







2018-22
POWERLINK QUEENSLAND REVISED REVENUE PROPOSAL








Powerlink QUEENSLAND®

Delivering better value

Executive Summary

This Revised Revenue Proposal provides details of the Queensland Electricity Transmission Corporation Limited's (Powerlink's) revised revenue requirements for prescribed transmission services in its next regulatory period from 1 July 2017 to 30 June 2022 (the 2018–22 regulatory period). The Revised Revenue Proposal has been prepared in response to the Australian Energy Regulator's (AER's) Draft Decision published on 29 September 2016.

Powerlink is a State Government Owned Corporation which owns, develops, operates and maintains the high voltage electricity transmission network in Queensland, extending 1,700km from the north of Cairns to the New South Wales border.

Powerlink's approach

Powerlink recognises that access to affordable and reliable electricity is a key enabler of the economy and supports life and our modern lifestyles. Powerlink is focused on doing its part in the overall electricity supply arrangements to deliver better value to its customers and consumers.

Powerlink's increased focus on customer and consumer engagement supports this approach. Its business-as-usual program of engagement activities has been extended to involve stakeholders over the course of the revenue determination process, including in the preparation of this Revised Revenue Proposal. During this process and through research on stakeholder priorities, customers and consumers have reinforced their concern over electricity prices and the expectation that Powerlink should drive changes in its business to increase efficiency and deliver cost reductions while still maintaining high reliability of electricity supply.

The electricity supply industry in Queensland has a long history of strong growth in electricity demand and there has been network investment to meet this demand. In line with the subdued outlook for economic growth in Queensland, a flat or reducing electricity demand outlook has required a change in mindset across Powerlink's business to minimise investment through alternative practices. As the majority of forecast capital investment is related to asset reinvestment, Powerlink is taking a more holistic view of future network needs, focused on integrated solutions to meet demand.

Powerlink also aims to achieve flexibility in the way in which it operates the transmission network so that renewable generation, including large scale renewables connected to the transmission network, can deliver electricity supply to loads. With increased certainty regarding the Large-scale Renewable Energy Target (LRET) and various other incentive schemes, Powerlink has seen an unprecedented increase in the level of connection enquiries and applications for renewable generation in Queensland. Powerlink will continue to play an important role in facilitating these connections, while maintaining a reliable and resilient transmission network that supports the efficient operation of the electricity market as the mix of generation changes over time.

Response to the AER's Draft Decision

Powerlink's Revenue Proposal proposed prudent and efficient expenditure forecasts and revenue requirements that Powerlink considered were capable of acceptance by the AER. This reflected Powerlink's focus on responding to consumer concerns over electricity prices through increased efficiency, cost reductions and a focus on alternative solutions that minimised the requirement for additional investment in the prescribed network. Powerlink also sought to align its Revenue Proposal with the AER's Guidelines and approach.

Powerlink is pleased that the AER has made a Draft Decision that accepted most of the key elements of Powerlink's Revenue Proposal, including the rate of return methodology, forecast operating expenditure and most elements of capital expenditure with the exception of forecast reinvestment.

In its Draft Decision and subsequent comments at its Pre-Determination Conference held on 19 October 2016, the AER also noted Powerlink's efforts to align with its Guidelines and that Powerlink had adopted a reasonable approach in the preparation of its Revenue Proposal.

Powerlink has carefully reviewed all of the matters raised by the AER in its Draft Decision. While Powerlink has accepted many elements of the AER's Draft Decision, there remain some areas where Powerlink does not agree with the AER's draft position. In particular:

- the decision to reduce forecast total capital expenditure by 19.3%, due to a reduction in forecast reinvestment capital expenditure of 23.2%;
- adjustments made by the AER to incentive schemes for operating expenditure and network performance; and
- an issue raised with one aspect of Powerlink's proposed Pricing Methodology.

Revised forecast capital expenditure

Powerlink accepts the AER's Draft Decision for the following categories of capital expenditure:

- Load driven – Augmentations, Connections and Easements;
- Non-load driven – Security/Compliance and Other; and
- Non-Network – Business IT, Commercial buildings, Motor vehicles and Tools and Equipment.

However, Powerlink does not accept the AER's Draft Decision for reinvestment capital expenditure. Powerlink considers the Draft Decision is based on an incorrect understanding of Powerlink's repex modelling methodology and the AER's alternative forecast is insufficient to enable Powerlink to meet the capital expenditure objectives set out in the National Electricity Rules (Rules). Powerlink has set out its detailed response to the AER's Draft Decision in Chapter 4, including a revised capital expenditure forecast aligned with its current investment outlook.

In preparing its revised capital expenditure forecast, Powerlink has retained its hybrid forecasting methodology that makes use of top-down forecasting tools, including Powerlink's version of the AER's Repex Model. Powerlink has reviewed the full range of inputs to the capital expenditure forecasting methodology to ensure the resulting forecasts reflect current asset management strategies and plans. In particular, Powerlink has:

- updated cash-flows for approved projects that contribute to the forecast;
- made further adjustments to the Repex Model inputs to ensure it aligns with Powerlink's most recent asset management strategies and plans, while also having regard to aspects of the AER's Draft Decision; and
- reviewed the scope and timing of some bottom-up projects that contributed to the forecast.

Powerlink also engaged with its Customer and Consumer Panel (C&CP) to seek feedback and input on its forecast reinvestment capital expenditure.

