2018-22
POWERLINK QUEENSLAND REVENUE PROPOSAL

APPENDIX 5.01

Powerlink Queensland
Operating and Capital Expenditure Criteria and Factors

Delivering better value

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1 Operating Expenditure Criteria and Factors

1.1 Operating expenditure criteria

The Australian Energy Regulator (AER) must accept Powerlink's forecast of operating expenditure if the AER is satisfied that the total of the forecast operating expenditure for the 2018-2022 regulatory period reasonably reflects the operating expenditure criteria set out in clause 6A.6.6(c) of the National Electricity Rules (Rules). The operating expenditure criteria are:

1. The efficient costs of achieving the operating expenditure objectives

As described in Section 6.4 of its Revenue Proposal, Powerlink has forecast operating expenditure using a version of the AER's base step trend model. To establish an efficient base year Powerlink has removed non-recurrent expenditure and other expenditure that in Powerlink's assessment was not reflective of an efficient level of operating expenditure in the base year. This assessment was guided by trend analysis, category analysis and independent expert opinion on benchmarking that concluded Powerlink's efficient base year is at the lower end of the expected range.

Powerlink has also sought to ensure that rate of change factors applied to forecast operating expenditure over the 2018-22 regulatory period drive efficiency and cost reduction.

Real price growth associated with labour and materials has been the subject of independent expert opinion to ensure an efficient and realistic forecast of real price growth. For both labour and materials, Powerlink has also adopted a conservative approach to forecasting price growth consistent with the AER's approach to determining a similarly efficient level of real price growth in revenue determinations for TransGrid and TasNetworks.

Consistent with Powerlink's forecast for demand and energy growth, output growth factors driving forecast operating expenditure are very low. Where output growth has increased due to the significant growth of LNG loads in the Surat Basin, Powerlink has curtailed the increase that would have occurred in forecast operating expenditure to only reflect the efficient costs of operating and maintaining those prescribed assets required to meet this additional output growth.

Through a line-by-line assessment of historic operating expenditure, Powerlink has also proposed a level of productivity growth in its forecast that is materially higher than the long run industry average productivity growth for Transmission Network Service Provider's (TNSP) determined by the AER in its Transmission Annual Benchmarking Reports for 2014 and 2015.

Finally, Powerlink has obtained independent advice to determine the prudent and efficient costs of operating expenditure derived from a zero-based approach, such as insurances and self-insurance.

Given the rigorous approach applied to develop an efficient forecast of operating expenditure, Powerlink considers that its proposal reflects the efficient costs of achieving the operating expenditure objectives.

2. The costs that a prudent operator would require to achieve the operating expenditure objectives

Beyond the efficient delivery and provision of prescribed transmission services, Powerlink acts to ensure it is recognised as a prudent operator of its transmission network. This includes activities that support the primary delivery of transmission services such as:

- Meaningful engagement with stakeholders, with a particular focus on landowners who host Powerlink's transmission infrastructure;
- Ensuring the physical and cyber security of the transmission network and its protection and control systems; and
- Pursuing business improvement initiatives to improve the overall efficiency of Powerlink's products, people, and processes.

Powerlink's operating expenditure forecasts include provision for undertaking the activities of a prudent transmission network business.

3. A realistic expectation of the demand forecast and cost inputs required to achieve the operating expenditure objectives

Powerlink's demand forecasting methodology, process and assumptions have been independently reviewed by KPMG, who have confirmed that the overall forecasting methodology, the processes used for managing data through the forecasting process and the key assumptions used in the forecast are all reasonable. In their report "Review of demand & energy forecasting methodologies" KPMG concluded, with relatively minor caveats, that Powerlink's maximum demand and energy forecasting models meet the AER's criteria for best practice forecasting.

Powerlink commissioned Jacobs to provide independent forecasts for the escalation of prices of a number of the key commodity inputs to Powerlink's cost estimates. Powerlink also commissioned BIS Shrapnel to provide independent forecasts for both internal and external labour costs. Separately Powerlink also identified labour cost forecasts prepared by Deloitte Access Economics (DAE) for the AER as part of recent revenue determinations.

In preparing the operating expenditure forecasts, Powerlink adopted a hybrid forecast consisting of labour price growth under its Enterprise Agreement followed by the average of the BIS Shrapnel and DAE labour cost forecasts. More detail on the approach Powerlink has adopted to escalation of input costs is contained in Section 7.5 of its Revenue Proposal.

