2018-22
POWERLINK QUEENSLAND REVENUE PROPOSAL

APPENDIX 6.01

Powerlink Queensland
Forecast Operating Expenditure Methodology and Model

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1 Purpose

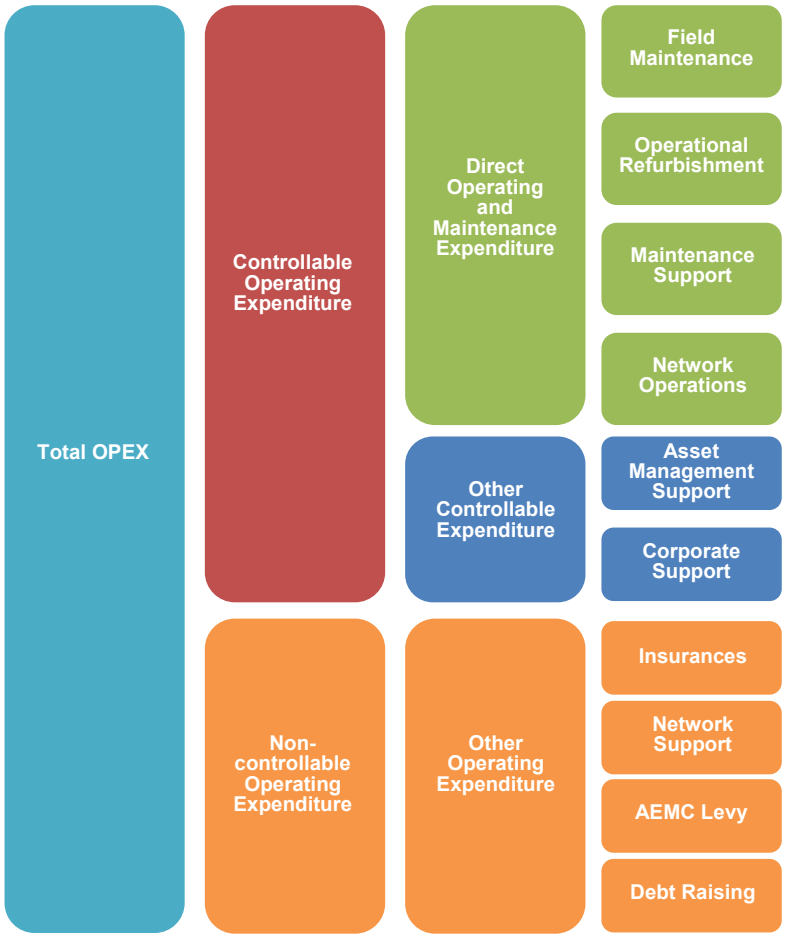
This document describes the methodology that Powerlink has adopted in the preparation of its forecast operating expenditure for the 2018-22 regulatory period. It includes a detailed explanation of how this methodology has been implemented in the forecasting operating expenditure model (Opex Model) provided as part of the Revenue Proposal. Powerlink has discussed many aspects of its approach to forecasting operating expenditure within the Revenue Proposal. For completeness, some of the information contained in the Revenue Proposal is repeated below.

2 Operating Expenditure Categories

To forecast its operating expenditure, Powerlink has retained the same broad categories of operating expenditure as adopted for the 2013-17 regulatory period. This should assist the Australian Energy Regulator (AER) and stakeholders in understanding the nature of the forecast for the 2018-22 regulatory period. Figure 1 shows how Powerlink's operating expenditure categories fit within the total operating expenditure framework.

Note that the Australian Energy Market Commission (AEMC) Levy has been added as an element of Other Operating Expenditure.

Figure 1: Operating expenditure categories



Source: Powerlink, Operational and Capital Expenditure Forecasting Methodology

Powerlink's Opex Model presents the AER's allowance, historical and forecast operating expenditure consistent with the categories described in Figure1.

2.1 Controllable – direct operating and maintenance expenditure

Controllable operating expenditure is the largest component of operating expenditure and relates to costs directly associated with maintaining and operating the network and key business support functions. The four elements of direct operating and maintenance costs are broken down for business-as-usual reporting and have been maintained for forecasting purposes.

