditure Allocation between Prescribed, Negotiated and Non-Prescribed

Powerlink allocates costs between Prescribed, Negotiated and Non-Prescribed activities based on the labour time charged for activities within these categories.

Sheet: 2.11 Labour

Table: 2.11.1 Cost Metrics per Annum

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 3 and 4) of the Category Analysis RIN.

Table 2.11.1 has been populated with estimated data.

Source

The data has been sourced from Powerlink's Human Resource and Financial Systems.

Methodology and assumptions

General

Why estimates are required

Powerlink's systems do not record the labour cost information at the level required by the RIN.

How the estimate has been produced

Powerlink has disaggregated the Average Staffing Level (ASL), Total Labour Costs and Average Productive Work Hours to prescribed transmission services based on the pro-rata allocation of time charges to prescribed and non-prescribed activities from all service providers to all activities.

Information from Powerlink's HR system has been used to identify ASL's and the metrics related to average productive hours.

Salary and Wage data has been sourced from the financial reporting systems and allocated to employee category. Costs that could not be directly attributed to a position have been apportioned to similar positions within the same employee category. Primarily these apportionments relate to contingent costs and end of year adjustments to leave entitlements.³¹

Labour Classification Level

Powerlink has included the following employee types in each of the relevant Classification Levels required under the RIN:

<i>RIN Labour Classification Level</i>	<i>Powerlink Job(s) or other definition</i>
Executive Manager	Chief Executive and Division Managers
Senior Manager	Group Managers and previous equivalents
Manager	All other Managers and Team Leaders
Professional	Engineer, Accountant, Professional –

³¹ Note – Powerlink adopted a different approach to estimating this data in previous years.

	Other, Construction Management, Project Management, Information Technology.
Semi Professional	Engineering Officer, System Controller.
Support Staff	Administration.
Intern, Junior Staff, Apprentice	Administration Trainee, Co-op/Vacation Student, Development Engineer, Development Engineering Officer, Graduate IT, Development Environmental Officer, Apprentice, Apprentice Linesperson.
Skilled Electrical Worker	Trade Technician (Lines, Subs, Sec Sys), Supervisor, Contingents in Construction Inspector positions ³² .
Skilled Non-Electrical Worker	None applicable at Powerlink.
Apprentice	Apprentice, Apprentice Linesperson, Intern & Junior Staff.
Unskilled Worker	Power Worker.

Total Labour Cost

Salary and Wage data has been sourced from the financial reporting systems and allocated to employee category. Costs that could not be directly attributed to a position have been apportioned to similar positions within the same employee category. Primarily these apportionments relate to contingent costs and end of year adjustments to leave entitlements.³³

For clarification, Powerlink has included employees that are consistent with the AER's RIN definitions. However, where employees were unable to be assigned to the RIN definitions they were excluded from Table 2.11. Predominantly these staff relate to those responsible for the delivery of infrastructure and technical services.

Productive Work Hours

Powerlink has used the following methodology to estimate the productive work hours:

1. Derived Gross Productive Hours per employee.
2. Added Overtime hours worked.
3. Reduced estimate by leave taken.
4. Reduced estimate by training hours.

Gross Productive Hours was derived as follows:

- Permanent full and part time employee FTE for each year was multiplied by the standard contract hours to determine the Gross Productive hours for each employee; and
- Contract and Casual employees productive hours were based on actual hours worked.

Overtime Hours Worked was based on actual overtime hours worked by employees.

³² Though contingents in construction position may not have to be Trade Technicians, they often are.

³³ Note – Powerlink adopted a different approach to estimating this data in previous years.

Leave Taken was based on actual leave taken.

Training Hours has been estimated using the following method:

- Apprentices were estimated to have undertaken 4.69 weeks of training per year based on historical averages.
- Field Services employees training hours were estimated to be 4.5% of their standard contracted hours.
- All other employees training hours were estimated to be 4% of their standard contracted hours.

Stand-down Occurrences

Powerlink does not monitor “Stand Down Occurrences Per ASL”. As such it has no basis on which to make estimates or provide actual data.

Table: 2.11.2 Extra Descriptor Metrics for Current Year

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 3 and 4) of the Category Analysis RIN.

Table 2.11.2 has been populated with estimated data.

Source

The data has been sourced from Powerlink's Human Resource and Payroll systems.

Methodology and assumptions

Powerlink has adopted the following methodology to complete the labour metrics table for the current year.

Why estimates are required

Powerlink's systems do not record the labour cost information at the level required by the RIN. Powerlink's HR information systems record the hours related to temporary labour hire and do not track the costs. Further, overtime hours are not specifically identified for temporary labour hire.