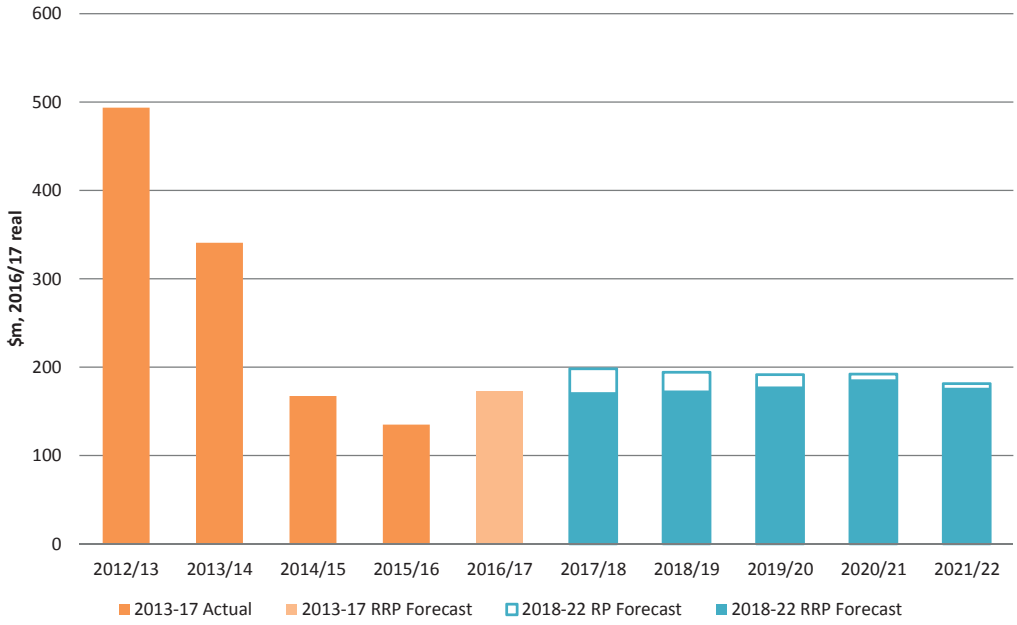
The details of Powerlink's review, which are set out Chapter 4, result in revised forecast total capital expenditure for the 2018–22 regulatory period of $886.3m, which is $70.8m (or 7.4%) lower than the $957.1m total forecast capital expenditure in Powerlink's Revenue Proposal.

Powerlink's revised forecast capital expenditure is set out in Table 1 and shown in Figure 1.

Table 1: Revised forecast capital expenditure ($m, 2016/17)

	2017/18	2018/19	2019/20	2020/21	2021/22	Total
Revenue Proposal – Total capital expenditure	198.2	194.2	191.4	192.1	181.3	957.1
Revised Revenue Proposal – Total capital expenditure	**171.7**	**173.6**	**178.1**	**186.2**	**176.6**	**886.3**
Difference	(26.5)	(20.6)	(13.3)	(5.8)	(4.7)	(70.8)

Figure 1: Actual and forecast total capital expenditure ($m, 2016/17)



Source: Powerlink data.

Revised revenue requirement and price path

Powerlink has updated its total building-block revenue requirement for the 2018–22 regulatory period, taking into account its revised forecast capital expenditure and other updates to inputs into the AER's Roll Forward Model (RFM) and Post Tax Revenue Model (PTRM).

For the purposes of its Revised Revenue Proposal, Powerlink has applied a rate of return of 5.48% consistent with the placeholder estimate and input parameter values established by the AER in its Draft Decision. Powerlink notes that the rate of return calculated in the AER's Final Decision may be higher or lower than this placeholder estimate, depending on prevailing financial market conditions and consistent with the averaging periods for the risk-free rate and cost of debt accepted by the AER in its Draft Decision.

The revised smoothed revenue requirement and X-factors for each year of the 2018–22 regulatory period are presented in Table 2.

Table 2: Revised smoothed revenue requirement and X-factor ($m, nominal)

	2017/18	2018/19	2019/20	2020/21	2021/22	Total
Smoothed revenue requirement	715.6	731.6	748.1	764.9	782.1	3,742.2
X-factor		0.15%	0.15%	0.15%	0.15%	–

In real terms, Powerlink's revised smoothed revenue for 2017/18 is forecast to reduce by 31.4% compared to revenue in 2016/17. In subsequent years of the regulatory period annual revenue is forecast to reduce by 0.15% per annum.

Powerlink's Revised Revenue Proposal results in a nominal 31.0% reduction in the indicative transmission price path compared to 2016/17. Indicative price growth over the balance of the 2018–22 regulatory period is forecast to remain within Consumer Price Index (CPI) on average.

Transmission charges comprise approximately 9% of an average residential household's electricity bill each year. The impact of Powerlink's Revised Revenue Proposal on residential electricity consumers each year will depend on a number of factors, which include:

- actual energy delivered from Powerlink's network;
- the proportion of annual prescribed revenue to be recovered from the Distribution Network Service Providers (DNSPs) (Energex and Ergon Energy, both part of the Energy Queensland group);
- the particular tariff arrangements applied by the DNSP and retailers; and
- the individual customer's electricity usage.

For a residential electricity consumer, Powerlink's Revised Revenue Proposal is expected to reduce the average electricity bill by about 2.9% in the first year. On the basis of assumed tariffs and consumption, this represents an estimated annual saving of between $25 and $41.

Table 3 provides a revised estimate of how the transmission component of a typical residential and business electricity bill will be impacted by the Revised Revenue Proposal.

Table 3: Revised indicative electricity bill impacts ($, nominal)

		2013–17 regulatory period		2018–22 regulatory period
		2015/16	2016/17	2017/18
Average annual residential electricity bill[(a)] (based on annual usage range of 2,500kWh and 5,173 kWh)	Transmission Component	$77 – $129	$80 – $134	$55 – $93
				(-31.0%)
Average annual business electricity bill[(b)] (based on annual usage range of 10,000kWh and 20,000 kWh)	Transmission Component	$270 – $470	$280 – $488	$193 – $337
				(-31.0%)

(a) 2015 AEMC Electricity Price Trends, AEMC, December 2015, p.105.

(b) Energy Made Easy, AER, https://www.energymadeeasy.gov.au/.

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1. Introduction

1.1 Background

Powerlink submitted its Revenue Proposal to the AER on 28 January 2016. The Revenue Proposal provided details of Powerlink's revenue requirements for prescribed transmission services in its next regulatory period from 1 July 2017 to 30 June 2022.

Powerlink's Revenue Proposal has been the subject of detailed review by the AER and its consultants. The AER published Powerlink's Revenue Proposal on 12 February 2016 and initiated the consultation period for public submissions, which closed on 28 April 2016. The AER also published its Issues Paper on 9 March 2016 and held a Public Forum on 15 March 2016, where Powerlink, the AER and the AER's Consumer Challenge Panel sub-panel 4 (CCP4) made presentations. The AER published its Draft Decision on Powerlink's revenue cap for the 2018–22 regulatory period on 29 September 2016 and held its Pre-Determination Conference on 19 October 2016 where the AER, the CCP4 and Powerlink made presentations.

