



Capital Expenditure Forecasting Methodology

May 2012

Version 1.1



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1. Document Purpose

This document describes the approach ElectraNet adopts to prepare its future capital expenditure forecast. This document only pertains to the forecasting of capital expenditure on ElectraNet’s prescribed transmission network.

2. Capital Expenditure Forecasting Model

The Capex Expenditure Forecasting Model (the Capex model) is used to establish a profile of the forecast capital expenditures and capitalisations for network load and non-load driven projects and non-network projects in a nominated regulatory period.

The Capex model is a Microsoft Excel based application that calculates the project capital expenditures and capitalisations for a set of estimated project costs and anticipated project completion dates. The Capex model relies on a number of input parameters, and escalators to establish the un-escalated weighted capex, escalated weighted capex, and escalated project capitalisations on an annual basis for the nominated regulatory period.

The inputs and outputs are summarised in Figure 1. A flow chart of the models processes is contained in Appendix A.

3. Capex Model Forecasting Methodology

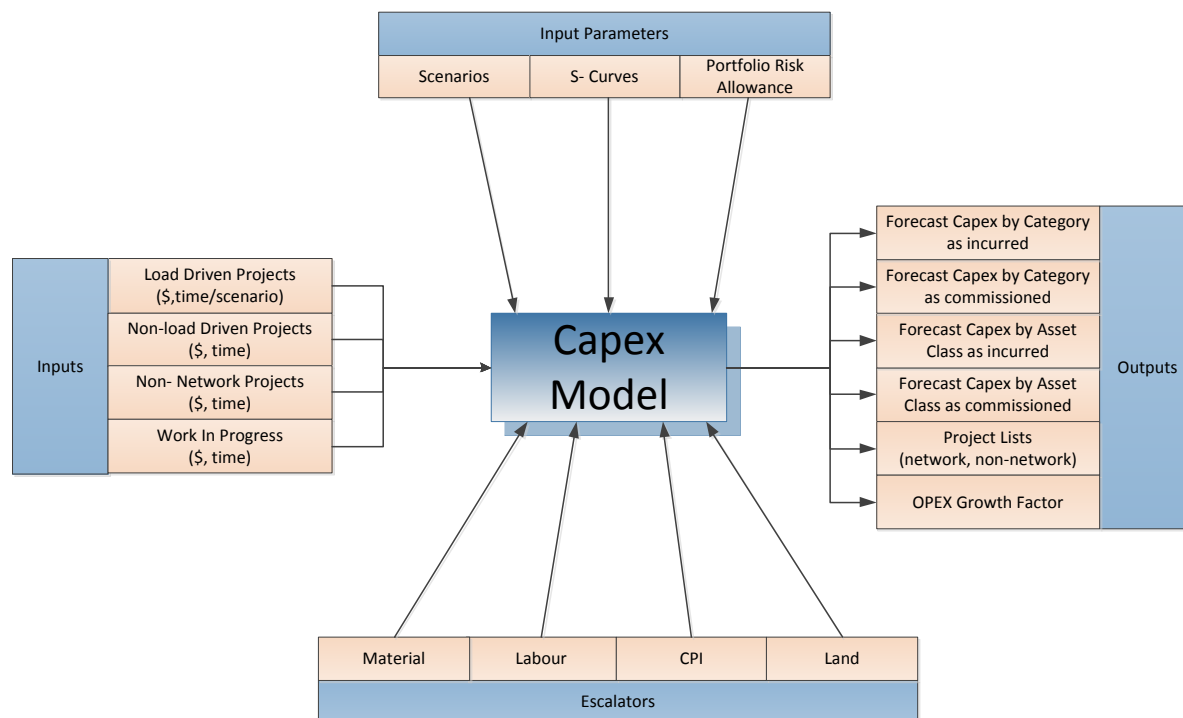


Figure 1: Capex model inputs and outputs

3.1 Inputs

The following inputs are required for the model:

3.1.1 Load Driven Project Costs

Load driven projects are identified by ElectraNet's planning process and are published in the Annual Planning Report. The projects are identified in the following categories;

- Augmentation
- Connection
- Strategic Land / Easements

The projects are scoped, and then estimated in the Success Enterprise estimating tool. The inputs into the Capex model, from Success, are in 2011/12 dollars and commissioning dates are derived from the 2012 ETSA Utilities connection point forecast and the 2011 AEMO state-wide demand forecast.