How the estimate has been produced

The average productive work hours and the related hourly rates have been calculated for Powerlink employees only. Powerlink considers that for the purposes of calculating an average rate the average would not materially differ due to the similar nature of the work.

Costs for the calculation of average hourly rates have been calculated from payroll data.

1. Annual ordinary time hours costs – average productive hours hourly rate per ASL.

Labour costs - ordinary time salaries and wages	included
Labour costs - other earnings, on-costs, and taxes	not included
Labour costs – super	not included

2. Annual overtime hours costs – average productive hours hourly rate per ASL.

Labour costs - ordinary time salaries and wages	not included
Labour costs - other earnings, on-costs, and taxes	Include overtime and allowances related to overtime hours.
Labour costs – super	not included

Sheet: 2.12 Input Tables

Table: 2.12 Input tables

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 2 and 3) and Appendix F of the Category Analysis RIN.

Source

The data has been sourced Powerlink's Regulatory Financial Statements and Powerlink's financial systems.

Methodology and assumptions

Powerlink adopted the following methodology to preparation of Table 2.12.

Why an estimate is required

Powerlink's financial systems do not record cost information in the form required under the RIN.

How the estimate has been produced

Opex Data

The Opex data for Vegetation Management, Routine Maintenance, Non-Routine Maintenance and Overheads was sourced from Templates 2.7.2, 2.8.2 and 2.10 and utilises the same methodology and assumptions discussed in the relevant sections of the Basis of Preparation.

To determine the split between direct material cost, direct labour cost, contract cost and other cost, Powerlink has considered the nature of the expenditure recognised against cost elements and then grouped them by nature into one of the four categories required by the RIN.

Expenditure estimates were derived using the methodology to unburden corporate overheads (including procurement overheads) from the cost data using the processes described in relation to Table 2.2.1 (Repex) of the Basis of Preparation.

Capex Data

The projects used to populate Templates 2.2.1, 2.3.1, 2.3.2 and 2.5.1 were also utilised as the base to identify the "As Incurred" Capex data required for Template 2.12.

To determine the split between direct material cost, direct labour cost, contract cost and other cost, Powerlink has considered the nature of the expenditure recognised against cost elements and then grouped them by nature into one of the four categories required by the RIN.

To determine the sub-category split for the “As Incurred” capital expenditure Powerlink applied the same sub-category apportionment used in Templates 2.2.1, 2.3.1, 2.3.2 and 2.5.1 for the “As Commissioned” capital expenditure reporting.

Expenditure estimates were derived using the methodology to unburden corporate overheads (including procurement overheads) from the cost data using the processes described in relation to Table 2.2.1 (Repex) of the Basis of Preparation.

Sheet: 5.2 Asset Age Profile

Table: 5.2.1 Asset age profile

RIN requirements

This section has been completed in accordance with Appendix E (sections 1, 3 and 6) of the Category Analysis RIN.

Table 5.2.1 has been populated with actual data for installed assets and estimated economic lives. The standard deviation has been calculated as the square root of the estimated mean economic life³⁴.

Source

All installed asset data has been sourced from Powerlink's corporate enterprise resource planning database, SAP. This includes the year of asset commissioning. For clarification, differences in the timing between Table 5.2.1 Asset age profiles and Table 2.2 Repex, Table 2.3 Augex and Table 2.5 Connections are due to:

- the commissioning dates being reported here, whereas the repex, augex and connections tables reflect capitalisation dates; and
- the original installation dates included here and asset transfer (and purchase) dates shown in the repex and augex tables.

Methodology and assumptions

Powerlink has adopted the following methodologies and assumptions in relation to the specific asset groups identified in the templates.

For clarification, consistent with the RIN, installed assets reported in the Table 5.2.1 reflect assets as at 30 June 2014. Any assets that were constructed and decommissioned prior to 30 June 2014, do not appear in the data.

Powerlink has used as commissioned dates for all entries except Communication Network Assets and Total Secondary Systems, which use asset capitalisation dates.

In the original RIN submission some of Powerlink's asset ages were established at Powerlink's asset level. Following a review of methodology the 2013/14 data the reporting was enhanced to establish the age at the equipment level to provide a more reflective age profile to better meet the RIN Instructions and Definitions.

Transmission towers by: highest operating voltage; circuit configuration

A list of all prescribed transmission tower structures (including poles), their commissioning year, operating voltage and circuit configuration was retrieved from SAP. The data was aggregated based on the number of towers per commissioning year/voltage/circuit configuration.

³⁴ Powerlink adopted a different approach in previous years.

Towers which have undergone line refit are reported in a separate line in accordance with the RIN instructions³⁵, namely “Transmission towers > 66kV & <= 132kV refurbished”. Consistent with its Transmission Determination³⁶, as line refits extend the original life of the asset, it is appropriate to treat them as capital expenditure.