Powerlink's Revised Revenue Proposal and Revised Pricing Methodology are submitted in accordance with the Rules[1]. Powerlink notes that in its Draft Decision the AER approved Powerlink's Negotiating Framework for Negotiated Transmission Services. Therefore, no new document has been provided in this Revised Revenue Proposal.

Powerlink has carefully reviewed all of the matters raised by the AER in its Draft Decision and notes that it accepted many aspects of Powerlink's Revenue Proposal. However, there remain some areas where Powerlink does not agree with the AER's Draft Decision. In particular:

- the decision to reduce forecast total capital expenditure by 19.2%, due to a reduction in forecast reinvestment capital expenditure of 23.2%;
- the adjustments made by the AER to incentive schemes, including additional exclusions to the 2018–22 Efficiency Benefit Sharing Scheme (EBSS) and some parameter values for the Service Target Performance Incentive Scheme (STPIS); and
- an issue raised with one aspect of Powerlink's proposed Pricing Methodology.

Where Powerlink has not accepted the AER's Draft Decision, the Revised Revenue Proposal provides supporting information and evidence, including expert reports, to address the AER's concerns. This material also demonstrates that Powerlink's revised forecast for capital expenditure reasonably reflects efficient and prudent costs and a realistic expectation of the demand forecast and cost inputs required to meet the capital expenditure objectives and criteria of the Rules.

The Revised Revenue Proposal supplements Powerlink's Revenue Proposal and makes reference to the information contained therein and to the AER's Draft Decision. Therefore, the Revised Revenue Proposal should be read in conjunction with those documents.

1.2 Structure of the document

The remainder of Powerlink's Revised Revenue Proposal is structured as follows:

- Chapter 2 describes how Powerlink has continued to engage with its customers and consumers and how it has used this feedback in preparing its Revised Revenue Proposal;
- Chapter 3 describes Powerlink's response to specific non-capital expenditure matters in the AER's Draft Decision and Powerlink's position in the Revised Revenue Proposal;
- Chapter 4 describes Powerlink's response to the AER's Draft Decision on capital expenditure and Powerlink's revised capital expenditure forecast; and
- Chapter 5 describes Powerlink's revised Maximum Allowed Revenue (MAR).

[1] National Electricity Rules, AEMC, Chapter 6A.

1.3 Basis of numbers

In Powerlink's Revised Revenue Proposal, the following conventions are applied, unless otherwise specified:

- Historical expenditure is presented in mid-year (December) nominal dollars;
- Forecast expenditure is presented in real end-year (June) 2016/17 dollars; and
- PTRM building-blocks are presented in end-year (June) nominal dollars.

Powerlink notes that numbers presented in tables may not add due to rounding.

1.4 Confidential information

Powerlink does not claim confidentiality over any part of this Revised Revenue Proposal document.

Where confidential information has been identified in separate appendices and supporting information, a confidential version has been provided to the AER and registered in accordance with the Confidentiality Guidelines published by the AER.

1.5 Governance and compliance

Powerlink's Board has issued a resolution, provided in Appendix 1.01, to certify that the key assumptions that underlie revised capital expenditure forecasts in the Revised Revenue Proposal are reasonable. Given that Powerlink accepts the AER's Draft Decision on Powerlink's forecast operating expenditure allowance, a similar resolution was not required from the Board.

2. Customer and Consumer Engagement

2.1 Introduction

This chapter outlines Powerlink's customer and consumer engagement activities following submission of its Revenue Proposal and how this has influenced Powerlink's Revised Revenue Proposal.

Key highlights

- Powerlink continued to engage with key stakeholders, based on its customer and consumer engagement framework, through activities which included:
    - Powerlink Transmission Network Forum;
    - Demand and Energy Forecasting Forum;
    - Powerlink Customer and Consumer Panel;
    - Stakeholder Perception Survey; and
    - One-on-one stakeholder briefings.
- Engagement on the AER's Draft Decision and Powerlink's Revised Revenue Proposal focused on capital expenditure forecasts and the Service Target Performance Incentive Scheme (STPIS). Feedback from customer and consumer representatives showed that while reliability is important, stakeholders wanted further information on potential impacts of reduced replacement expenditure to better understand the balance between reliability risk and cost.
- Powerlink's approach to stakeholder engagement has continued to evolve based on feedback received from customers and consumers about engagement activities. Powerlink has focused on providing relevant information in advance of face-to-face discussions to ensure that stakeholders are better prepared to provide input during engagement activities.
- Powerlink continued to take a long term view of engagement. Stakeholder input has informed better decision-making as part of business-as-usual, not just for Powerlink's revenue determination process.

2.2 Powerlink's engagement approach

2.2.1 Engagement objectives

As part of its commitment to the International Association for Public Participation (IAP2) values and the AER's Consumer Engagement Guideline[2], Powerlink set a number of engagement objectives. These objectives, which were discussed in detail in Powerlink's Revenue Proposal, placed particular focus on:

- Engaging stakeholders early on issues they find important, at the "Involve" level of the IAP2 Spectrum;
- Clearly scoping engagement activities and presenting information in a clear and accessible manner to enable effective participation and meaningful feedback; and
- Genuinely considering feedback received and demonstrating how engagement has improved Powerlink's decision-making.

[2] Consumer Engagement Guideline for Network Service Providers, AER, November 2013.

2.3 Engagement activities

Since Powerlink lodged its Revenue Proposal to the AER in January 2016, a number of business-as-usual engagement activities have been undertaken, which are outlined below. All pre-reading, presentations and supporting information generated as part of face-to-face engagement were made available on Powerlink's website[3].

2.3.1 Powerlink Customer and Consumer Panel

Powerlink's Customer and Consumer Panel is an advisory panel with representative membership of directly connected customers, consumer advocates and industry representatives.

On 25 February 2016, the panel meeting involved discussion on the key building-blocks of Powerlink's Revenue Proposal, gaining input on which aspects might be challenged through the regulatory determination process. The panel emphasised its focus on the efficiency of forecast operating expenditure (and the value of benchmarking to inform the AER's assessment); the basis of demand forecasts which underpinned forecast capital expenditure; and the potential impact of increased renewable generation on Powerlink's forecast capital expenditure.