3.1.2 Non-Load Driven Network Projects

Non-load driven network projects are identified by ElectraNet's planning process and Asset Management Plan with replacement projects published in the Annual Planning Report. The projects are identified in the following categories:

- Replacement
- Refurbishment
- Security/Compliance
- Inventory/Spares
- Other

The projects are scoped and estimated in the Success Estimator tool. The inputs are in 2011/12 dollars and commissioning date is derived from asset management planning processes.

3.1.3 Non-Network Projects

Non-network projects are identified by annual business planning processes in the following categories:

- Business IT
- Buildings/Facilities

The projects are scoped and then estimated in the Success Enterprise estimating tool. The inputs are in 2011/12 dollars and implementation date (derived from business requirements).

3.1.4 Work In Progress Model

Work In Progress (WIP) cost estimates are contained within ElectraNet's SAP system. A WIP model breaks these estimates into three distinct quantities:

- project cost;

- as incurred expenditure; and
- as commissioned expenditure.

These cost breakdowns are used as an input to the Capex Model to assist in producing the as incurred, as commissioned expenditures for Category and Asset Class AER Templates.

3.2 Input Parameters and Escalators

To establish annual project cash flows, the Capex model 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 input data is addressed in further detail below.

3.2.1 Scenario Modelling

ElectraNet engaged ROAM Consulting to establish a range of likely generation and load development scenarios on the basis of load forecast, carbon price and interconnector developments in South Australia. Each scenario is weighted according to the likelihood of the scenario eventuating.

ElectraNet has then applied the weighted scenarios to test the sensitivity of the load driven capital expenditure forecast to changes in load and generation development patterns.

This analysis revealed little impact on the timing of augmentation and connection projects in the forthcoming regulatory period as the projects comprising the ex ante capital expenditure forecast are largely independent of the generation development and demand forecast assumptions considered in the range of scenarios modelled.

Non-load driven projects (i.e. 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.

Those augmentation projects triggered by an ETC driver date are also committed 3 years in advance based on the timing requirements that apply under the new ETC.

3.2.2 Labour Escalation

Capital and operating expenditure programs are delivered using both internal ElectraNet resources as well as external contract labour.

ElectraNet engaged BIS Shrapnel to provide an expert opinion regarding the outlook for labour costs and labour market issues relevant to electricity networks. The real escalation rates proposed by BIS Shrapnel are based on the Labour Price Index (LPI) measure of labour cost escalation.

ElectraNet's proposed forecast for internal labour costs reflects ElectraNet's Enterprise Agreement in force to the period ending June 2015.

Table 1 below shows the wages growth escalation factors that have been applied to the internal and external labour components of the capital expenditure forecast.

Table 1: Wages growth forecast for SA utilities and construction sector (in LPI terms)

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Internal Labour Escalation (nominal)	4.5	4.5	4.5	4.5	4.8	5.0	5.3
Internal Labour Escalation (real)	2.9	1.5	2.0	2.0	2.3	2.5	2.8
Construction Labour escalation (real)	1.9	1.2	3.3	2.4	1.8	2.5	3.0

Source: ElectraNet Enterprise Agreement outcomes and BIS Shrapnel advice

The source data for each of the labour escalations is:

- ElectraNet internal general labour (to 2014-15) – ElectraNet
- ElectraNet internal general labour (from 2015-16) – BIS Shrapnel
- External Construction Labour – BIS Shrapnel.

3.2.3 Materials Escalation

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

The method for materials cost escalation adopted in this proposal is based on the methodology set out in ElectraNet’s (2008) Revised Proposal approved by the AER¹.