Towers which have been refit and included under “Transmission towers > 66kV & <= 132kV; refurbished” have not been included in other categories under “transmission towers by highest operating voltage; circuit configurations” to ensure that they are only counted once.

Consistent with Powerlink’s capitalisation policy, operational refurbishment projects do not extend the original life of an asset and are treated as operating expenditure. Therefore, such refurbishment works are reported in the RIN response under maintenance expenditure.

Transmission tower support structures by: highest operating voltage; circuit configuration

A list of all prescribed insulator strings, their commissioning year, operating voltage and tower circuit configuration was retrieved from SAP. The data was aggregated based on the number of insulators per commissioning year/voltage/tower circuit configuration.

Conductors by: voltage; summer normal rating³⁷

A list of all prescribed circuit kilometres, their commissioning year, operating voltage and feeder identification was retrieved from SAP. The maximum summer normal rating for each feeder was retrieved from Powerlink’s rating database, TNDB. The data was aggregated on the basis of the number of circuit kilometres per commissioning year/voltage/ summer normal rating.

Transmission cables by: voltage; insulation type

A list of all prescribed underground cable feeders, their commissioning year, operating voltage and insulation type was retrieved from SAP. The data was aggregated based on the number of underground cable feeder circuit kilometres per commissioning year/voltage/insulation type.

Substation switch-bays by: highest operating voltage; switch type

A list of all prescribed substation equipment records for hybrid gas insulated switchgear (GIS) modules, circuit breakers, isolators, earth switches, voltage transformers (VTs), and current transformers (CTs), grouped by switch-bay was retrieved from SAP. As Powerlink’s switch-bays may contain one or more of the switch types specified in the RIN, a hierarchy was determined in the following order:

1. GIS module;
2. Air insulated circuit breaker;
3. Air insulated isolators/earth switch;
4. VT; and
5. CT.

³⁵ Category Analysis RIN, section 6.1(b), p22.

³⁶ Australian Energy Regulator (2012), Final Decision, Powerlink Transmission Determination 2012/13 to 2016/17, pp203-209.

³⁷ Ratings have been estimated, consistent with Powerlink’s methodology described in section 2.3.2 Augex.

Each switch-bay (and the equipment therein) was counted only once based on the highest level component. For example, if a switch-bay contained an air insulated circuit breaker, an air insulated isolator, and a CT, the switch-bay would be counted as an air insulated circuit breaker bay.

The data was aggregated on the basis of the number of switch-bays per switch-type commissioning year/voltage/switch-type.

Substation power transformers by: voltage; MVA rating³⁸

A list of all prescribed equipment records for power transformers was retrieved from SAP. The data was aggregated on the basis of the commissioning year/voltage/MVA rating. The data includes spare transformers to be consistent with Table 2.8, maintenance, in the templates.

Substation reactive plant by: voltage; function

A list of all prescribed equipment records for static var compensators (SVCs), capacitor banks, and oil filled reactors was retrieved from SAP. The data was aggregated on the basis of the commissioning year/voltage/equipment type.

SCADA, network control and protection systems by: function

A list of all communications and secondary systems asset records was retrieved from SAP. The records were broken down by the following functions:

- Telecommunication assets include:
 - Digital multiplexors;
 - Microwave radios;
 - VHF and UHF radios; and
 - Telecommunication Remote Terminal Units.

- Secondary system assets include:
 - Protection relays;
 - Metering;
 - Local Control Facilities; and
 - Secondary System Remote Terminal Units.

The data was aggregated on the basis of the commissioning year/function and align with the replacement expenditure data in sheet 2.2 (Repex) of the templates.

³⁸ Ratings have been estimated, consistent with Powerlink's methodology described in section 2.3.2 Augex.

Buildings

A list of all prescribed network buildings was retrieved from SAP. The data was aggregated on the basis of the number of buildings per commissioning year.

Site infrastructure

A list of all prescribed network sites was retrieved from SAP. The data was aggregated on the basis of the number of sites per commissioning year.

Economic Lives

Why an estimate is required

Powerlink's systems do not record economic life data for its population of assets in the form required by the AER.

How the estimate has been produced

Powerlink has sourced the economic life for the following asset classes from the AER's Transmission Determination³⁹ for Powerlink's current (2012/13 to 2016/17) regulatory period:

- transmission lines – 50 years;
- cables – 45 years;
- substation and site infrastructure – 40 years; and
- secondary systems – 15 years.