On 26 May 2016, panel discussions focused on the submissions received on Powerlink's Revenue Proposal, commentary from CCP4, demand and energy forecasting and asset management models. With respect to the Revenue Proposal, panel members focused on a submission made by CCP4 regarding the regulatory framework and Powerlink's profitability.

On 27 October 2016, the panel met to discuss elements of the AER's Draft Decision and Powerlink's initial positioning on its Revised Revenue Proposal. Feedback and input was sought from panel members on the level of forecast reinvestment expenditure and STPIS. The feedback from panel members on these matters is discussed in more detail in Table 2.1.

Members of the AER's CCP4 were invited, and attended, all Customer & Consumer Panel meetings over this period. This provided CCP4 members with an opportunity to observe Powerlink's engagement on its Revenue Proposal and other business-as-usual activities.

2.3.2 Demand and Energy Forecasting Forum

On 22 March 2016, Powerlink hosted its second Demand and Energy Forecasting Forum with experts from a wide range of industries to learn more about new technologies and the impacts they may have on future electricity demand and energy.

Attendees were given the opportunity to provide their insights into four key drivers – battery storage, energy efficiency, tariff reform and demand side management.

The outputs from the forum were used to enhance Powerlink's forecasting methodology in the 2016 Transmission Annual Planning Report (TAPR). In line with Powerlink's commitment to transparency, its demand and energy forecasting model is publicly available through its website.

2.3.3 Transmission Network Forum

On 20 July 2016, Powerlink held its annual Transmission Network Forum, attended by more than 85 stakeholders, to discuss the future development of Queensland's electricity transmission network. The forum built on the success of last year's event with stakeholder discussion focused on the future of the transmission network.

Powerlink presented the key findings from the 2016 TAPR and provided an insight into future energy and demand forecasts, network development and future investments. The opening presentation was followed by two interactive breakout sessions to discuss how:

- the transmission network can better support large-scale renewable generation; and
- Powerlink can improve its engagement on non-network solutions.

3 Customer and Consumer Panel and Engagement Forums, Powerlink, https://www.powerlink.com.au/Community_and_Environment/Stakeholder Engagement/Customer_and_Consumer Panel_and_Engagement_Forums.aspx.

Further information regarding stakeholder feedback and input from the Transmission Network Forum is in Appendix 2.01.

2.3.4 Stakeholder Perception Survey

In August and September 2016, more than 100 in-depth interviews with key Powerlink stakeholders were undertaken as part of Powerlink's 2016 Stakeholder Perception Survey. The results of this survey are summarised in Section 2.5.2.

The survey measured Powerlink's social licence to operate, reputation and tracked perceptions of stakeholder engagement.

2.3.5 Stakeholder Briefings

Since the submission of its Revenue Proposal, Powerlink has engaged with a range of key stakeholders to seek their feedback and views including the Energy Users Association of Australia (EUAA), Queensland Resources Council (QRC), FNQ (Far North Queensland) Electricity Users Network and the Chamber of Commerce & Industry Queensland (CCIQ).

2.3.6 Powerlink Website

Dedicated sections for stakeholder engagement and the revenue determination process were created on Powerlink's website during preparation of Powerlink's Revenue Proposal to allow greater transparency and broader access to information. This provided an opportunity for those stakeholders not involved in face-to-face engagement activities to be informed of such activities and provide input.

2.4 How feedback influenced the Revised Revenue Proposal

In its Draft Decision the AER broadly accepted Powerlink's Revenue Proposal. In particular, Powerlink's proposed rate of return approach, total forecast operating expenditure and most elements of forecast capital expenditure except reinvestment. Since publication of the AER's Draft Decision in late September 2016, the focus of Powerlink's engagement discussions with customers and consumers has been on forecast reinvestment capital expenditure (Repex) and STPIS, two key areas which the AER sought to adjust in its Draft Decision. Table 2.1 provides a summary of the key topics discussed with stakeholders at Powerlink's Customer and Consumer Panel meeting of 27 October 2016, the feedback received and how Powerlink considered and used this feedback in developing its Revised Revenue Proposal.

Further information about how stakeholder feedback was used to inform Powerlink's Revised Revenue Proposal is discussed in the relevant chapters.

Table 2.1: How feedback influenced the Revised Revenue Proposal

Topic	Themes and focus areas	Summary of feedback received	Powerlink response
Reinvestment Capital Expenditure (Repex) Forecast	Cost v reliability trade-off – views on appropriate level of replacement capital expenditure to maintain reliability, balanced against reduction in electricity prices.	• It would be useful to understand how Powerlink's mean replacement lives compare against other transmission	• Powerlink has discussed benchmarking observations on its mean replacement lives in its Revised Revenue Proposal.
		• Powerlink should focus on quantifying the impact of reduced replacement expenditure on customer reliability so that it can better describe the risk-cost balance for consumers.	• Powerlink has included supporting information in its Revised Revenue Proposal to clarify the potential longer term impacts on relevant network performance indicators related to asset fleet management and reliability.
		• Longer term impacts of Draft Decision and reduced reinvestment expenditure may be difficult to objectively assess. Potential that any future pain may only be known "down the track" and used as a basis to support more expenditure in the future.	
		• For many customers reliability is key – without power they "do not operate". Customers would need to have a clear view of the risks in relation to outages and network impacts from extending asset lives.	• Powerlink has provided further information in its Revised Revenue Proposal regarding risks to customer supply reliability, particularly in relation to potential in-service failures and outages.
	AER's assessment approach – views on AER's assessment of replacement expenditure related to extended replacement lives and further adjustments (15% offset).	• Based on information presented to the panel, there was not strong evidence supporting the mean replacement life increase and the 15% offset – both look like they can be negotiated.	• Powerlink has responded with further analysis of the AER's assessment of mean replacement lives and the basis of the 15% offset in its Revised Revenue Proposal.
		• Important for Powerlink to consider and apply non-network solutions in replacement expenditure decisions, noting the Rule change progressing in this area.	• Powerlink has already been active in consulting market participants on non-network solutions for reinvestment without the Rule change, and will continue to do this where feasible.