The forecasting method is summarised in the following steps:

1. Place resource components into cost categories (e.g. structures and fabricated steel, primary plant, transformers, aluminium conductor, labour etc.);
2. Breakdown the resource component costs into component inputs for which there is a forecast available (e.g. aluminium, copper, steel, labour, construction etc.);
3. Estimate the proportion of different component inputs used in the production of each resource component and weight each for its contribution to the total amount of inputs used in each cost category;
4. Identify the weight that each cost category has in explaining the base period cost of the capital expenditure forecast;

The Table 2 summarises the output from steps 1-4.

¹ ElectraNet, ‘Transmission Network Revised Revenue Proposal 1 July 2008 to 30 June 2013,’ 18 January 2008

Table 2: Material's escalation

	Weight	Copper	Aluminium	Crude oil	Steel	Labour (EGW wages)	Other construction costs	Other (CPI)	Land and easements
Labour contractors overheads	0.151					1.00			
Primary plant	0.14	0.14	0.19	0.02	0.36	0.04	0.01	0.25	
ElectraNet labour	0.136					1.00			
Secondary systems	0.053	0.00	0.00	0.00		0.04		0.96	
Structures fabricated steel	0.004				1.00				
Civil construction	0.096				0.03	0.07	0.62	0.28	
Transformers	0.004	0.29	0.00	0.19	0.29	0.03	0.00	0.20	
Transmission towers	0.051				0.73	0.18		0.09	
Concrete poles	0.006				0.04	0.06	0.06	0.83	
Electrical construction	0.117	0.00	0.00		0.00	0.93		0.07	
Buildings	0.011				0.00	0.00	0.97	0.03	
Aluminium conductor	0.007	0.00	0.22		0.26	0.05		0.48	
Land and easements	0.052					0.00	0.00		1.00
Underground copper cable	0.007	0.24	0.00		0.00			0.75	
Materials other	0.166	0.00	0.00		0.01	0.08	0.02	0.87	0.01

* Proportion of component inputs for resource components supplied by PSC Consulting

5. Source available forecasts for the component inputs identified in step 2 and select a point estimate/range for that forecast;

ElectraNet engaged Competition Economists Group (CEG) to estimate real escalation rates for aluminium, copper, steel, crude oil and construction².

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

² CEG, 'Escalation Factors Affecting Expenditure Forecasts,' February 2012

escalator for plant and equipment, and all other components. The following table summarises the real non-labour escalation factors used in the Capex model in step 5.

Table 3: Real non-labour escalation factors

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Aluminium	(11.3)	2.5	5.3	3.9	2.9	2.5	2.0
Copper	(5.9)	1.2	0.4	(1.5)	(3.4)	(3.9)	(4.5)
Steel	(3.8)	(4.1)	3.5	1.8	0.3	(0.1)	(0.6)
Crude oil	3.9	7.5	(2.2)	(3.4)	(2.4)	(1.5)	(1.2)
Construction	(0.5)	(1.8)	(0.6)	(0.3)	0.1	0.6	0.9

The foreign exchange rate adopted in the calculation of the escalation factors is the AUD/USD rate provided by CEG, May 2012.

6. Calculate weighted average annual escalation factors for each capital expenditure forecast cost category by multiplying the forecasts in step 5 by the weights in step 4; and
7. Calculate the weighted average materials escalation from the cost category weightings.

The following table summarises the cost category escalators from steps 6 and 7.