Powerlink estimated the economic life of the following asset classes:

- Line Refits - 15 years is the estimated line refit economic life. In the AER's Draft Decision⁴⁰ the AER considered that a 15 year asset life was appropriate for capex associated with transmission lines surface preparation and painting works. Powerlink also consider that these works will typically only last approximately 15 years. Hence an estimated economic life of 15 years is assumed.
- Buildings - 23 years is the estimated weighted average economic life of the substation buildings. Pre 2000 substation buildings are of a brick construction and have an estimated nominal life expectancy of 40 years. Post 2000 substation buildings are typically demountables and have an estimated nominal life expectancy of 15 years.

³⁹ Australian Energy Regulator (2012), Final Decision, Powerlink Transmission Determination 2012/13 to 2016/17, p209.

⁴⁰ Australian Energy Regulator (2011), Draft Decision, Powerlink Transmission Determination 2012/13 to 2016/17, p254.

Sheet: 5.3 Maximum Demand at Network Level

Table: 5.3.1 – Raw and weather corrected coincident maximum demand at network level (summed at transmission connection point)

RIN requirements

This section has been completed in accordance with sections 1, 3 and 8, Appendix E of the Category Analysis RIN.

Table 5.3.1 has been populated with actual data except for “Weather corrected (10% POE) network coincident MD” and “Weather corrected (50% POE) network coincident MD” which are populated with estimated data.

Source

Power demand and embedded generation recordings were sourced from Powerlink’s metering database, known as LoadDB. This contains half hour average demands for each connection point and embedded generator, expressed as MWs. Raw data has been provided by registered Meter Data Providers (MDP)⁴¹ as required under the National Electricity Rules. Weather data was sourced from the Bureau of Meteorology website⁴².

Methodology and assumptions

Raw network coincident MD

This is the summation of actual unadjusted (i.e. not weather normalised) demands at Powerlink’s downstream connection and supply locations at the time when this summation is greatest. Export demand is provided for interconnector flows at this same time.

Date and time of raw network coincident MD

This is the date and time when the raw network coincident MD occurs. Note that the times listed in Table 5.3.1 are the time of the half hour ending (e.g. 00:30 corresponds to the half hour period 00:00 to 00:30).

Winter/Summer peaking

This is the season associated with the date when the raw network coincident MD occurs.

Embedded Generation

This is the summation of embedded generation at the time of raw network coincident MD. Details on the type of embedded generation⁴³ are set out below in relation to Table 5.4.1.

⁴¹ National Electricity Rules, AEMC, Version 60, January 2014, clause 7.2.5 (c1).

⁴² www.bom.gov.au

⁴³ Category Analysis RIN, Appendix E, clause 8.5(a)

Weather corrected (10% PoE) network coincident demand

While this measure is based on actual data, being the non weather adjusted maximum demand, it is also materially dependent on judgments and assumptions in developing the methodology for weather adjustment. As there is no independent means of verifying the correctness or otherwise of historical weather adjustment Powerlink considers this variable will remain as estimated data in the future.

In order to report a delivered value for Transmission System coincident weather adjusted maximum demand 10% POE, a conversion ratio to convert from 50% PoE to 10% PoE has been determined by analysing variations in demand against prevailing weather conditions recorded at seven weather stations across Queensland within a single year. This ratio has then been applied to the “Weather corrected (50% POE) network coincident demand” to calculate “Weather corrected (100% POE) network coincident demand”.

Weather corrected (50% PoE) network coincident demand

While this measure is based on actual data, being the non weather adjusted maximum demand, it is also materially dependent on judgments and assumptions in developing the methodology for weather adjustment. As there is no independent means of verifying the correctness or otherwise of historical weather adjustment Powerlink considers this variable will remain as estimated data in the future.

The measure has been populated based on temperature corrected data reported in Powerlink’s 2014 TAPR⁴⁴, along with actual information from the variable ‘Raw network coincident MD’.

The difference between corrected and uncorrected native state peak demand has been added to the ‘Raw network coincident MD’.

⁴⁴ Refer: http://www.powerlink.com.au/About_Powerlink/Publications/Transmission_Annual_Planning_Reports/Transmission_Annual_Planning_Report_2014.aspx, Table 2.8, p.31.

Sheet: 5.4 Maximum Demand And Utilisation at Spatial Level

Table: 5.4.1 Non-coincident & Coincident Maximum Demand

RIN requirements

This section has been completed in accordance with sections 1, 3 and 8 of Appendix E and Appendix F of the Category Analysis RIN.

All variables in Table 5.4.1 have been populated with actual data except for “Connection point rating which has been populated with estimated data.

Source

Connection point rating

Data for connection point rating has been obtained from Powerlink’s Enterprise Resource Planning system (SAP).