Topic	Themes and focus areas	Summary of feedback received	Powerlink response
Service Target Performance Incentive Scheme (STPIS)	Overview of AER Draft Decision for STPIS and outcomes for consumers. Discussion on bonus and penalty arrangements under components of the scheme. Feedback sought on Draft Decision outcomes.	• Stakeholders perceived that Powerlink had benefited from previous schemes in terms of incentives received. • Stakeholders noted the asymmetrical penalty under the Network Capability Component (NCC) of the STPIS, but considered this risk should be considered by looking at the STPIS incentive arrangements as a whole, rather than just some elements. • Stakeholders noted that Powerlink could potentially undertake NCC priority projects without scheme incentives if they still provided value.	• Powerlink will be subject to significantly more challenging network performance financial incentives and targets under Version 5 of the STPIS. • Powerlink has again noted its concern regarding the disproportionate nature of NCC incentives under the scheme.

2.5 Engagement evaluation

2.5.1 Views on Powerlink's customer and consumer engagement

In its Draft Decision the AER acknowledged Powerlink had taken important steps to engage with its customers and that the engagement undertaken had significantly built on the engagement program undertaken in previous regulatory reviews for other network service providers[4]. The AER also noted a submission from a CCP4 member which stated that stakeholders considered Powerlink's engagement approach was positive; that Powerlink listened to views presented and responded in appropriate ways; and that Powerlink was open and transparent with no "negative surprises" in its Revenue Proposal[5].

However, CCP4 members did note that there was some scope for Powerlink to improve its engagement going forward with a view that while the engagement approach was well considered, the execution of the program was somewhat limited in terms of the breadth of stakeholders engaged. Powerlink will continue to engage with the AER and members of CCP4 to gain further insight regarding a more appropriate breadth of consumer engagement for a transmission network business.

2.5.2 Results of Stakeholder Perception Survey

In August and September 2016, Powerlink undertook in-depth interviews with more than 100 stakeholders to measure satisfaction with its engagement approach. Satisfaction ratings are outlined in Table 2.2.

[4] Powerlink transmission draft determination 2017–22 – Overview, AER, p.46.

[5] Ibid, p.46.

Table 2.2: Stakeholder Group Satisfaction ratings

Stakeholder Group	Stakeholder Engagement Rating Scale 1 (Poor) – 5 (Excellent)
Overall (all stakeholder groups)	3.49
State Government	4.18
Regulator	3.75
Consumer advocates	3.50
Customers (directly-connected)	3.40
Industry associations	3.25

Further information on the Stakeholder Perception Survey is included as Appendix 2.02 to Powerlink's Revised Revenue Proposal.

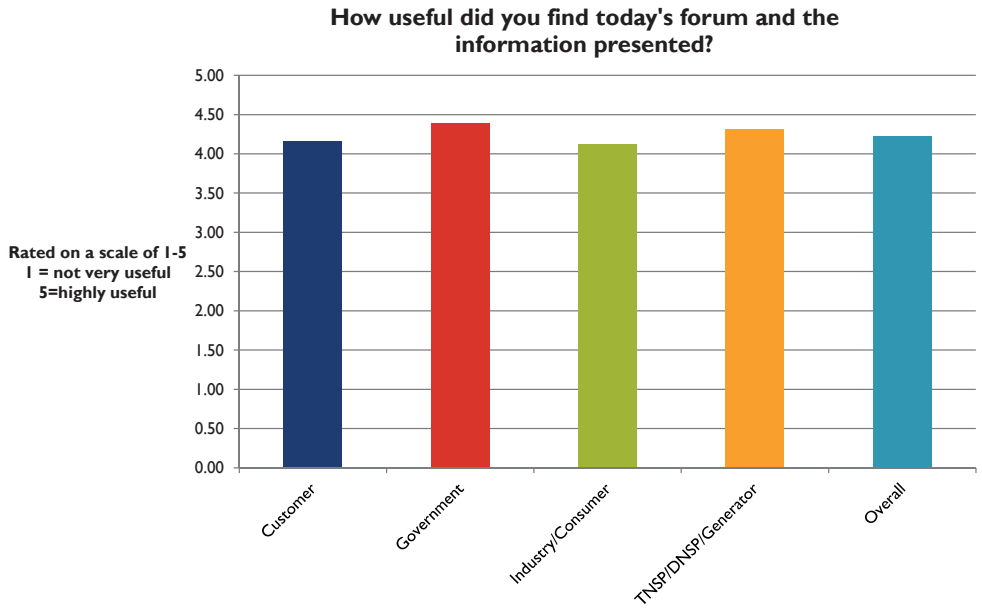
2.5.3 Post activity feedback forms

To rate the effectiveness of key engagement activities, Powerlink regularly requests participants to complete a feedback form to gain insights on the effectiveness of the activity and the suitability of the information provided.

At the 2016 Powerlink Transmission Network Forum in July 2016, participants were asked to rate on a scale of 1 to 5 (1 being not very useful to 5 highly useful) the information presented at the forum and in the individual breakout sessions. A total of 64 out of 85 participants responded. The results are shown in Figures 2.1 and 2.2. These results indicate that:

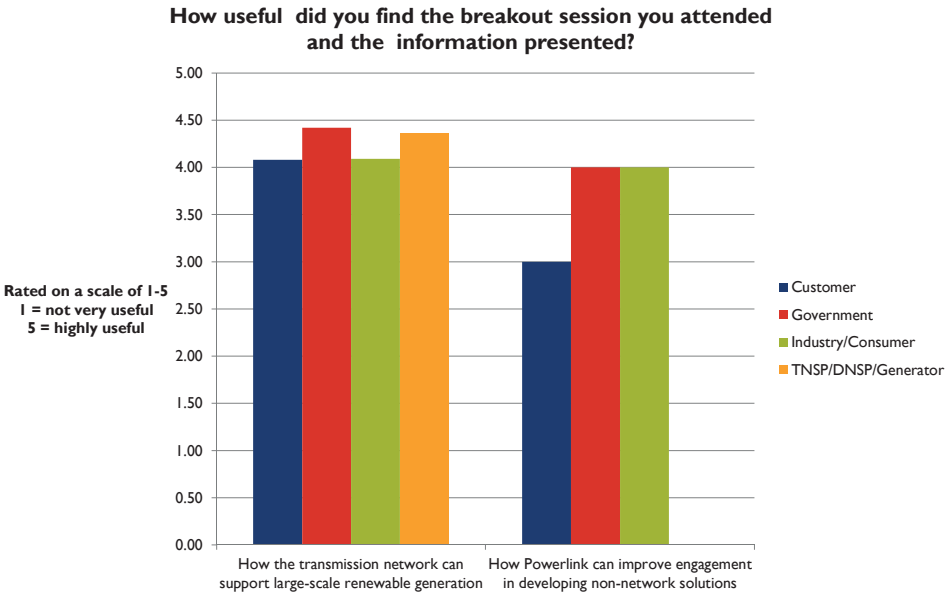
- all stakeholder groups found the presentation and information presented on the 2016 TAPR at the Transmission Network Forum to be very useful; and
- most stakeholder groups found the information presented at the breakout sessions on large-scale renewable generation and non-network solutions to be very useful.