1.2 Assessment against operating expenditure factors

In deciding whether or not the AER is satisfied whether Powerlink's operating expenditure forecast reasonably reflect the operating expenditure criteria, the AER must have regard to the operating expenditure factors set out in clause 6A.6.6(e) of the Rules. The operating expenditure factors are:

1. AER benchmarking report

The most recent annual benchmarking report for electricity transmission service providers was published by the AER in November 2015. The report followed broadly the same format as the first annual benchmarking report in 2014. The annual benchmarking report presents information on a range of benchmarks:

- Multilateral Total Factor Productivity (MTFP);
- Multilateral Partial Factor Productivity (MPFP); and
- Partial Performance Indicators (PPI).

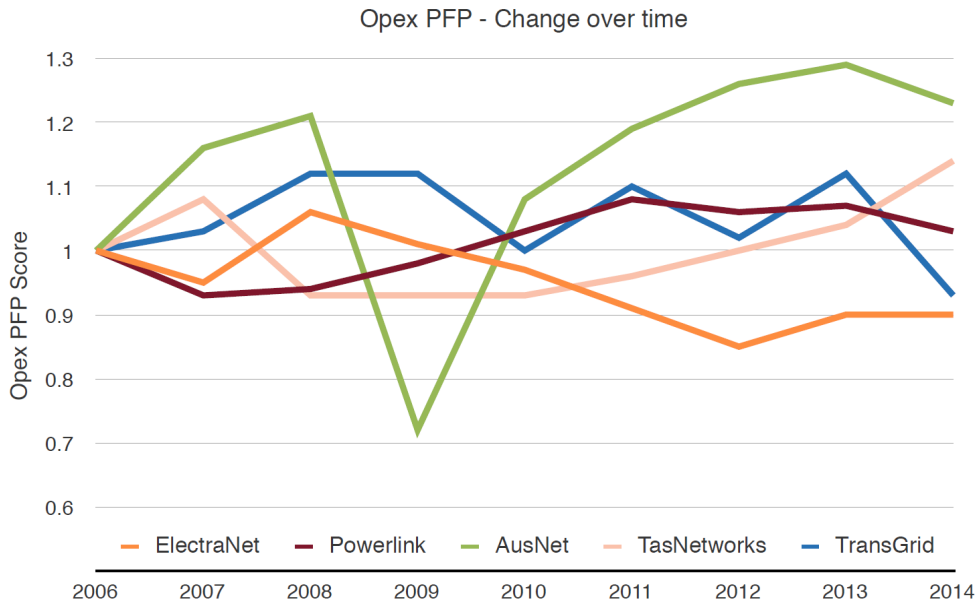
Powerlink is supportive of the AER's work to establish a robust approach to benchmarking that is meaningful to transmission businesses.

In considering it performance under the AER's annual benchmarking reports, Powerlink sought independent expert opinion from Huegin.[1] In its report, Huegin concluded that due to the inherent limitations in making relative comparisons using the Multilateral Total Factor Productivity (MTFP) and Multilateral Partial Factor Productivity (MPFP) specifications, TNSPs are likely to be benchmarked against themselves over time. The AER made similar observations in its 2014 and draft 2015 Annual Benchmarking Reports.[2]

[1] *Powerlink Benchmarking Report,* Huegin, November 2015.
[2] *Draft Annual Benchmarking Report, Electricity Transmission Network Service Providers*, AER, November 2015, p. 16 and *Final Annual Benchmarking Report, Electricity Transmission Network Service Providers*, AER, November 2014, p. 21.

Figure 1 illustrates Powerlink's total operating expenditure PFP[3] over time, consistent with the methodology adopted by Economic Insights[4] in its advice to the AER for the 2014 and 2015 Annual Benchmarking Reports.

Figure 4.4: Operating expenditure PFP scores



Source: Huegin, Powerlink Operating Expenditure Benchmarking Review, November 2015.

Under the total operating expenditure PFP measure, Powerlink's productivity has on average improved since 2006, with an average annual total operating expenditure productivity growth of +0.24% by 2014 compared to the industry average of -0.03%.

Powerlink notes that this long run average performance has been delivered by Powerlink despite the challenges of operating and maintaining a greater number of transmission assets which serve proportionally lower customer demand and energy consumption, compared to most other TNSPs.

Between 2013 and 2014, Powerlink's total operating expenditure PFP score reduced. The chart shows a similar trend for all TNSPs except TasNetworks. Huegin's analysis reveals that these changes were substantially driven by output growth factors related to energy throughput and unserved energy. These factors are unlikely to result in a proportional change in operating expenditure in a single year.[5] This further illustrates that caution must be exercised when making relative comparisons under this measure or inferring that improvements were driven solely by cost efficiency.