Table 4: Cast category escalators

Cost Escalators and Weightings (real)	Weight	2013-14	2014-15	2015-16	2016-17	2017-18
Labour Contractors Overheads	0.152	0.033	0.024	0.018	0.025	0.030
Primary Plant	0.141	0.030	0.030	0.023	0.021	0.016
Labour ENet	0.137	0.033	0.024	0.018	0.025	0.030
Secondary Systems	0.053	0.015	0.021	0.019	0.016	0.017
Structures Fabricated Steel	0.004	0.041	0.041	0.026	0.025	0.018
Civil Construction	0.095	0.004	0.007	0.008	0.011	0.013
Transformers	0.004	0.011	0.011	0.007	0.007	0.005
Transmission Towers	0.051	0.037	0.036	0.024	0.024	0.020
Concrete Poles	0.004	0.015	0.021	0.018	0.016	0.017
Electrical Construction	0.115	0.032	0.024	0.018	0.024	0.029
Buildings	0.011	-0.005	-0.002	0.002	0.006	0.009
Aluminium Conductor	0.006	0.032	0.034	0.028	0.025	0.022

Cost Escalators and Weightings (real)	Weight	2013-14	2014-15	2015-16	2016-17	2017-18
Land And Easements	0.052	0.070	0.070	0.070	0.070	0.070
Underground Copper Cable	0.007	0.011	0.014	0.012	0.008	0.008
Materials Other	0.167	0.016	0.021	0.019	0.017	0.018
Weighted average	1	0.027	0.025	0.021	0.023	0.025
Compounded weighted average		0.037	0.063	0.083	0.106	0.131

These escalators are then applied to the relevant network capital projects to derive the escalated capital expenditure forecast.

3.2.4 Land Escalation

ElectraNet's network extends from the largely urban area of the Adelaide City area north to Leigh Creek West to the middle of Eyre Peninsula, and east to the NSW and Victorian borders and covers a service area of approximately 200,000km².

Land value forecasts were established for ElectraNet by Maloney Field Services (MFS). These forecasts are based on the Australian Bureau of Statistics time series "Value of Land by Land Use by State/Territory – as at 30 June, Current Prices". This time series spread sheet indicates the value of land broken down into the following categories for each year beginning in June 1989 through to June 2010:

- residential,
- commercial,
- rural;
- other land and
- total Land

In adopting an escalation rate MFS have determined that the South Australian "Total Land" factor of 9.5% per annum represents the most reliable escalator for site values of the ElectraNet portfolio for the period 2013 - 2018.

3.2.5 S-Curves

The Capex model applies a set of generic s-curves based on 15 standardised project types:

- Information Systems
- Engineering
- Facilities
- Land and Easements
- Substation Land

- Line Uprate
- Major Network Augmentation
- Major Substation and Line
- Substation Large - RIT-T
- Substation Large - No RIT-T
- Substation Small
- Inventory - Spare Transformers
- Inventory - Annual
- Communication Bearers - OPGW and MW
- Substation Communications

The curves are established from the average of historical trends of capital expenditure in the 2008/09 to 2011/12 period for each project type. These projects are representative of future project cash flows.

3.2.6 Portfolio Risk Allowance

Cost estimation risk analysis is based on a statistical approach to understanding the uncertainties and probabilities associated with project cost estimates. The cost estimation risk analysis process recognises that there exists, on average, an asymmetric cost outcome on projects between an initial concept level cost estimate, and final outturn cost. Portfolio risk analysis captures the average cost impact of risk diversified at a portfolio level across the overall capital expenditure forecast.

The concept level estimate for network projects are established by a top down methodology using ElectraNet's Success Estimator Cost Objects. These costs are applied to a defined scope of work to produce a project cost estimate and exclude an allowance for contingency.

The concept estimates can be established up to 10 years ahead of project approval. In the period from preparation of the concept estimate to project approval, 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 portfolio risks are accounted for separately by the application of a Portfolio Risk Allowance across the project portfolio. This allowance was established by Evans and Peck using ElectraNet's project data for active³ and future⁴ projects completed or progressed to an advanced stage in the current period to date.

A resultant composite portfolio risk allowance has been applied to the capital expenditure forecast, limited in its application to those future network projects that present a material risk to the portfolio. As such, the portfolio risk allowance excludes:

³ Active listed projects are projects that had been approved but not completed at the time of the last Revenue Proposal Submission

⁴ Future listed projects are projects that had not been approved at the time of the last Revenue Proposal Submission

- Non-network projects;
- Telecommunications, land and easement acquisitions and information technology projects; and
- Projects that have progressed to the point where a detailed bottom-up cost forecast has been developed.