Figure 2.1: Transmission network forum feedback summary



Source: Powerlink, Transmission Network Forum Survey Results.

Figure 2.2: Transmission network forum breakout sessions feedback



Source: Powerlink, Transmission Network Forum Survey Results.

2.6 Future direction

Effective engagement with its customers and consumers is central to how Powerlink delivers its transmission services.

While Powerlink's approach to stakeholder engagement has been generally well received to date, there is further potential to improve. Powerlink's overall focus is to continue to involve stakeholders in decision-making across all relevant areas of the business and ensure that Powerlink continues to deliver value to customers and consumers.

In particular, Powerlink will focus on ensuring that it engages with an appropriately diverse cross-section of directly connected customers, consumer advocates and industry representatives with a focus on better understanding customer needs across all aspects of its business.

3. Response to AER's Draft Decision

3.1 Introduction

This chapter outlines Powerlink's response to specific non-capital expenditure matters in the AER's Draft Decision and Powerlink's position in the Revised Revenue Proposal, for the AER to consider in making its Final Decision.

Key highlights

- Powerlink is pleased that the AER made a Draft Decision that accepted most of the key elements of its Revenue Proposal.
- In its Revised Revenue Proposal, Powerlink has continued to prioritise consumer concerns regarding electricity prices and, having regard to aspects of the AER's assessment in its Draft Decision, has proposed revised forecast capital expenditure that it considers to be prudent and efficient.
- Powerlink accepts the AER's Draft Decision for Rate of Return (RoR) and has applied an estimate of 5.48% in its Revised Revenue Proposal consistent with the Draft Decision. Powerlink has proposed that the AER should apply any changes to its approach to estimate the value of imputation credits (gamma) resulting from a decision of the Federal Court to Powerlink's 2018–22 regulatory period.
- Powerlink accepts the AER's Draft Decision for a total forecast operating expenditure allowance of $976.7m for the 2018–22 regulatory period.
- Powerlink does not accept a number of the adjustments made by the AER to incentive schemes, including Powerlink's proposed additional exclusions for the 2018–22 Efficiency Benefit Sharing Scheme (EBSS) and some parameter values for the Market Impact Component (MIC) of the Service Target Performance Incentive Scheme (STPIS).
- Powerlink does not accept the AER's Draft Decision on its Pricing Methodology and after further engagement with the AER, has submitted a Revised Pricing Methodology in its Revised Revenue Proposal.

3.2 Overall position

Powerlink's Revenue Proposal proposed prudent and efficient expenditure forecasts and revenue requirements that Powerlink considered were capable of acceptance by the AER. This reflected Powerlink's focus on responding to consumer concerns over electricity prices through increased efficiency, cost reductions and a focus on alternative solutions that minimised the requirement for additional investment in the prescribed network. Powerlink also sought to align its Revenue Proposal with the AER's Guidelines and approach.

Powerlink is pleased that the AER has made a Draft Decision that accepted most of the key elements of its Revenue Proposal, including its rate of return approach, forecast operating expenditure and most elements of capital expenditure with the exception of forecast reinvestment. In its Draft Decision and subsequent comments at its Pre-Determination Conference held on 19 October 2016, the AER also noted Powerlink's efforts to align with its Guidelines and approach and that Powerlink had adopted a reasonable approach in the preparation of its Revenue Proposal.

In its Revised Revenue Proposal, Powerlink has continued to prioritise consumer concerns regarding electricity prices and, having regard to aspects of the AER's assessment in its Draft Decision, has proposed revised forecast capital expenditure that it considers to be prudent and efficient.

The following sections discuss Powerlink's response to specific non-capital expenditure matters in the AER's Draft Decision and Powerlink's position in the Revised Revenue Proposal. Forecast capital expenditure matters are separately addressed in Chapter 4.

3.3 Cost of capital and taxation

At the time Powerlink submitted its Revenue Proposal, a number of matters related to the AER's application of its RoR Guideline were the subject of an appeal before the Australian Competition Tribunal (the Tribunal). While Powerlink adopted the AER's RoR Guideline to estimate the rate of return and value of imputation credits (gamma) in its Revenue Proposal, it reserved its rights to provide updated estimates in a separate submission, or in its Revised Revenue Proposal, that reflected one or more aspects of the Tribunal's decision[6].

The Tribunal handed down its decisions[7] on 26 February 2016. While the Tribunal found in favour of the AER in some areas, it also found that the AER had erred in its determinations related to the:

- rate of return (cost of debt), particularly the transition arrangements to a trailing average for the cost of debt; and
- estimate for the value of imputation credits (gamma).

Consequently the Tribunal remitted the determinations back to the AER to remake, taking into account the directions provided in its decisions. On 24 March 2016, the AER applied to the Federal Court of Australia (the Court) for judicial review of the Tribunal's decisions.

Taking into account the matters discussed above, Powerlink made a submission to the AER on 28 April 2016 to propose that any resultant changes in the AER's approach to estimate these parameters apply to Powerlink's 2018–22 regulatory period.