[3] The total operating expenditure PFP compares the total operating expenditure of each TNSP against a standard basket of outputs delivered from the network (including energy throughput, ratcheted non-coincident maximum demand, voltage weighted connection points, circuit kilometres of transmission line and unserved energy).
[4] *Economic Benchmarking Assess of Operating Expenditure for NSW and Tasmanian Electricity TNSPs*, Economic Insights, November 2014
[5] For example, TasNetworks' significantly improved performance was due to a strong increase in energy throughput and a decrease in unserved energy (leading to a +11.3% improvement in its output index). In contrast, Powerlink's reduced performance was due to a fall in energy throughput and increase in unserved energy (leading to a -1.9% reduction in its output index).

In its report, Huegin concluded that Powerlink's large service area, highly radial network, low load density and sparsely located customer base will materially influence its ongoing required total operating expenditure. Given these environmental factors and broad indications of relative efficiency at the total and disaggregated levels of operating expenditure, Huegin found that its benchmarking analysis suggests Powerlink's historical revealed operating expenditure is comparable to other TNSPs.

2. Expenditure during preceding regulatory periods

An overview of Powerlink's operating expenditure performance in the 2013-17 regulatory period is provided in Section 4.5 of Powerlink's Revenue Proposal.

Total operating expenditure in the 2013-17 regulatory period is forecast to be $1046.6m (real 2016/17) which is incrementally lower than the AER's allowance of $1061.6m (real 2016/17). In the first two years of the 2013-17 regulatory period, Powerlink delivered operating expenditure 5-6% lower than the AER's allowance. Operating expenditure in the latter part of the period, from 2014/15 to 2016/17, increased to a level equal to or greater than the AER's allowance. This increase in operating expenditure was due to:

- Powerlink restructuring its business to establish a more simplified structure, drive efficiency in process and decision making and align resource levels with forecast workload levels. This initiative has resulted in increased operating expenditure for restructuring costs and redundancy payments;
- The increasing average age of the transmission line fleet has required increased maintenance and refurbishment expenditure above historic trends, particularly for the management of advanced corrosion of structures, insulators and line hardware and line decommissioning costs;
- The write-off of expenditure on early capital project development works no longer required due to reduced electricity demand growth; and
- Additional operating expenditure to address the introduction of a new Australian Energy Market Commission (AEMC) Levy, legislated by the Queensland Government in 2014.

Forecast operating expenditure in the 2018-22 regulatory period is $976.7 million (real 2016/17), representing a 7% reduction compared to total actual operating expenditure in the 2013-17 regulatory period. This reduction is due to Powerlink making significant adjustments to its actual operating expenditure in 2014/15 to establish an efficient base year, coupled with the application of productivity growth in its forecast exceeding its own historical performance and the long term industry average.

3. Feedback from consumers

During the course of developing the operating expenditure forecasts for the 2018-22 regulatory period Powerlink consulted with and sought input from a range of stakeholders. Details of Powerlink's approach to engaging with customers and consumers are described in Chapter 3 of its Revenue Proposal.

In the development of its Revenue Proposal, Powerlink undertook engagement activities with stakeholders, including customers and consumers on the methodology for forecast operating expenditure, discussed in Section 6.5 of the Revenue Proposal.

During this process and through in-depth research, customers and consumers reinforced their concern over electricity price and the expectation that Powerlink should drive change in its business to deliver increased efficiency and cost reduction.

Stakeholders indicated that Powerlink should conduct a detailed analysis of operating expenditure efficiency at a category level, consider long term operating expenditure trends (that assessed the relative efficiency of alternative base years) and demonstrate the application of benchmarking techniques. These approaches have been implemented by Powerlink and are discussed in Section 6.6 of its Revenue Proposal.

4. Relative prices of capital and operating inputs and substitution possibilities between capital and operating expenditure

An important factor in the development of Powerlink's Revenue Proposal has been Powerlink's consideration of retirement of existing network assets as they approach their end-of-life, instead of reinvesting in those assets. For transmission lines the cost of removal and making good the easement can be substantial, indicatively up to 15% of the cost of constructing a new transmission line or 30% of the cost of refitting the existing line. As decommissioning and removal of assets without reinvestment is operating expenditure, while refit or rebuild is capital expenditure, Powerlink carefully evaluates the long term cost impacts of the various options for managing transmission line end-of-life.