2.1.1 Field maintenance

Field maintenance includes all field activities required to ensure network assets continue to perform the required functions. There are three types of field maintenance:

1) *Routine maintenance* - is defined by maintenance plans implemented in Powerlink's corporate asset management system (SAP) for routine inspection, testing or servicing of plant and equipment;
2) *Condition-based maintenance* - usually evolves out of routine maintenance, where it is identified that the condition of plant or equipment is such that action must be taken to avoid future defects (e.g. equipment operating outside of tolerance limits); and
3) *Corrective maintenance* - involves rectification of defects in plant or equipment that must be attended to preserve (personal or equipment) safety, manage environmental issues or return plant to service to reduce the impacts of network outages on customers.

Powerlink's Asset Maintenance Policy sets out the overarching principles which determine maintenance needs, plans and work program.

2.1.2 Operational refurbishment

Operational refurbishment involves activities that return an asset to its pre-existing condition or function, or activities undertaken on part of an asset to return that specific component to its pre-existing condition or function. These refurbishment activities do not involve increasing the capacity or capability of the plant, or extending its working life beyond its original design (which would typically be defined as capital reinvestment).

Operational refurbishment typically involves quite extensive works performed only once or twice over an asset's life which are of such complexity that they are delivered as an integrated project.

Powerlink's Asset Refurbishment Policy sets out the overarching principles which determine operational refurbishment needs, plans and projects.

2.1.3 Maintenance support

Maintenance support includes activities required to develop and maintain the systems to support field maintenance. This includes provision of asset support functions in the field (such as engineering technical support and management of safety and environmental compliance) as well as non-field functions, such as developing maintenance strategies, maintenance auditing and overall performance management.

2.1.4 Network operations

Network operations includes the control centre functions as well as those additional activities required to ensure the safe, reliable and efficient operational management of the Queensland transmission network. There are four main functions carried out within network operations:

1) *Real-time control room function* - this is a 24-hour continuous requirement. Network operators provide the functions of network operation, coordination and switching sheet preparation for all plant outages;
2) *Operational planning and engineering support* - this function involves operational planning, security analysis, contingency and outage planning;
3) *Technical support* - for the Energy Management System (EMS) and SCADA systems – support functions such as EMS maintenance configuration, database management, hardware installation, software upgrade and maintenance; and

4) *Asset monitoring* - monitoring asset performance and condition, which includes response management, auditing network configurations and performing fault diagnosis.

2.2 Controllable - other controllable expenditure

2.2.1 Asset management support

Asset Management (AM) support includes those operational activities required to support the strategic development and ongoing asset management of the network. AM Support has four major sub elements:

1) *Network planning* - includes forecasting future network demand, analysing future network capabilities, developing network investment plans and joint planning activities;
2) *Asset management* - includes costs associated with the development of strategies, policies and procedures for the life cycle management of Powerlink's network assets;
3) *Network customer and regulatory support* - includes Powerlink's customer management, network pricing and regulatory functions; and
4) *Operational support* - includes the costs associated with the development of strategies, policies and procedures for the operational and security aspects of Powerlink's network assets.

2.2.2 Corporate support

Corporate support encompasses the support activities required by Powerlink in order to ensure adequate and effective corporate governance. Corporate Support has four major sub-elements:

1) *Corporate support* - provision of business administrative services to support Powerlink's corporate operations;
2) *Direct corporate support charges* - direct charges component of corporate support incorporates the costs associated with corporate governance and corporate support.
3) *Revenue reset costs* - are costs associated with the preparation of Powerlink's Revenue Proposal and determination process; and
4) *IT support* - includes the costs associated with the future strategy development, planning and support of Powerlink's information technology infrastructure.

2.3 Non-controllable - other operating expenditure

Other operating expenditure is driven by exogenous factors that are generally outside Powerlink's control (e.g. borrowing and insurance costs). Currently, other operating costs comprise four categories.

2.3.1 Insurances

Insurance includes both insurance premiums and a self-insurance allowance to provide cover for below deductible losses contained in Powerlink's insurance portfolio, for which it is not efficient to procure additional insurance coverage.