On 29 September 2016, the AER made its Draft Decision for Powerlink consistent with its RoR Guideline. In its Draft Decision, the AER noted Powerlink's proposal that any resultant changes in its approach to estimate the rate of return parameters (including gamma) would apply to Powerlink's 2018–22 regulatory period. In response, the AER stated that if it was required to, or did, amend its approach to the estimation of the value of imputation credits (gamma) it would have regard to this in its Final Decision.

At the time of submitting this Revised Revenue Proposal, the judicial review of the Tribunal's decision (including the value of imputation credits) remains before the Court. Hearings have been completed and judgement has been reserved, with a decision expected prior to release of Powerlink's Final Decision by end April 2017.

While Powerlink accepts that the AER has made its Draft Decision in accordance with its RoR Guideline, Powerlink also considers that, consistent with the general intention of its April 2016 submission on this matter, the AER should apply any changes to its approach to estimate the value of imputation credits (gamma) resulting from a decision of the Court to Powerlink's 2018–22 regulatory period.

For the purposes of its Revised Revenue Proposal, Powerlink has applied a rate of return of 5.48% consistent with the placeholder estimate and input parameter values established by the AER in its Draft Decision, presented in Table 3.1. Powerlink notes that the rate of return calculated in the AER's Final Decision may be higher or lower than this placeholder estimate, depending on prevailing financial market conditions and consistent with the averaging periods for the risk-free rate and cost of debt accepted by the AER in its Draft Decision.

[6] In its Revenue Proposal, Powerlink sought independent expert advice (refer Chapter 9 and Appendix 9.02 of the Revenue Proposal) on its proposed rate of return which concluded that some departures from the AER's RoR Guideline were appropriate to estimate the required rate of return in a manner that best meets the requirements of the National Electricity Law (NEL), the Rules and supports the National Electricity Objective (NEO). While Powerlink supported these views, it nonetheless adopted the AER's RoR Guideline approach in its Revenue Proposal.

[7] Refers to decisions made by the Tribunal with respect to appeals from Ausgrid, Endeavour Energy, Essential Energy and ActewAGL (and a number of interveners) which addressed a broad range of matters including return on equity, return on debt, value of imputation credits (gamma), forecast operating expenditure, quantitative application of benchmarking, network performance and operating expenditure incentive schemes and metering services.

Table 3.1: Summary of Weighted Average Cost of Capital (WACC) and value of imputation credits

	Revised Revenue Proposal estimates
Nominal risk free rate	1.95%
Market risk premium	6.50%
Equity beta	0.7
Proportion of equity funding	40%
Cost of debt	4.79%
Proportion of debt funding	60%
WACC	5.48%
Value of imputation credits (gamma)	0.4

3.3.1 Forecast inflation

In its Revenue Proposal, Powerlink applied the approach used by the AER in its recent regulatory decisions to forecast inflation. This involved calculating a 10 year forward looking (geometric) average, using the Reserve Bank of Australia's (RBA) inflation forecasts for the next two years and the mid-point of the RBA's target band for inflation for the remaining eight years. At the time of the Revenue Proposal this methodology resulted in a forecast inflation rate of 2.45%.

The AER accepted Powerlink's forecast inflation methodology in its Draft Decision. Recent updates to RBA inflation forecasts[8] have lowered the inflation outlook for the next two years to an average of 2.00% per annum. Using the AER's inflation forecast methodology, this has resulted in a revised forecast inflation rate over Powerlink's 2018–22 regulatory period of 2.40% per annum. Powerlink has applied this updated forecast inflation rate in the RFM and PTRM submitted with its Revised Revenue Proposal.

While Powerlink has accepted the AER's approach to forecast inflation, Powerlink has concerns that based on recent financial market conditions and expert advice[9], this approach may lead to an over estimation of expected inflation. This gives rise to the possibility that Powerlink may not be able to recover its efficient financing costs through the MAR set in its revenue determination.

Powerlink considers that material differences between forecast and outturn inflation may unreasonably distort the revenue recovered by network businesses and prices paid by consumers over time. If the AER's determination for forecast inflation is higher than outturn inflation, it will overstate the level of required indexation of the Regulatory Asset Base (RAB), thereby reducing the building-block allowance for regulatory depreciation. This may result in a potential under-recovery of efficient financing costs during the regulatory period. However, if the AER's forecast for inflation is lower than outturn inflation, it will understate the level of required indexation of the RAB, thereby increasing the building-block allowance for regulatory depreciation. This may result in a potential over-recovery of efficient financing costs during the regulatory period.

The Tribunal recently heard an appeal related to forecast inflation from SA Power Networks[10] in which it decided that under the Rules, a review of the forecast inflation methodology must occur through a review of the PTRM in accordance with the relevant consultation procedures in the Rules.

Powerlink supports a broader review of the forecast inflation methodology (including how inflation is applied in the AER's RFM and PTRM) to mitigate the risks described above. Given the interrelationship between forecast inflation, calculation of the rate of return and the AER's regulatory models, Powerlink considers that such reviews may need to be coordinated and occur in a similar timeframe.

[8] RBA Statement on Monetary Policy 3 November 2016.

[9] For example, see Best Estimate of Expected Inflation, CEG, September 2016, submitted by AusNet Services in its Revised Revenue Proposal.

[10] Application by SA Power Networks [2016] ACompT 11, Australian Competition Tribunal, October 2016.

3.4 Forecast operating expenditure

Powerlink accepts the AER's Draft Decision for a total forecast operating expenditure allowance of $976.7m for the 2018–22 regulatory period.

However, Powerlink has a number of in-principle concerns with aspects of the approach adopted by the AER in developing its alternative estimate of forecast operating expenditure. In particular, the AER elected to treat insurance premiums, self-insurance and the Australian Energy Market Commission (AEMC) levy as controllable operating expenditure.

Powerlink considers that a network service provider, consistent with the approach set out in the AER's Expenditure Forecast Assessment Guidelines[11], can have regard to the nature of expenditure and adopt an appropriate forecasting technique that results in a forecast which meets the expenditure objectives and criteria in the Rules. For example, if a category of expenditure is non-controllable (due to factors outside a network service provider's control, and hence might reasonably be expected to vary from the level of expenditure found in its revealed costs) a zero-based estimate is appropriate.