Once a decision to decommission a transmission line asset is made it does not automatically follow that expenditure is incurred to physically remove the asset. Powerlink continues to manage the physical risks associated with the asset. It is generally only when material expenditure would otherwise be required to manage these risks that a commitment is made to remove the asset. This approach is consistent with that adopted by the AER in relation to the proposed demolition by ElectraNet of two redundant 132kV transmission lines associated with the upgrade of the Heywood Interconnector.[6]

In regards to the relative prices of inputs to operating and capital expenditures Powerlink has adopted the same cost escalation factors to operating expenditure forecasts as have been applied to capital expenditure forecasts.

5. Consistency with incentive schemes

Incentive schemes that are relevant to operational expenditure forecasts are the Efficiency Benefit Sharing Scheme (EBSS) and the Service Target Performance Incentive Scheme (STPIS).

EBSS

The operating expenditure forecast is consistent with the Version 2 of the EBSS that will apply to Powerlink in the 2018-22 regulatory period (as noted in the final Framework and Approach Paper for Powerlink). The EBSS offers a continuous incentive for improvements in operating expenditure efficiency. Powerlink's EBSS approach is explained in detail in Section 14.3 of its Revenue Proposal.

STPIS

The forecast operating expenditure does not include any expenditure specifically to improve network performance under the STPIS.

6. Related parties

No part of Powerlink's forecast operating expenditure is referable to related parties.

7. Contingent projects

Powerlink's operating expenditure forecast does not include any expenditure relating to contingent projects. Powerlink's contingent projects only relate to growth above the base demand forecast on which the operating expenditure forecast is based.

8. Most recent National Transmission Network Development Plan (NTNDP)

The NTNDP is a plan, published annually, that considers the capability of the national transmission grid and developments of national transmission flow paths. The most recent NTNDP was published in November 2015 (2015 NTNDP).

The 2015 NTNDP did not identify any emerging reliability limitations on major transmission flow paths in Queensland. Powerlink's operating expenditure forecasts are consistent with this assessment.

[6] *Decision ElectraNet Heywood Interconnector Upgrade Contingent Project*, AER, March 2014, pp. 18-19.

9. Non-network alternatives

Powerlink's approach to considering non-network alternatives is described in Section 5.9 of its Revenue Proposal. In preparing the capital expenditure forecasts for its Revenue Proposal, Powerlink has examined where there may be opportunities for non-network alternatives. Based on Powerlink's area planning processes, the only opportunity for a non-network alternative that has been identified is replacement of a 132/66kV transformer at Garbutt Substation.

While the Garbutt transformer replacement has been identified as a candidate for a non-network solution, it is not forecast to be required until summer 2018/19.[7] Powerlink has only recently commenced the process of seeking proposals and evaluating alternatives to this need.

Accordingly, Powerlink has no committed non-network alternatives and for the 2018-22 regulatory period has made an allowance of $0 per annum for network support costs as part of its total forecast operating expenditure. To the extent that a network support event occurs during the 2018-22 regulatory period, Powerlink will make a cost pass through application under clause 6A.7.2 of the Rules.

10. Regulatory Investment Test for Transmission (RIT-T)

In November 2014 Powerlink and TransGrid published a Project Assessment Conclusions Report (PACR) in relation to a proposed upgrade to the capacity of the Queensland/New South Wales Interconnector (QNI). The overall result of the analysis presented in the PACR showed that the ranking of credible options varied across the scenarios considered. In addition, many credible options had negative net market benefits under a number of scenarios and hence ranked below the "do nothing" option. For these reasons it was concluded that there was no preferred credible option. Powerlink and TransGrid committed to continue to monitor electricity market developments and to take into account the latest available information as part of any future RIT-T assessment.

The operating expenditure forecast does not include any amounts related to the PACR for QNI Upgrade. Powerlink has proposed that a future QNI Upgrade be included as a contingent project which is addressed in the context of forecast capital expenditure.

11. Other factors

At the time of submission of its 2018-22 Revenue Proposal the AER had not advised Powerlink of any additional operating expenditure factors.

[7] *Transmission Annual Planning Report 2015*, Powerlink, p. 55.

2 Capital Expenditure Criteria and Factors

2.1 Capital expenditure criteria

The AER must accept Powerlink's forecast of capital expenditure if the AER is satisfied that the total of the forecast capital expenditure for the 2018-22 regulatory period reasonably reflects the capital expenditure criteria set out in clause 6A.6.7(c) of the Rules. The capital expenditure criteria are:

1. The efficient costs of achieving the capital expenditure objectives

This is demonstrated through the forecast capital expenditure being based on both an efficient quantity of investment, primarily reinvestment in network assets, and an efficient unit rate for delivering that quantity of investment. As described in Section 5.4 of its Revenue Proposal, Powerlink has forecast much of its reinvestment capital expenditure using a version of the AER's repex model. The calibration of the model has used both historical reinvestment quantities and the historical state of Powerlink's asset base to derive an efficient forecast quantity of asset reinvestments.