Raw adjusted maximum demand

Power demand and embedded generation records are sourced from Powerlink’s metering database, known as LoadDB. Half hour average of MW and MVA values are recorded for connection points. MVA can be calculated from this data ($MVA = \sqrt{MW^2 + MVA_r^2}$). Raw demand and embedded generation data has been provided by registered Meter Data Providers (MDP)⁴⁵ as required under the National Electricity Rules.

Information on network outages which may have impacted connection point demands is sourced from Powerlink’s outage management system, called OSTRAC. Raw information is populated into this system through normal business processes as outages are applied for, evaluated, scheduled and conducted. This system also stores information about outages on other networks (e.g. Energex and Ergon) that impact on the Powerlink network.

Methodology and assumptions

Connection Point Rating

Clause 8.11 of Appendix E of the Category Analysis RIN states that rating refers to normal cyclic rating. Further explanation was provided by AER in its response to Issue 88 raised by ElectraNet⁴⁶. As required by the AER, connection point rating reflects the total installed capacity at a connection point in its normal operating condition.

Why an estimate is required

Equipment ratings are calculated using a rating methodology which requires judgments to be made on a number of input assumptions and criteria and choice of methodology which relate to the operation of Powerlink assets. The resulting rating is therefore dependent on the judgments made by Powerlink in regards to rating of its assets.

⁴⁵ National Electricity Rules, AEMC, Version 60, January 2014, clause 7.2.5 (c1)

⁴⁶ Final category analysis RINs – issues register – 010414_1157.xlsx

How the estimate has been produced

Ratings for substation equipment has been produced on the same basis and from the same source as described under Table 2.3.1 Augex asset data – substations. Ratings for transmissions lines has been produced on the same basis and from the same source as described under Table 2.3.2 Augex asset data – lines.

Depending on the electrical configuration of the connection point, the rating was calculated by one of the following methods:

1. Where Powerlink owns the step-down transformers that step the voltage down from either the 132 kV or 110 kV network, then the connection point rating is the combined Normal Cyclic Capacity (NCC) ratings or limiting bay ratings of the step down transformers. An example of this is Richlands Substation.
2. In the situation where the DNSP or a direct connect customer owns the step-down transformers that step the voltage down from either the 132 kV or 110 kV Network and Powerlink does not own a 110 kV or 132 kV outgoing feeder to supply the step-down transformer, then the connection point rating is the combined NCC ratings of the feeder bays. An example of this is Alan Sherriff Substation.
3. Where the DNSP or a direct connect customer owns the step-down transformers that step the voltage down from either the 132 kV or 110 kV network and Powerlink owns part or all of the feeder that supplies the step-down transformer, then the connection point rating is the combined NCC ratings of the feeders. The individual rating of feeders that are to be summated, is either the feeder or its associated feeder bay, depending on which is the most limiting. Where the customers step-down transformer is supplied via a Tee arrangement, then the individual rating of the feeder to be summated, will be the minimum rating of the feeder and both feeder bays. An example of this North Goonyella Substation.
4. When there is only one connection point at a 275/132 kV or 275/110 kV injection point, and all outgoing circuits or transformers at 132kV or 110kV are owned by the DNSP, then the connection point rating is the combined NCC ratings or limiting bay ratings of the 275/132 kV or the 275/110 kV transformers. An example of this is Gin Gin Substation.
5. When there are multiple connection points that are being supplied by a 275/132 kV or 275/110 kV injection point, or where Powerlink owns outgoing circuits or transformers at 132kV or 110kV, then the connection point rating is the combined NCC ratings of the feeders and/or feeder bays that make up that particular connection point. The individual rating of feeders that are to be summated will include the minimum rating of either the feeder or its associated feeder bay. An example of this is Belmont Substation.
6. Where a separate connection is supplied from the tertiary windings of Powerlink owned transformers the nameplate rating of the relevant transformer tertiary windings is summed together.

The table below indicates which method(s) were relevant to each connection point.

Connection Point	Method Type(s)
Abermain (Lockrose)	5
Abermain	1
Algerster	1
Ashgrove West (33)	1
Belmont	5
Ashgrove West (110)	2
Bundamba	2
Goodna	1
Loganlea	1
Molendinar	4
Mudgeeraba (110)	5
Mudgeeraba (33)	1
Murarrie (Belmont)	5
Palmwoods	4
Redbank Plains	1
Richlands	1
Runcorn	1
South Pine	5
Sumner	2
Blackstone	5
Tennyson (Rail)	3
Tennyson	1
Wecker Road	1
Alan Sherriff	2
Alligator Creek (33)	1
Biloela	1
Blackwater (66)	1
Bolingbroke	3
Bowen North	1
Bulli Creek (Waggamba)	1
Cairns	1
Cairns City	3
Callemondah (Rail)	2
Cardwell	1
Chinchilla	2
Clare	1
Collinsville Load	1
Columboola	2
Coppabella (Rail)	3
Dan Gleeson	1