2.3.2 Network support

Network support refers to costs associated with non-network solutions used by Powerlink as an efficient alternative to network augmentation or reinvestment. Potential non-network solutions may include local generation, cogeneration, demand side response and services from a Market Network Service Provider (MNSP).

2.3.3 Debt raising

Debt raising costs relate to costs incurred by Powerlink over and above the benchmark debt margin approved by the AER. These costs are encountered when new debt is raised, or current lines of credit are renegotiated or extended.

2.3.4 Australian Energy Market Commission (AEMC) Levy

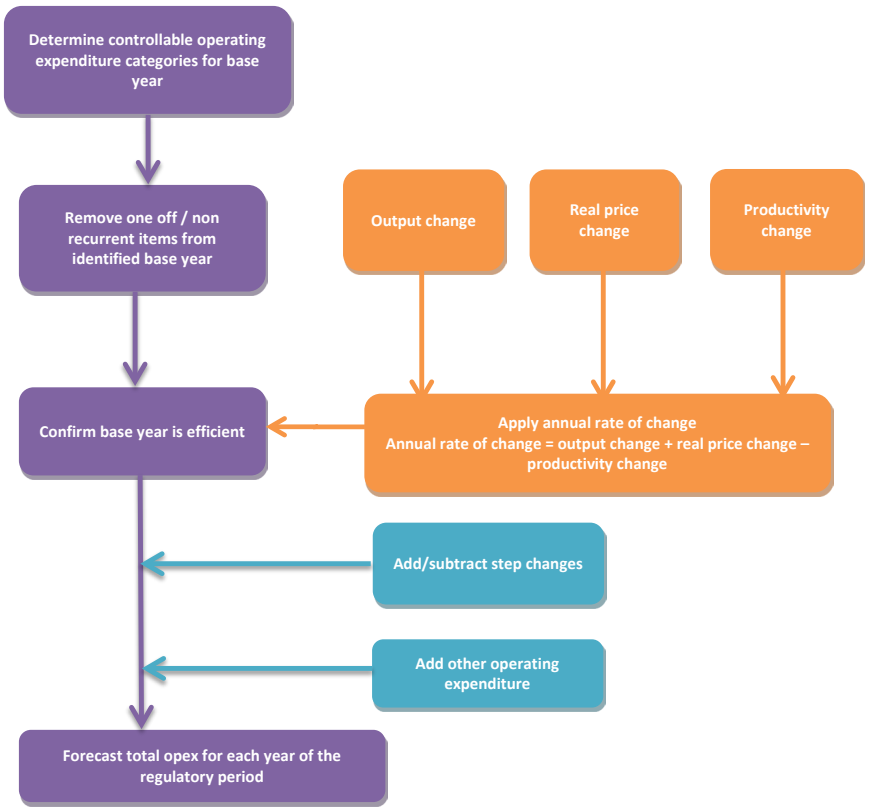
In 2014, the Queensland Government enacted changes to the Electricity Act 1994 (Qld).[1] Under these changes Powerlink, as holder of a Transmission Authority in Queensland, must pay an annual fee that is a portion of the Queensland Government's funding commitments to the AEMC. The levy was first applied to Powerlink in 2014/15 and resulted in an increase in other operating expenditure within the current regulatory period that is required on a recurrent basis. Powerlink has confirmed with the Queensland Government a forecast for the AEMC Levy for the 2018-22 regulatory period.

3 Operating expenditure forecasting methodology

Powerlink has largely used the approach set out in the AER's Expenditure Forecast Assessment Guideline (EFA Guideline).[2] A base step trend approach has been applied to the controllable operating expenditure categories and a zero-based approach applied to other operating expenditure items.

The methodology used to prepare Powerlink's operating expenditure forecast is summarised in Figure 2 and explained in the following sections.

Figure 2: Powerlink's operating expenditure forecasting methodology



Source: Powerlink, Operational and Capital Expenditure Forecasting Methodology

The application of the base-step-trend approach first requires the selection of a base year with revealed costs in the 2013-17 regulatory period.

One-off or non-recurrent expenditure items are removed from the base year and further analysis of the recurrent expenditure undertaken (including trend analysis, category analysis and external benchmarking) to determine any adjustments required to the base year to establish an efficient level of recurrent expenditure.