Powerlink has gone to considerable effort to ensure the forecast of asset reinvestment quantities reflects only that quantity of reinvestment that is based on the condition of assets and the ongoing need for those assets to provide the required level of prescribed transmission services.

Powerlink has also ensured that the costs adopted in the capital expenditure forecasts are consistent with industry benchmarks for efficient project delivery. Powerlink engaged Jacobs to provide benchmark costs for the typical project works that make up the majority of Powerlink's capital expenditure forecasts. Based on the Jacobs analysis, the costs adopted for Powerlink's Revenue Proposal represent the efficient costs for delivering the proposed capital expenditure.

2. The costs that a prudent operator would require to achieve the capital expenditure objectives

Beyond the efficient delivery and provision of prescribed transmission services, Powerlink acts to ensure it is recognised as a prudent operator of its transmission network. This includes activities that support the primary delivery of transmission services such as:

- Meaningful engagement with stakeholders, with a particular focus on landowners who host Powerlink's transmission infrastructure;
- Ensuring the physical and cyber security of the transmission network and its protection and control systems; and
- Pursuing business improvement initiatives to improve the overall efficiency of Powerlink's products, people, and processes.

Powerlink's capital expenditure forecasts include provision for undertaking the activities of a prudent transmission network business.

3. A realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objectives

Powerlink's demand forecasting methodology, process and assumptions have been independently reviewed by KPMG, who have confirmed that the overall forecasting methodology, the processes used for managing data through the forecasting process and the key assumptions used in the forecast are all reasonable. In their report "Review of demand and energy forecasting methodologies" KPMG concluded, with relatively minor caveats, that Powerlink's maximum demand and energy forecasting models meet the AER's criteria for best practice forecasting.

Powerlink commissioned Jacobs to provide independent forecasts for the escalation of prices of a number of the key commodity inputs to Powerlink's cost estimates. Powerlink also commissioned BIS Shrapnel to provide independent forecasts for both internal and external labour costs. Separately Powerlink also identified labour cost forecasts prepared by Deloitte Access Economics (DAE) for the AER as part of recent electricity determinations.

In preparing the capital expenditure forecasts, Powerlink adopted a hybrid forecast for input cost escalators consisting of labour price growth under its Enterprise Agreement followed by the average of the BIS Shrapnel and DAE labour cost forecasts. More detail on the approach Powerlink has adopted to escalation of input costs is contained in Section 7.5 of its Revenue Proposal.

2.2 Assessment against capital expenditure factors

In deciding whether or not the AER is satisfied that the total capital expenditure forecast reasonably reflect the capital expenditure criteria, the AER must have regard to the capital expenditure factors. Powerlink has undertaken its own assessment of the capital expenditure forecasts against these factors, as set out below:

1. AER benchmarking report

Annual benchmarking report

The most recent annual benchmarking report for electricity transmission service providers was published by the AER in November 2015. The report followed broadly the same format as the first annual benchmarking report in 2014. The annual benchmarking report presents information on a range of benchmarks:

- Multilateral Total Factor Productivity (MTFP);
- Multilateral Partial Factor Productivity (MPFP); and
- Partial Performance Indicators (PPI).

Powerlink is supportive of the AER's work to establish a robust approach to benchmarking that is meaningful to transmission businesses. In this respect Powerlink notes the AER's comments that "…the benchmarking of transmission networks is relatively new" and that "…the comparison of productivity levels between firms should be treated with caution."[8]

Powerlink has previously highlighted to the AER a number of concerns regarding the data used in the PPI measures, particularly the connection point voltage and transformer capacity data. These are areas where there are differences in industry structure between jurisdictions (i.e. an exogenous factor) or TNSPs have interpreted the AER's requirements differently.

In respect of transformer capacity data Powerlink has adapted its data preparation methodology to allow for the observed differences in industry structure between jurisdictions. This ensures the transformer capacity used in the relevant PPI measure now better reflects the quantum of Powerlink's transformer capacity that is directly serving customers connected to the Powerlink network. Powerlink is also aware that the AER has taken steps to ensure connection point voltage data is prepared and presented on a consistent basis across all TNSPs.

In light of this, Powerlink is disappointed that the AER has removed all reference to the transformer capacity PPIs in the annual benchmarking report. Powerlink considers that the steps taken to improve the quality and consistency of the data would have seen Powerlink move from being considered a very poor performer on this measure to being consistent with other TNSPs.

[8] *Annual Benchmarking Report Electricity Transmission Network Service Providers*, AER, November 2015, p. 13.