Dingo (Rail)	3
Dysart	1
Edmonton	1
Egans Hill	1
El Arish	1
Garbutt	1
Gin Gin	4
Gladstone	3
Gladstone South	1
Grantleigh (Rail)	3
Gregory (Rail)	3
Ingham	1
Innisfail	1
Kamerunga	1
Kemmis	1
King Creek	3
Lilyvale (Barcaldine)	2
Lilyvale	1
Alligator Creek (132)	3
Mackay	1
Mindi	3
Moranbah (Town)	6
Moranbah (Mine)	1
Moranbah South (Rail)	3
Moura	1
Mt McLaren (Rail)	3
Nebo	1
Newlands	1
Norwich Park (Rail)	3
Oakey	2
Oonooie (Rail)	3
Pandoin	1
Peak Downs (Rail)	3
Pioneer Valley	1
Proserpine	1
QLD Nickel (Yabulu)	2
Rockhampton	1
Rocklands (Rail)	3
Ross	2
Stony Creek	2
Tangkam (Dalby)	2
Tarong 132kV Load	1
Tarong 66kV Load	2

Teebar Creek	4
Tully	1
Turkinje (Craiglee)	2
Turkinje	1
Townsville East	1
Townsville South	1
Wandoo (Rail)	3
Woree	2
Yarwun – Boat Creek (Ergon)	2
Blackwater (132)	2
Moranbah (Broadlea)	2
BSL 132kV	3
BSL 275kV	3 (see note below)
Loganlea (110kV Supplies)	5
Middle Ridge	5
North Goonyella	3
QAL (Gladstone South)	3
Rocklea (Archerfield)	5
Woolooga	4
QNI	3
Terranora	3
Pandoin (132)	2
Wandoan South	1

Notes:

Where ratings are determined by methods 2, 3 or 5 above it is likely that the rating will be significantly greater than the maximum demand at the connection point. This is because, unlike transformers, the cost of feeder bay equipment is largely independent of its thermal capacity. Powerlink has standardised much of its substation equipment purchases and the same equipment is installed across a wide variety of loading situations.

Where the season in which non-coincident maximum demand occurs varies between summer and winter, (ie there is no strong seasonality to the demand) the calculation of rating is based on the summer rating of transmission lines, given the network configuration on the date of the maximum demand. This is because summer line ratings are materially lower than winter ratings and this difference is greater than the observed variability in demand.

Where connection points are not providing prescribed services⁴⁷, the connection point rating has been omitted and the cell shaded black.

The BSL 275kV connection point contains regulated and non-regulated assets – the reported rating is that of the regulated assets only. The maximum demand figures for BSL 275kV are for the entire connection point.

⁴⁷ Category Analysis RIN, p1 – Matters the subject of this notice.

The Belmont 110kV connection point contains a feeder bay that connects to the Energex feeder to Energex's Beenleigh Substation. This feeder is normally 'open' in order to manage fault levels. As required by the AER⁴⁸ the connection point rating does not include this feeder bay as the normal power system condition does not supply Beenleigh Substation from this connection point.

Correction of connection point ratings

The QNI connection point rating was previously incorrectly reported for the financial years of 2008/09 to 2012/13. The correct thermal rating for QNI has been reported within the 2014 RINs. QNI transfer capability is not limited by the thermal capacity provided at the connection point.

Equipment Rerating

The Normal Cyclic Capacities of power transformers are periodically reviewed to ensure that the estimate of their ratings reflect current loading profiles. The following connection points (with a rating method of 1 or 4) have had one or more transformers rerated within the 2013/14 financial year;

- Loganlea
- Mackay
- Bowen North
- Teebar Creek

The rerating of the above mentioned connection points has only been applied to the 2013/14 financial year (ie the connection point rating documented for previous financial years has not been changed).

Non-Coincident Raw Adjusted MD

Clause 8.10 of Appendix E of the Category Analysis RIN requires Powerlink to use *raw unadjusted maximum demand* as the basis for calculating the *raw adjusted maximum demand*. Powerlink sought further clarification from the AER to confirm that this is to be the maximum of the adjusted maximum demands during the regulatory year⁴⁹.

A two-step process has been used to identify where the maximum *raw unadjusted demand* records may have been impacted by temporary network arrangements:

1. Using statistical analysis techniques to identify maximum demands at connection points which are unusual compared to other daily maximum demands at the same connection points in the same regulatory year; then
2. Powerlink's record of outages which occurred on the same day as the unusual maximum demand were reviewed to identify any outages likely to have caused the unusual maximum demand on the affected connection point.