[1] *Electricity and Other Legislation Amendment Bill 2014*, Queensland Government, Part 2, Amendment of Electricity Act 1994.
[2] *Expenditure Forecast Assessment Guideline for Electricity Transmission,* AER, November 2013.

An annual real rate of change factor is then applied to the controllable operating expenditure categories from the efficient base year, for each year of the forecast regulatory period. The annual real rate of change is a function of the forecast change in real input costs (labour and materials), the forecast change in productivity, and the forecast change in network output.

An assessment of new requirements and other factors that may require a step change in controllable operating expenditure is conducted and zero-based estimates established for items in the other operating expenditure category. While Powerlink's operating expenditure forecasting methodology provides for the assessment of step changes, Powerlink has not proposed any for the 2018-22 regulatory period.

The forecast of other operating expenditure is then added to the expenditure forecast established under the base step trend approach for controllable operating expenditure to produce total forecast operating expenditure for the 2018-22 regulatory period.

4 Forecast operating expenditure model

4.1 General model inputs

Powerlink's Opex Model includes a number of general inputs for the purposes of modelling forecast expenditure:

1) *Inflation (Input|Inflation)* - forecast operating expenditure is presented in real 2016/17 (June) dollars. To enable the forecast and historical data to be presented on the same basis, the Opex Model applies Consumer Price Index (CPI) (March – March) to convert, as required, from:
    - Real to real (end of year);
    - Nominal(mid year) to real (end of year); and
    - Real (end of year) to nominal (mid year).
2) *AER allowance (Input|Allowance)* - the Opex Model incorporates the AER's operating expenditure allowances for the current and previous regulatory periods (expressed in mid year $2011/12), aligned with each category of forecast operating expenditure.
3) *Historical operating expenditure (Input|Historic)* - the forecast operating expenditure model presents actual operating expenditure for the current and previous regulatory periods (expressed in nominal $'s), including the proposed 2014/15 base year.

4.2 Establishing the efficient base year

Consistent with its operating expenditure forecasting methodology, Powerlink selected the 2014/15 financial year as the base year for its forecast of controllable operating expenditure. The 2014/15 base year is the most recent full year of reported operating expenditure that has been independently audited.

Actual expenditure in the base year has been reviewed and expenditure items removed that are non-recurrent or not considered to reflect an efficient level of recurrent controllable operating expenditure based on a range of analysis techniques (including trend analysis, category analysis and independent benchmarking advice). In the forecast operating expenditure model, the worksheet Input|Base Year Adjustment in Figure 3 records the adjustments made to 2014/15 controllable operating expenditure. The adjustments are shown against relevant categories of controllable operating expenditure and classified as:

- *Non recurrent* – controllable operating expenditure that is one-off and typically caused by exogenous factors;
- *Work program efficiency* – controllable operating expenditure that has been removed based on Powerlink's assessment that it does not represent an efficient level of recurrent expenditure for the 2014/15 financial year. This assessment has been informed by trend, category and benchmarking analysis; and
- *Workforce efficiency review* – controllable operating expenditure that relates to Powerlink restructuring and adjusting resource levels within the business.

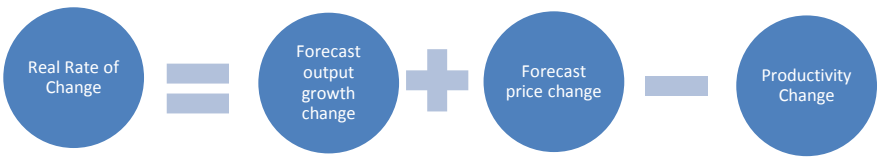
Figure 3: Input|Base Year Adjustment worksheet