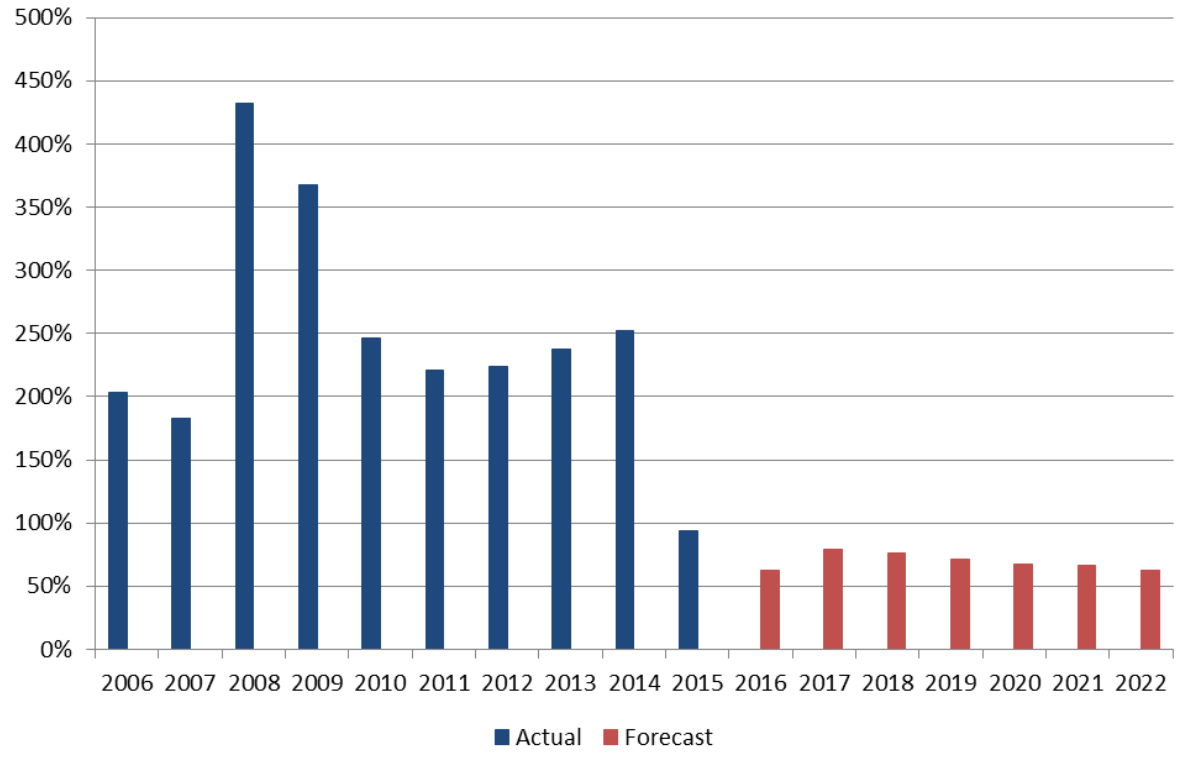
Capital expenditure benchmarking

Capital expenditure benchmarking is reflected in both the MTFP and the PPI measures through the use of an Annual User Cost (AUC) of the Regulatory Asset Base (RAB). The AUC includes both return on and return of capital investment and measures the cost to network users to fund the existing asset base. Over the past decade, Powerlink made significant capital investments to augment its network in response to both high forecast demand growth and the N-1 reliability standard licence requirement in place at the time, hence the annual input of capital increased. While most other TNSPs also experienced significant increases in capital inputs over this period, Powerlink's performance was exacerbated by the long distances from where generation is located to where the load growth was being experienced. This has required greater capital investment than if the same requirement for network capacity could have been met over shorter distances.

A drawback of the AER's AUC approach is that past capital expenditure decisions based on forecasts made at that earlier time continue to have a disproportionate influence on benchmarking results. This influence continues even after the business has responded to changes in the operating environment, such as greatly reduced demand growth forecasts, by reducing capital expenditure. Powerlink acknowledges that the AUC reasonably reflects capital expenditure that consumers are required to fund. However, it continues to measure a business' historic capital expenditure performance and not its current performance and forecast responses.

As an alternative capital expenditure benchmark that measures changes in capital expenditure performance as they are made, Powerlink has calculated the ratio of annual additions to the RAB to annual straight-line depreciation. In a period of growth the additions to the RAB could be expected to exceed the straight-line depreciation (greater than 100%), reflecting the real growth in the RAB. Conversely, in a period of low or no growth the additions to the RAB should be comparable to the straight-line depreciation. For Powerlink the historical and forecast ratio of RAB additions to straight-line depreciation are shown in Figure 2.