If a maximum demand record was identified as unusual and there is a record of an outage which could have affected the load, that day was disregarded and the day with the next highest *raw unadjusted demand* record was considered. This process was repeated until a

⁴⁸ Final category analysis RINs – issues register – 010414_1157.xlsx

⁴⁹ Final category analysis RINs – issues register – 010414_1157.xlsx, issue 54.

raw unadjusted demand record was identified for the connection point which was not unusual and/or there was no record of a relevant network outage.

In several instances, the time of peak non-coincident MVA demand is different to the time of peak non-coincident MW demand. These incidents are listed below, as required⁵⁰:

Connection points where MVA maximum demand has occurred at a different time to MW maximum demand:

Connection Point	2013/14
Ashgrove West (110)	112.7682
Bundamba	34.7136
Goodna	
Loganlea	89.4965
Mudgeeraba (110)	286.4537
Palmwoods	359.7975
Blackstone	92.5040
Alan Sherriff	24.5842
Bluff	
Cairns	56.4374
Cairns City	46.6972
Coppabella (Rail)	
Dan Gleeson	73.1983
Duarina (Rail)	
Dingo (Rail)	
Garbutt	71.0881
Grantleigh (Rail)	
Gregory (Rail)	
Innisfail	24.8992
Alligator Creek (132)	59.3473
Mindi	
Moranbah (Mine)	68.5508
Mt McLaren (Rail)	
Norwich Park (Rail)	
Oonooie (Rail)	
Proserpine	54.0024
Raglan	
Rockhampton	90.6507
Rocklands (Rail)	17.5570
Ross	37.2992

⁵⁰ Category Analysis RIN, Appendix E, clause 8.8

Tangkam (Dalby)	29.1449
Townsville South	85.3981
Wandoo (Rail)	
Wycarbah	
Yarwun – Boat Creek (Ergon)	53.5347
Blackwater (132)	52.3900
Moranbah (Broadlea)	45.3732
BSL 132kV	
BSL 275kV	
Goonyella Riverside Mine	50.8263
Loganlea (110kV Supplies)	367.8920
Middle Ridge	294.4385
North Goonyella	
QAL (Gladstone South)	
Yarwun – Rio Tinto	
Townsville South (KZ)	
Orana (LNG)	
Wandoan South (LNG)	
Bellevue (LNG)	

Coincident Raw Adjusted MD

Powerlink has reported the *raw adjusted maximum demand* for each connection point at the time of the coincident peak demand in each year.

Similar to the *non-coincident raw adjusted maximum demand*, Powerlink first looked for raw unadjusted demand records at time of coincident peak that appeared unusually high. As no unusual readings were identified at any connection point, the adjusted and unadjusted connection point maximum demands at time of coincident peak are the same.

Date MD Occurred

For coincident maximum demand this is the date on which the summated demand across all connection points in a single half-hour was greatest.

For non-coincident maximum demand this is the date on which the maximum adjusted demand (identified using the process described above) for that connection point occurred.

In instances where a new connection point was commissioned but did not supply any load in a year (i.e. the customer did not start to draw power), the date of the non-coincident maximum demand was set to be the same as the coincident maximum demand for that year.

Half Hour Time Period MD Occurred

For coincident maximum demand this is the half hour in which the summated demand across all connection points in a single half-hour was greatest.

For non-coincident maximum demand this is the half hour in which the maximum adjusted demand (identified using the process described above) for that connection point occurred.

The times listed in Table 5.4.1 are the time of the half hour ending (e.g. 00:30 corresponds to the half hour period 00:00 to 00:30).

In instances where a new connection point was commissioned but did not supply any load in a year (i.e. the customer did not start to draw power), the time of the non-coincident maximum demand was set to be the same as the coincident maximum demand for that year.

Winter/Summer Peaking

For coincident maximum demand this is the season in which the summated demand across all connection points in a single half-hour was greatest.

For non-coincident maximum demand this is the season in which the maximum adjusted demand (identified using the process described above) for that connection point occurred.

As required by the definitions in the RIN⁵¹, summer corresponds to the period 1 October – 31 March, and winter corresponds to the period 1 April to 30 September.

Adjustments – Embedded Generation

This variable has been populated for the embedded generators listed in the table below. The transmission connection point of Roma and Condamine changed in 2012/13 due to the transfer of some 132kV network in the Surat Basin from Ergon Energy to Powerlink.