Line Item	Comment	Adjustment for Efficient Base Year 2014-15
Controllable Operating Expenditure		
Direct Operating and Maintenance Expenditure		
Field Maintenance - Routine	[Work program efficiency] - Vegetation management	(0.02)
Field Maintenance - Condition-based	[Work program efficiency] - Vegetation management	(1.41)
Field Maintenance - Corrective	[Work program efficiency] - Vegetation management	(0.32)
Field Maintenance - Condition-based	[Non recurrent]- G20 preparation works	(0.20)
Operational Refurbishment	[Work program efficiency]- refurbishment program	(2.90)
Maintenance Support	[Non recurrent]- G20 preparation works	(0.07)
Maintenance Support	[Work program efficiency] - Vegetation management	(0.27)
Other Controllable Operating Expenditure		
Asset Management Support	[Non recurrent] - Cancelled project	(0.48)
Corporate Support	[Non recurrent] - Cancelled project	(12.07)
Corporate Support	[Work force efficiency review]	(4.68)
Corporate Support	Movement in Provisions	0.25
Other Operating Expenditure		
Total		**(22.17)**

Source: Powerlink Opex Model

4.3 Determine annual real rate of change

This section describes how the annual real rate of change is determined within the Opex Model and applied to establish forecast controllable operating expenditure. The real annual rate of change function is described below.



Powerlink has defined the parameters and calculation of the annual real rate of change in the Calc|Rate of Change worksheet (Figure 7) in the forecast operating expenditure model.

4.3.1 Forecast output growth change

Output change is the expected change in the following measures of network output identified by the AER in its EFA Guideline:

- Energy;
- Ratcheted non-coincident maximum demand;
- Weighted entry and exit points; and
- Transmission line circuit length.

In the Calc|Rate of Change worksheet (Figure 4), Powerlink has developed a forecast for these quantities over the regulatory period, described as output measures. The annual rate of change for each of these quantities is calculated within the Calc|Rate of Change worksheet, to derive the growth factor for each year of the forecast.

The methodology applied to derive each output measure forecast quantity is described below.

Energy throughput

Powerlink's energy forecasts are based on its Transmission Annual Planning Report 2015 (TAPR) supplemented by the Australian Energy Market Operator (AEMO) electricity flow forecasts across the Queensland/New South Wales border via the Queensland/New South Wales Interconnector (QNI) and Teranorra interconnectors taken from AEMO's 2015 National Transmission Network Development Plan (NTNDP).

Powerlink reviewed the impact of energy growth on its forecast controllable operating expenditure and recognised that the forecast annual growth in energy throughput between the 2015/16 and 2017/18 years was due to the significant forecast growth of Liquid Natural Gas (LNG) load concentrated in the Surat Basin. This energy is being delivered via the prescribed network and LNG proponent funded non-regulated assets.

Taking this into account, Powerlink reduced the Surat Basin LNG load in its energy throughput data between 2015/16 and 2017/18 for forecasting its operating expenditure. Powerlink pro-rated this energy throughput data in line with the proportions of regulated and non-regulated capital expenditure associated with developing the assets to serve the LNG load. This resulted in Powerlink reducing Energy growth between the 2015/16 and 2017/18 years by 71%.

Ratcheted maximum demand

Powerlink's ratcheted maximum demand forecasts are based on the same sources as its energy throughput forecasts noted above.

Entry and exit points

Powerlink is forecasting no new entry and exit points in the 2018-22 regulatory period and has therefore maintained in its forecast the voltage weighted entry and exit points recorded in the 2017/18 year over the 2018-22 regulatory period.

Circuit length

Powerlink has forecast no increase in circuit length over the 2018-22 regulatory period and has adjusted the forecast of circuit kilometre length to reflect planned line decommissioning over the 2018-22 regulatory period.

In the Calc|Rate of Change worksheet (Figure 4), weightings are applied to each growth rate in accordance with the factors described by the AER in its Multilateral Total Factor Productivity (MTFP) analysis. This results in a weighted annual forecast of output growth change for the 2018-22 regulatory period, presented in Figure 4.