Figure 2: Additions to RAB/straight-line depreciation (%)



Source: Powerlink data

It can be seen that during the 2018-22 regulatory period Powerlink's forecast additions to the RAB are consistently less than the straight-line depreciation (ratio is less than 100%) reflecting a reduction in the real value of the RAB over time. Powerlink considers that this indicates that Powerlink's forecast capital expenditures benchmark well when considered in the context of the current investment environment.

Powerlink considers that no single benchmark measure can fully capture all of the myriad factors that influence a transmission business' relative capital expenditure efficiency and productivity. Powerlink acknowledges that it does not benchmark favourably on some of the AER's measures, while for other measures it performs comparably with other TNSPs. Powerlink continues to work to understand the AER's approach to benchmarking and the published measures and what steps Powerlink can take to improve its performance or demonstrate that it is responding.

3. Expenditure in preceding regulatory periods

An explanation of the drivers and influences on Powerlink's capital expenditure performance in the 2013-17 regulatory period is provided in Section 4.4, of its Revenue Proposal. This report provides a brief overview of that assessment and compares actual and expected capital expenditure in the current and preceding regulatory period with the forecast capital expenditure for the 2018-22 regulatory period.

During the 2013-17 regulatory period, a sharp downturn in commodity prices has combined with significantly reduced economic growth, substantial changes in consumer behaviour and emergent technology to greatly reduce the growth in demand for electricity. Powerlink expects to spend approximately $317m on load driven capital expenditure in the 2013-17 regulatory period, a reduction of approximately $790m (or 71%) from the AER Final Decision.

Reductions in demand growth forecasts also had an impact on non-load driven capital expenditures and allowed for greater use of alternative options, such as network reconfiguration or asset retirement, to manage asset condition and risk at a lower cost. More detailed understanding of the asset conditions and risks as project pre-approval investigations commenced also allowed for the prudent deferral of a number of projects. Overall the non-load driven capital expenditure for the 2013-17 regulatory period is now forecast to total $878m, a reduction of $592m (or 40%) from the AER Final Decision.

During the 2013-17 regulatory period Powerlink has also, and continues to, significantly restructure the business and adjust resource levels to provide better long-term value for customers and meet the changing demand for transmission services. These internal changes have impacted non-network capital expenditure in the 2013-17 regulatory period which is now expected to be approximately $100m, compared to $133m in the AER Final Decision.

Table 1 shows the expected total capital expenditure in the 2013-17 regulatory period compared to the forecast capital expenditure in the 2018-22 regulatory period by expenditure category. Total capital expenditure for the 2018-22 regulatory period is expected to be approximately 31% less than in the 2013-17 regulatory period. This is primarily due to the low level of demand growth leading to very little forecast expenditure on load-driven capital expenditure.

Table 1: Comparison of total expenditure by category ($m, 2016/17)

Expenditure category	2013-17 Total	2018-22 Total	Change (%)
Augmentation	280.2	3.1	-99%
Connection	15.4	0.0	-100%
Easement	49.6	7.7	-84%
Network load driven	**345.1**	**10.8**	**-97%**
Reinvestment (replacement)	875.9	794.3	-9%
Security/compliance	22.8	18.8	-18%
Other	31.9	30.1	-6%
Network non-load driven	**930.6**	**843.2**	**-9%**
IT	57.2	60.5	+6%
Buildings	28.9	24.5	-15%
Motor vehicles	13.5	12.9	-4%
Moveable plant/tools and equipment	5.6	5.3	-5%
Non-network	**105.3**	**103.1**	**-2%**
Total	**1,381.0**	**957.1**	**-31%**

It can be seen that forecast capital expenditure for the 2018-22 regulatory period is less than the expected capital expenditure in the 2013-17 regulatory period for all categories of network expenditure. Importantly, reinvestment expenditure is forecast to be less than in the 2013-17 regulatory period, reflecting ongoing optimisation of the network in the face of subdued demand growth.

4. Feedback from consumers

Section 5.7 of Powerlink's Revenue Proposal details the feedback that has been received from electricity consumers and how the capital expenditure forecasts have been developed to respond to that feedback.

5. Relative prices of capital and operating inputs and substitution possibilities between capital and operating expenditure

An important factor in the development of Powerlink's Revenue Proposal has been the consideration of retirement of existing network assets as they approach their end-of-life, instead of reinvesting in those assets. For transmission lines the cost of removal and making good the easement can be substantial, indicatively up to 15% of the cost of constructing a new transmission line or 30% of the cost of refitting the existing line. As decommissioning and removal of assets without reinvestment is operating expenditure, while refit or rebuild is capital expenditure, Powerlink carefully evaluates the long term cost impacts of the various options for managing transmission line end-of-life.