Generator	Type	Connection Point that the Generation is Embedded Within	
		Prior to 2012/13	From 2012/13
Roma	Scheduled	Tarong 132kV	Columboola 132kV
Condamine	Scheduled	Tarong 132kV	No longer embedded – connects directly to Columboola 132kV
Yabulu	Scheduled	Yabulu connects into Ergon's meshed 66kV Townsville network, which is supplied by multiple Powerlink connection points. The Yabulu generation is apportioned between the connection points as follows, based on the degree to which Yabulu generation deloads the connection points, based on system normal conditions. 30% Garbutt 66kV 33% Dan Gleeson 66kV 13% Townsville East 66kV 24% Townsville South 66kV	

⁵¹ Regulatory Information Notice, 7 March 2014, Appendix F, p52.

Pioneer Mill	Non-Scheduled	Clare South 66kV
Moranbah	Non-Scheduled	Moranbah(Twn)
Moranbah North	Non-Scheduled	Moranbah 66kV
Barcaldine	Scheduled	Lilyvale 132kV
German Creek	Non-Scheduled	Lilyvale 66kV
Oakey Creek	Non-Scheduled	Lilyvale 66kV
Isis Sugar Mill	Non-Scheduled	Teebar Creek 132kV
Daandine	Non-Scheduled	Tangkam 110kV
KR Castlemaine	Non-Scheduled	Middle Ridge 110kV
Rocky Point	Non-Scheduled	Loganlea 110kV
Bromelton	Non-Scheduled	Loganlea 110kV

Weather Corrected MD 10% PoE

As permitted under the RIN⁵², Powerlink has not populated this variable and the cells have therefore been blacked out. Powerlink does not currently collect or report this information.

Weather Corrected MD 50% PoE

As permitted under the RIN⁵³, Powerlink has not populated this variable and the cells have therefore been blacked out. Powerlink does not currently collect or record this information.

Newly commissioned/decommissioned connection points

For 2013/14 several new connection points have been commissioned. For these connection points no maximum demand data is available prior to their commissioning date. If the commissioning date occurs during a regulatory year but after the date of coincident maximum demand then no demand information will be available for that regulatory year for coincident maximum demand. Data for non-coincident maximum demand will still be available for that regulatory year.

⁵² Category Analysis RIN, Appendix E, clause 8.13(b)

⁵³ Category Analysis RIN, Appendix E, clause 8.13(b)

As required by this RIN⁵⁴, instances where Powerlink has decommissioned a connection point are noted below. This covers the entire reporting period of this RIN from 2008/09.

Decommissioned connection point	Customer load transfer
Tarong 132kV	Chinchilla and Columboola ⁵⁵

⁵⁴ Regulatory Information Notice, 7 March 2014, Clause 8.7

⁵⁵ This is the result of an asset transfer from Ergon Energy to Powerlink which shifted the connection point. There was no physical change to the electricity network configuration.

Appendix A

Reconciliation to Powerlink's Regulatory Financial Statements and Powerlink's Audited Statutory Accounts

Prescribed transmission services capex (as incurred)	2013/14
Total Capex as per RIN Templates	511,555
Capitalised Corporate Overhead as per RIN Definition	19,108
Balancing Items	
- Capex "As Incurred" Project Adjustment	-262,989
- CAPEX not Covered by RIN	31,609
- Post Commissioning Cost	16,797
Total Balancing Item	-214,583
Total Capex - Table 2.1.1	316,080
Total Regulated Capex - Powerlink's Regulatory Accounts	316,080
Capex - Non Regulated and Negotiated	107,647
Total Adjusted for Non Regulated and Negotiated Capex	423,727
Total Capex - Powerlink's Audited Statutory Accounts	423,727

Appendix A (continued)

Reconciliation to Powerlink's Regulatory Financial Statements and Powerlink's Audited Statutory Accounts	
Prescribed transmission services opex by category	2013/14
Total Opex as per RIN Templates 2.6.1, 2.7.2, 2.8.2, 2.9.1,2.9.2	224,422
<i>Balancing Items</i>	
- Capitalised Corporate Overhead as per RIN Definition	-17,018
- Adjustment for Template 2.5 Double Counting as per RIN Requirement	-27,593
Total Balancing Item	-44,611
Total Opex as Per Table 2.1.2	179,811
Total Prescribed OPEX - Powerlink's Regulatory Financial Statements	179,811
Total Non Prescribed OPEX - Powerlink's Regulatory Financial Statements	19,139
<i>Total OPEX - Table 2.1.2 Adjusted for Negotiated/Non-Regulated Opex</i>	198,950
<i>Total Opex - Powerlink's Audited Statutory Accounts</i>	198,950

Appendix B



References

AS 2374.7 -1997, Power Transformers, Part 7: Loading Guide for Oil-Immersed Power Transformers.

Australian Energy Market Commission, National Electricity Rules, Version 60, January 2014.

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