Figure 4: Output growth

Total Opex Growth Calculation									
		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Forecast output growth change									
Output measure	Energy	53088	53924	55330	56769	56780	56892	56635	57034
	Ratcheted non-coincident maximum demand	12247	12247	12262	12524	12580	12580	12580	12580
	Weighted entry and exit points	17160	17276	17413	17413	17413	17413	17413	17413
	Circuit length	14755	14755	14544	14544	14532	14463	14463	14463
Growth	Energy		0.46%	0.76%	0.75%	0.02%	0.20%	-0.45%	0.70%
	Ratcheted non-coincident maximum demand		0.00%	0.03%	0.62%	0.45%	0.00%	0.00%	0.00%
	Weighted entry and exit points		0.67%	0.80%	0.00%	0.00%	0.00%	0.00%	0.00%
	Circuit length		0.00%	-1.43%	0.00%	-0.08%	-0.47%	0.00%	0.00%
Weights	Energy		21.40%						
	Ratcheted non-coincident maximum demand		22.10%						
	Weighted entry and exit points		27.80%						
	Circuit length		28.70%						
			TRUE						
Output growth change			***0.28%***	***-0.02%***	***0.30%***	***0.08%***	***-0.09%***	***-0.10%***	***0.15%***

Source: Powerlink Opex Model

4.3.2 Forecast price change

In determining aggregate real input escalation forecasts, Powerlink notes that the AER has in its recent revenue determinations used a weighting of 62% for labour and 38% for materials. Powerlink has investigated the appropriateness of this weighting and found that this it is consistent with the split of labour and materials costs in Powerlink's historical controllable operating expenditure. Accordingly, Powerlink has applied these weightings to develop its real input escalation forecasts for the 2018-22 regulatory period.

Labour input price change

Powerlink's forecast of labour input price changes is based on independent expert advice from BIS Shrapnel, complemented by publically available labour cost forecasts published by Deloitte Access Economics (DAE).[3]

As these forecasts are projections of the changes in the price of labour and not the cost of labour, they do not compensate for any form of labour productivity change. Powerlink's forecast for productivity change accounts for labour productivity improvement.

The labour input price changes are recorded as the Forecast Price Change - Labour in the Calc|Rate of Change worksheet.

Materials input price change

Powerlink has used the CPI as a conservative proxy to forecast price increases in the materials component of controllable operating expenditure for the 2018-22 regulatory period.

The material input price changes are defined as the Forecast Price Change - Materials in the Calc|Rate of Change worksheet.

Based on the weightings determined for labour and materials price growth an aggregate forecast for real input growth is derived in accordance with the Real Price Change shown in the Calc|Rate of Change worksheet (Figure 5).

[3] The Deloitte Access Economics (DAE) forecasts have been taken from a February 2015 paper developed for the AER to assess Energex and Ergon Energy's labour cost forecasts up to 2019/20.

Figure 5: Forecast real price change (%)

		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Forecast price change									
Forecast price change	Labour		0.7%	0.6%	0.6%	0.9%	1.2%	1.4%	1.5%
	Materials		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Weights	Labour		62%	62%	62%	62%	62%	62%	62%
	Materials		38%	38%	38%	38%	38%	38%	38%
			TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Real price change			***0.4%***	***0.3%***	***0.4%***	***0.6%***	***0.7%***	***0.8%***	***0.9%***

Source: Powerlink Opex Model

4.3.3 Forecast productivity change

For the 2018-22 regulatory period, Powerlink's forecast of productivity gains is based on a line-by-line assessment of the potential efficiencies across its whole controllable operating expenditure program. This approach is consistent with feedback from consumers and customers that Powerlink should undertake a "deep dive" to identify operational efficiencies and reflects the impact of Powerlink's ongoing focus on achieving efficiencies and cost reduction.

The forecast of productivity change for the 2018-22 regulatory period using Powerlink's approach is -1.2% per annum. Powerlink's approach has resulted in a much stronger level of productivity improvement each year compared to the level of operating expenditure productivity applied by the AER in its transmission determinations for TransGrid and TasNetworks (-0.86% per annum).

The annual productivity change factor is defined as Productivity Change in the Calc|Rate of Change worksheet shown in Figure 6.

Figure 6: Forecast productivity change (%)

	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Forecast productivity change								
		1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
Productivity change		***1.2%***	***1.2%***	***1.2%***	***1.2%***	***1.2%***	***1.2%***	***1.2%***

Source: Powerlink Opex Model

4.3.4 Total rate of change

Figure 7 shows the summation of output, price and productivity forecast changes over the 2018-22 regulatory period, defined as the Total Rate of Change. In aggregate, the impact of Powerlink's forecast strong productivity performance will be to reduce forecast controllable operating expenditure in real terms by 0.5% per annum.

