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Powerlink Queensland 2013 - 2017 Revenue Proposal



Capital Accumulation Model Methodology

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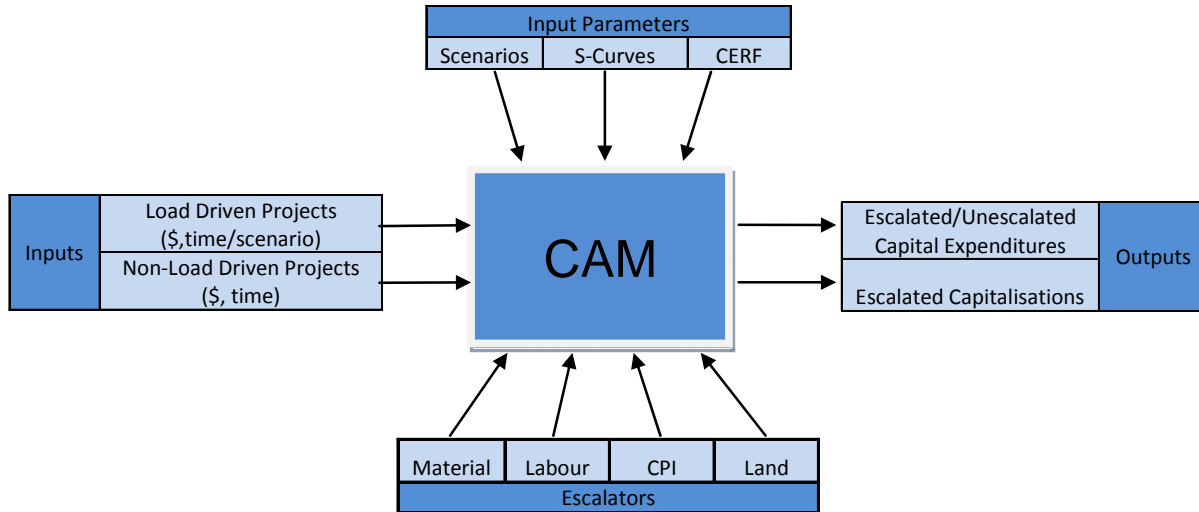
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Figure 1: CAM inputs and outputs



3.1 Input Parameters and Escalators

To establish annual project cash flows, the CAM relies on a range of input parameters and escalators. Real escalation rates are provided by experts in forecasting forward movements in specific cost areas. The escalation rates are converted to nominal escalation rates by adding the mid range CPI forecast. Where specific escalation rates are not able to be established the nominal escalation of CPI is applied.

The input data is addressed in further detail below.

3.1.1 Scenario Weighting

Powerlink engaged Roam consulting to establish a range of likely generation scenarios on the basis of load forecasts and potential generation developments in Queensland. Each scenario is weighted according to the likelihood of the generation/load pattern eventuating.

Planning studies establish the load driven capital network projects that are required for each scenario. Not all load driven projects contribute a solution to every scenario, hence the resultant probabilistic nature of the forecast cash flows.

Non-load driven projects (ie projects whose need is driven by condition) will contribute expenditure to all scenarios resulting in 100% of the project costs being accounted for. Accordingly, non-load driven projects are fully committed in the study period.

3.1.2 Labour Escalation

Capex and opex projects are delivered using both internal Powerlink labour resources as well as external labour.

Powerlink has engaged BIS Shrapnel to establish a forecast of labour escalation rates for the period July 2010 to June 2017. The real escalation rates proposed by BIS Shrapnel are based on the Average Weekly Ordinary Time Earnings (AWOTE) measure of labour cost escalation.

The source data for each of the labour escalations is:

- Powerlink internal specialist labour – Queensland EGW AWOTE data
- Powerlink internal general labour – Queensland Business Services AWOTE data
- External Labour – Queensland Construction sector AWOTE

The labour escalation rates have been further modified to include the proposed changes to the superannuation guarantee.

3.1.3 Materials Escalation

The CAM applies specific escalations to aluminium, steel, copper, and plant and equipment. All other components are escalated at CPI using the mid-range CPI forecast.

Real escalation rates for aluminium, steel, and copper were established by Sinclair Knight Merz (SKM) for Powerlink. The escalation rates for these commodities were established using the respective material USD prices or indices, as the majority of these materials are either procured in USD or in currencies that are significantly influenced by the USD. CPI has been applied as the escalator for plant and equipment, and all other components.

The foreign exchange rate adopted in the model is the AUD/USD rate provided by the Econtech Australian National and State Industry Outlook (ANSIO), March 2011.

3.1.4 Land Escalation

Powerlink's network extends from the largely urban area of Southeast Queensland north through Central and North Queensland, and west to South West Queensland.

Land value forecasts were established for Powerlink by Urbis on the basis of three land use categories - residential, industrial and rural for the 4 regions above, using historical sales data and economic indicator forecasts including:

- Queensland Gross State Product (GSP), regional population growth, and Queensland employment for urban forecasts;
- Queensland Industrial Production, Australian mining sector output for industrial land growth; and
- Australian farm sector output for rural growth forecasts.

A range of other indicators were also used in the analysis to inform the forecasts including Australian coal production, coal prices, private housing investment, and average weekly earnings.

As the industrial land category closely approximates urban trends in Southern Queensland, and rural trends in Central and Northern Queensland, the modelling of land escalation rates has been simplified to urban and rural land categories. Composite land escalation rates for statewide urban and rural land uses have been established and employed in the model.