Once a decision to decommission a transmission line asset is made it does not automatically follow that expenditure is incurred to physically remove the asset. Powerlink continues to manage the physical risks associated with the asset. It is generally only when material expenditure would otherwise be required to manage these risks that a commitment is made to remove the asset. This approach is consistent with that adopted by the AER in relation to the proposed demolition by ElectraNet of two redundant 132kV transmission lines associated with the upgrade of the Heywood Interconnector.[9]

In regards to the relative prices of inputs to operating and capital expenditures Powerlink has adopted the same cost escalation factors to capital expenditure forecasts as have been applied to operating expenditure forecasts.

6. Consistency with incentive schemes

Incentive schemes that are relevant to capital expenditure forecasts are the Capital Expenditure Sharing Scheme (CESS) and the Service Target Performance Incentive Scheme (STPIS).

[9] *Decision ElectraNet Heywood Interconnector Upgrade Contingent Project*, AER, March 2014, pp. 18-19.

CESS

The effectiveness of the CESS is dependent on the forecast capital expenditure being efficient, or that it reasonably reflects the capital expenditure criteria. As described in Section 2.1 above, Powerlink considers that the forecast capital expenditure reasonably reflects the capital expenditure criteria. As noted in the Final Framework and Approach Paper for Powerlink the AER proposes to apply the CESS to Powerlink in the 2018-22 regulatory period.

STPIS

The forecast capital expenditure does not include any expenditure specifically to improve network performance under the STPIS.

7. Related parties

No part of Powerlink's forecast capital expenditure is referable to related parties.

8. Contingent projects

The forecast capital expenditure in Powerlink's Revenue Proposal is based on a single, most likely, scenario of demand growth, being medium economic growth. Any capital expenditure to meet the demand for prescribed services beyond this most likely scenario has been included as proposed contingent projects. Powerlink's proposed contingent projects are described in more detail in Section 5.8 of its Revenue Proposal. The forecast capital expenditure in Powerlink's 2018-22 Revenue Proposal does not include any proposed contingent capital expenditure, either in whole or in part, as required by clause 6A.8.1(b)(2)(i) of the Rules.

9. Most recent National Transmission Network Development Plan (NTNDP)

The NTNDP is a plan that considers the capability of the national transmission grid and developments of national transmission flow paths. The most recent NTNDP was published in November 2015 (2015 NTNDP).

The 2015 NTNDP did not identify any emerging reliability limitations on major transmission flow paths in Queensland. Powerlink's capital expenditure forecasts are consistent with this assessment.

10. Non-network alternatives

Powerlink's approach to considering non-network alternatives is described in Section 5.9 of its Revenue Proposal. In preparing the capital expenditure forecasts for its Revenue Proposal, Powerlink has examined where there may be opportunities for non-network alternatives. Based on Powerlink's area planning processes, the only opportunity for a non-network alternative that has been identified is replacement of a 132/66kV transformer at Garbutt Substation.

While the Garbutt transformer replacement has been identified as a candidate for a non-network solution, it is not forecast to be required until summer 2018/19[10]. Powerlink has only recently commenced the process of seeking proposals and evaluating alternatives to this need. Accordingly the cost of the network alternative is included in the forecast capital expenditure. If a non-network alternative is ultimately adopted as a lower cost solution that will be reflected in Powerlink's Revised Revenue Proposal.

[10] *Transmission Annual Planning Report 2015*, Powerlink, p. 55.

11. Regulatory investment test for transmission (RIT-T)

In November 2014 Powerlink and TransGrid published a Project Assessment Conclusions Report (PACR) in relation to a proposed upgrade to the capacity of the Queensland/New South Wales Interconnector (QNI). The overall result of the analysis presented in the PACR showed that the ranking of credible options varied across the scenarios considered. In addition, many credible options had negative net market benefits under a number of scenarios and hence ranked below the "do nothing" option. For these reasons it was concluded that there was no preferred credible option. Powerlink and TransGrid committed to continue to monitor electricity market developments and to take into account the latest available information as part of any future RIT-T assessment.

The capital expenditure forecast does not include any amounts related to the PACR for QNI Upgrade. Powerlink has proposed that a future QNI Upgrade be included as a contingent project.

12. Other factors

At the time of submission of its Revenue Proposal the AER had not advised Powerlink of any additional capital expenditure factors.