Figure 7: Forecast annual rate of change (%)

Total Opex Growth Calculation									
		2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Forecast output growth change									
Output measure	Energy	53088	53924	55330	56769	56780	56892	56635	57034
	Ratcheted non-coincident maximum demand	12247	12247	12262	12524	12580	12580	12580	12580
	Weighted entry and exit points	17160	17276	17413	17413	17413	17413	17413	17413
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Growth	Energy		0.46%	0.76%	0.75%	0.02%	0.20%	-0.45%	0.70%
	Ratcheted non-coincident maximum demand		0.00%	0.03%	0.62%	0.45%	0.00%	0.00%	0.00%
	Weighted entry and exit points		0.67%	0.80%	0.00%	0.00%	0.00%	0.00%	0.00%
	Circuit length		0.00%	-1.43%	0.00%	-0.08%	-0.47%	0.00%	0.00%
Weights	Energy		21.40%						
	Ratcheted non-coincident maximum demand		22.10%						
	Weighted entry and exit points		27.80%						
	Circuit length		28.70%						
			TRUE						
Output growth change			***0.28%***	***-0.02%***	***0.30%***	***0.08%***	***-0.09%***	***-0.10%***	***0.15%***
Forecast price change									
Forecast price change	Labour		0.7%	0.6%	0.6%	0.9%	1.2%	1.4%	1.5%
	Materials		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Weights	Labour		62%	62%	62%	62%	62%	62%	62%
	Materials		38%	38%	38%	38%	38%	38%	38%
			TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Real price change			***0.4%***	***0.3%***	***0.4%***	***0.6%***	***0.7%***	***0.8%***	***0.9%***
Forecast productivity change									
			1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
Productivity change			***1.2%***	***1.2%***	***1.2%***	***1.2%***	***1.2%***	***1.2%***	***1.2%***
Total rate of change			**-0.5%**	**-0.9%**	**-0.5%**	**-0.6%**	**-0.6%**	**-0.5%**	**-0.1%**

Source: Powerlink Opex Model

4.4 Define step changes and other operating expenditure

Under the EFA Guideline, the AER's approach is to separately assess the prudency and efficiency of forecast cost increases or decreases associated with new regulatory obligations and capex/opex trade-offs (step changes). Powerlink has assessed the requirement for step changes and has not proposed any for the 2018-22 regulatory period. For this reason, there is no expenditure identified for step changes in controllable operating expenditure in the Input|Step & Zero Base Changes worksheet (Figure 8).

For other operating expenditure, Powerlink has applied a zero-based forecasting approach. A zero-based approach uses an external or bottom-up cost build to estimate the total cost of a particular activity. Figure 8 illustrates the forecast of other operating expenditure as part of the Input|Step & Zero Base Changes worksheet in the forecast operating expenditure model.

Figure 8: Other operating expenditure forecast (Input|Step & Zero Base Changes)

	Real (End Year)				
	2016-17				
Provider	2017-18	2018-19	2019-20	2020-21	2021-22
Controllable Operating Expenditure					
Direct Operating and Maintenance Expenditure					
Other Controllable Operating Expenditure					
Total Controllable Operating Expenditure	-	-	-	-	-
Other Operating Expenditure					
Network Support	-	-	-	-	-
Self Insurance	1.49	1.48	1.48	1.47	1.47
Insurance Premiums	7.61	7.79	7.94	8.09	8.29
AEMC Levy	4.20	4.20	4.20	4.20	4.20
Debt Raising	3.60	3.57	3.53	3.48	3.43

Source: Powerlink Opex Model

4.5 Total forecast operating expenditure

Total forecast operating expenditure is presented in the Calc|Forecast worksheet in Figure 9. This worksheet consolidates the following input data to derive the controllable and total operating expenditure forecast for the 2018-22 regulatory period:

- *Input|Inflation* – used to adjust the 2014/15 base year nominal (mid year) operating expenditure to real 2016/17 (end year);
- *Input|Historic* – provides the 2014/15 base year total operating expenditure and other operating expenditure;
- *Input|Base Year Adjustment* – provides adjustments for controllable operating expenditure in the 2014/15 efficient base year;
- *Calc|Rate of Change* – provides the rate of change factors to be applied to controllable operating expenditure from the 2014/15 efficient base year; and
- *Input|Step & Zero Base Changes* – provides zero-based forecasts for step changes in controllable operating expenditure and other operating expenditure that are added to the underlying trend of controllable operating expenditure.