3.1.5 S-Curves

The CAM applies s-curves to 10 project types:

- Line Projects
- Substation Establishment / Replacement
- Substation Transformer Augmentation
- Substation Capacitor Bank Augmentation
- Substation Secondary System Replacement
- Static VAr Compensator Augmentation
- Communications & IT
- Easement Acquisition
- Easement Project
- Land Offset

The curves are established from the average of historical trends of capital expenditure in the 2007/08 to 2010/11 period for each project type. These projects are representative of future project cashflows.

3.1.6 Cost Estimation Risk Factor (CERF)

The network project estimates, concept estimates, are established by a top down methodology using Powerlink's Base Planning Objects (BPO's). These BPO's are applied to a defined scope of work. The BPO's make an allowance for each component of the works necessary to establish the project on the ground and excludes project risks.

The concept estimates are established up to 7 years ahead of project approval. In the period from preparation of the concept estimate to project approval, it has been shown that the project cost tends to increase beyond the amount provided for by the forecast escalation rates. These increases are generally the result of costs increases from events that are unforeseen including but not limited to delays to site access, changes to technology, legislative and compliance requirements, community management matters, unforeseen site conditions, and extreme weather patterns.

Project risks are accounted for separately by the application of the Cost Estimation Risk Factor (CERF) across the project portfolio. The CERF was established by Evans and Peck using Powerlink's project data for active¹ and future² projects completed in the current period to date. A resultant composite portfolio risk factor is applied.

3.2 Outputs

The CAM provides escalated and unescalated capital expenditure by both asset class and project category based on the above inputs. Capitalisations are also provided by asset class and are based on the escalated weighted capital expenditures. The outputs are provided on an annual basis.

¹ Active listed projects are projects that had been approved but not completed at the time of the last Revenue Proposal Submission

² Future listed projects are projects that had not been approved at the time of the last Revenue Proposal Submission

Appendix 1 – CAM User Guide

A1. CAM Input Files

The CAM project data is sourced from 2 files:

- Project commissioning dates; and
- Project cost data.

Preliminary planning studies establish a range of load driven network needs for the suite of likely generation scenarios. These needs are addressed by one or a number of projects determined through planning studies and are detailed in the Grid Plan.

An amount of Powerlink's substation and lines will also be subject to replacement as they reach the end of their serviceable lives. The list of replacement projects is established as detailed in the Non-load Driven Plan.

Details of the project source data are addressed below.

A1.1. General Input Parameters

The model must first be set up with common information that defines the period to be analysed and the source model data. These are set in the instruction sheet and include:

- The BPO cost reference date is the reference financial year the model commences the calculations for annual capex and capitalisations.
- The number of generation scenarios that need to be calculated.
- The project commissioning date filename.
- The project cost data filename.
- The output master filename. This file provides the template calculations for each scenario.

A1.2. Project Cost File

The projects identified in the Grid and Non-load Driven Plans are scoped and then estimated using Powerlink's top down BPO method using the Xpres estimating tool. This produces the concept estimates.

Easement projects are estimated using a bottom up approach based on the likely land area required for the transmission line route and substation location, and the estimated unit land costs. Project delivery, consultancy and other overhead costs are also established on the basis of the type, complexity and size of the project.

Operational projects are also estimated using a bottom up approach to produce the project estimates.

All the estimates are collated into a single source CAM cost input file. This file contains fields for project costs, project code and description. In addition it lists:

- Project Type which defines the project s-curve;
- Asset 2 which defines the asset class for allocation of costs; and
- Component which is used for the application of escalation rates.

A1.3. Project Date File

The load and non-load driven project completion dates established in the relevant plans are collated into a single data file. This file contains the completion dates for load driven network projects in each of the scenarios in which it applies. Completion dates for non-load driven network projects are applied to all scenarios using the same completion date to ensure project costs are captured.

In addition to the project commissioning dates, this file allocates one of each of the following categories to each project:

- Augmentation
- Connection
- Easement
- Other
- Replacement
- Security/Compliance

These groupings are provided to allocate project costs to the appropriate types of network investment.

A2. CAM Output Files

The CAM output presents a range of cost tables, listed below, that show the individual scenario and summary cash flows for capex and capitalisations, by asset class, project category and scenarios. The CAM produces an output scenario file for each scenario using the Excel bases Output Master formula template. At completion of the execution for each CAM scenario iteration, the CAM reads data from each of the files and imports the information to the summary tables on the CAM output sheet.

The tables produced by the CAM are listed as follows:

A2.1. Summary Table

- Summary data table with the cash flow totals for each annual period.

A2.2. Unescalated Project Cash Flows

- Summary Table - Capex by Asset Class (weighted average)
- Summary Table - Capex by Project Category (weighted average)
- Capex by Asset Class (weighted average)
- Capex by Project Category (weighted average)
- Capex by Scenario
- Capex by Scenario (weighted average)

A2.3. Escalated Project Cash Flows

- Summary Table - Capex by Asset Class (weighted average)
- Summary Table - Capex by Project Category (weighted average)
- Capex by Asset Class (weighted average)
- Capex by Project Category (weighted average)
- Capex by Scenario
- Capex by Scenario (weighted average)



A2.4. Capitalisations

- Summary Table - Capitalisation by Asset Class (weighted average escalated)
- Summary Table - Capitalisation by Project Category (weighted average escalated)
- Capitalisation by Scenario (weighted average escalated)
- Capitalisation by Asset Class (weighted average escalated)