Further information relating to the methodology used to calculate the PRS can be found in Appendix M.

3.3 Outputs

The capex model provides capital expenditure outputs by both asset class and project category based on the above inputs. The outputs are provided on an annual basis.

Other outputs include Network and non-network project lists as required by the AER templates and an OPEX growth factor. The outputs are described in the following clauses.

3.3.1 Forecast Capex by Project Category (as incurred)

This output describes the forecast “as incurred” capital expenditure per regulatory period year in the following categories.

3.3.1.1 Network Projects

- Augmentation
- Connection
- Strategic Land / Easements
- Replacement
- Refurbishment
- Security/Compliance
- Inventory/Spares

3.3.1.2 Non Network

- Business IT
- Buildings / Facilities

The incurred cost output is in 2012-13 AUD.

3.3.2 Forecast Capex by Project Category (as commissioned)

This output is forecast “as commissioned” capital expenditure in the same categories described in 3.3.1 above and is in 2012-13 AUD.

3.3.3 Forecast Capex by Asset Class as incurred

This output describes the forecast “as incurred” capital expenditure per regulatory period year in the following asset classes.

- Commercial Buildings
- Communications - Civil
- Communications - Systems
- Computers, software, and office machines
- Easement
- Land
- Network Switching Centres
- Office furniture, movable plant, and misc
- Refurbishment
- Substation Primary Plant
- Substation Demountable Buildings
- Substation Establishment
- Substation Fences
- Substation Secondary Systems - Electromechanical
- Substation Secondary Systems - Electronic
- Transmission lines - Overhead
- Transmission lines - Underground
- Working Capital
- Accelerated Depreciation
- Refurbishment Projects 2008-2013
- Equity Raising Cost - 2003 Opening RAB and 2003-08 capex
- Equity Raising Cost 2013-2018
- Transmission Line Refit

The output is in as incurred costs in 2012-13 AUD.

3.3.4 Forecast Capex by Asset Class as commissioned

This output is forecast “as commissioned” capital expenditure in the same asset classes described in 3.3.3 above and are in 2012-13 AUD.

3.3.5 Project Lists

All network and non-network projects are listed in these outputs with their annual expenditure per regulatory period year in 2012-13 AUD.

3.3.6 OPEX Growth Factor

This output calculates the growth in asset class value taking into account project spend per asset class and asset disposal worth, net of replacement expenditure, to determine the underlying growth in the asset base.

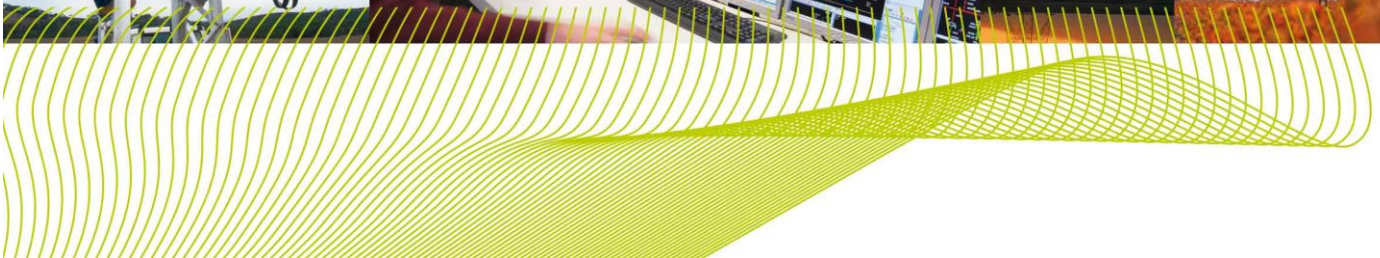


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Appendices

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Appendix A Capital expenditure model