The following steps are carried out in the Calc|Forecast worksheet shown in Figure 9:

1) Other operating expenditure and base year adjustments are deducted from the total operating expenditure for the 2014/15 base year to derive the efficient base year controllable operating expenditure (nominal);

2) Nominal (mid year) expenditure for the efficient base year controllable operating expenditure is converted to real (end year) 2016/17 using inflation factors derived from the Input|Inflation worksheet;

3) A total rate of change for output growth, price growth and productivity is applied from the 2014/15 efficient base year to 2021/22. The annual rate of change factors are applied for the balance of the current regulatory period (2015/16 and 2016/17) which delivers an additional level of productivity at the commencement of the 2018-22 regulatory period; and

4) Step changes and other operating expenditure defined in the Input|Step & Zero Base Changes worksheet (Figure 8) are added to the controllable operating expenditure forecast, resulting in total forecast controllable operating expenditure.

Figure 9: Calc|Forecast worksheet for total operating expenditure forecast

Total Controllable Operating Expenditure Growth Calculation									
	2014-15	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**Total**
Total Operating Expenditure	212.66								
Less Other Operating Expenditure									
Network Support	(2.66)								
Self Insurance	(1.72)								
Insurance Premiums	(6.71)								
AEMC Levy	(3.82)								
Debt Raising	(0.50)								
Less Base Year Adjustments	(22.32)								
Efficient Base Year Controllable Operating Expenditure	**174.93**								
	TRUE								
	174.93		**183.44**						
Controllable Operating Expenditure									
Rate of change Output Growth		*0.28%*	*-0.02%*	*0.30%*	*0.08%*	*-0.09%*	*-0.10%*	*0.15%*	
Change		*0.52*	*0.48*	*1.02*	*1.15*	*0.97*	*0.79*	*1.04*	4.96
Price Growth		*0.40%*	*0.34%*	*0.39%*	*0.56%*	*0.71%*	*0.84%*	*0.90%*	
Change		*0.74*	*1.36*	*2.06*	*3.04*	*4.28*	*5.73*	*7.26*	22.36
Productivity		*1.19%*	*1.19%*	*1.19%*	*1.19%*	*1.19%*	*1.19%*	*1.19%*	
Change		*(2.19)*	*(4.37)*	*(6.51)*	*(8.63)*	*(10.72)*	*(12.81)*	*(14.86)*	(53.52)
Cumulative Change		*(0.93)*	*(2.52)*	*(3.44)*	*(4.44)*	*(5.47)*	*(6.29)*	*(6.55)*	(26.19)
Total Rate of change		-0.51%	-0.87%	-0.51%	-0.56%	-0.58%	-0.46%	-0.15%	
Total Forecast Controllable Opex, excluding step changes and Other Operating Expenditure		182.51	180.92	**180.00**	**179.00**	**177.96**	**177.15**	**176.88**	**891.00**
Step Changes				-	-	-	-	-	-
Total Forecast Controllable Opex, excluding Other Operating Expenditure				**180.00**	**179.00**	**177.96**	**177.15**	**176.88**	**891.00**
Other Operating Expenditure									
Network Support				-	-	-	-	-	-
Self Insurance				1.49	1.48	1.48	1.47	1.47	7.39
Insurance Premiums				7.61	7.79	7.94	8.09	8.29	39.72
AEMC Levy				4.20	4.20	4.20	4.20	4.20	21.00
Total Forecast Opex excluding Debt Raising costs				**193.29**	**192.47**	**191.58**	**190.91**	**190.84**	**959.10**
Debt Raising				3.60	3.57	3.53	3.48	3.43	17.61
Total Forecast Operating Expenditure				**196.89**	**196.04**	**195.11**	**194.40**	**194.27**	**976.71**

Source: Powerlink Opex Model