In its Revenue Proposal, Powerlink applied a zero-based estimate to forecast operating expenditure for the following items:

- insurance and self-insurance premiums – which are respectively driven by insurance market cycles and independent actuarial assessment of potential losses arising from non-recurrent events (refer advice from Finity Consulting in Appendix 6.02 of the Revenue Proposal); and
- the AEMC Levy – which is an annual cost imposed on Powerlink under Queensland legislation which may be subject to change as agreed by the States regarding the scope and extent of work to be conducted by the AEMC.

While it accepts the AER's Draft Decision, Powerlink maintains its view that these categories of expenditure are non-controllable and can be reasonably forecast by means of a zero-based estimate. In addition, for the EBSS applicable to the 2018–22 regulatory period, Powerlink considers that this type of non-controllable expenditure should be excluded from the calculation of carryover amounts.

3.5 Real material price growth

In its Revenue Proposal, Powerlink used CPI as a proxy to forecast increases in the materials component of capital and operating expenditure for the 2018–22 regulatory period, consistent with the approach applied by the AER in recent regulatory determinations.

Under certain economic conditions, Powerlink maintains that there may be cause to apply materials cost escalators above or below CPI, broadly consistent with the approach outlined by Jacobs in Powerlink's Revenue Proposal[12].

Powerlink chose not to adopt Jacob's forecasts in its Revenue Proposal but reserved its rights to revisit this issue in its Revised Revenue Proposal, pending the overall outcome of the AER's Draft Decision on expenditure allowances.

Taking into account the AER's overall Draft Decision, and noting Powerlink's overarching position that under certain economic conditions there may be cause to apply materials cost escalators above CPI, Powerlink accepts the use of CPI for materials price growth in its Revised Revenue Proposal for the 2018–22 regulatory period.

[11] Expenditure Forecast Assessment Guideline for Electricity – Transmission, AER, November 2013, p.30.

[12] As part of independent expert advice provided as Appendix 7.03 in the Revenue Proposal.

3.6 Pass through events

3.6.1 Nominated pass through events

Powerlink accepts the AER's Draft Decision for the following nominated pass through events: Insurance Cap Event; Insurer Credit Risk Event; and Terrorism Event. Powerlink notes that for the Insurance Cap Event definition the AER has incorrectly nominated the commencement of Powerlink's regulatory period as 2016/17, which should be amended to 2017/18 in the AER's Final Decision.

3.6.2 Network support events

In its Draft Decision the AER noted that clause 6A.7.2 of the Rules allows "for a TNSP to seek a pass through of any difference between forecast and actual efficient costs associated with network support events"[13]. In its Draft Decision the AER accepted Powerlink's total operating expenditure forecast, which included zero network support costs. Powerlink understands this to mean a $0 network support allowance.

3.7 Incentive schemes

The following sections outline Powerlink's response to the AER's Draft Decision on incentive schemes that Powerlink will be subject to during the 2018–22 regulatory period. These include:

- the EBSS, which is focused on providing continuous incentives to reduce operating expenditure;
- the Capital Expenditure Sharing Scheme (CESS), which provides an incentive for efficient capital expenditure during a regulatory period; and
- the STPIS, which provides an incentive for Powerlink to maintain a high level of service for the benefit of market participants and electricity consumers.

3.7.1 Efficiency Benefit Sharing Scheme (EBSS)

This section discusses the EBSS for both Powerlink's current (2013-17) and next (2018-22) regulatory periods.

2013–17 EBSS net carryover amount

In its Draft Decision, the AER accepted Powerlink's proposed net carryover amount for the 2013–17 regulatory period of -$7.8m. Powerlink accepts the AER's Draft Decision and this adjustment has been incorporated in the PTRM in Powerlink's Revised Revenue Proposal and is set out in Table 3.2.

Table 3.2: EBSS carryover calculation ($m, 2016/17)

	2017/18	2018/19	2019/20	2020/21	2021/22	Total
Carryover amount	(0.8)	(6.8)	(3.0)	2.8	-	(7.8)

2018–22 EBSS adjustments

Powerlink accepts that it will be subject to Version 2 of the EBSS during the 2018–22 regulatory period, based on the forecast operating expenditure targets established in the AER's Draft Decision.

[13] Powerlink transmission draft determination 2017-22, Attachment 13 (Pass through events), AER, p.8.

Under Version 2 of the EBSS, certain categories of operating expenditure may be excluded from the scheme where that expenditure was not forecast using a single year revealed cost approach. In its Revenue Proposal, Powerlink identified a number of categories of operating expenditure which were not forecast using a single year revealed cost approach. Consistent with Version 2 of the EBSS, Powerlink proposed that these categories of expenditure be excluded from the EBSS, namely:

- insurance and self-insurance;
- the AEMC Levy;
- Redundancy Costs;
- Network Support; and
- Debt Raising Costs.

In its Draft Decision, the AER accepted that Network Support and Debt Raising Costs would be excluded from the 2018–22 EBSS as they were not forecast on the basis of revealed expenditure in a single year[14]. However, the AER did not accept the additional exclusions Powerlink proposed for insurance and self-insurance, the AEMC Levy and Redundancy Costs.

Insurance, self-insurance and the AEMC Levy

Powerlink does not accept the AER's Draft Decision to include insurance, self-insurance and the AEMC Levy as part of the 2018–22 EBSS. In its Revenue Proposal Powerlink outlined that these are non-controllable costs that can be reasonably forecast using a zero-based estimate for the purposes of forecasting its operating expenditure.

In its Explanatory Statement published as part of Version 2 of the EBSS[15], the AER outlined its position that the costs of uncontrollable events should not be excluded from the EBSS. In its reasoning that supported this position, the AER noted that for an uncontrollable *event* that has occurred:

- material risks arising from such an event can be managed through pass-through events and contingent projects; and
- network service providers usually have some control over the costs of such uncontrollable events.

Powerlink does not consider that insurance, self-insurance or the AEMC Levy are events that fall within these criteria and that the AER should reconsider whether including these costs within the 2018–22 EBSS provides a continuous incentive to reduce operating expenditure[16].

Powerlink also has concerns about the impact of such costs on its operations and consumers under the AER's treatment. Powerlink notes that if actual expenditure increases above that included in the AER's operating expenditure allowance for these categories, it will incur a net loss in the current regulatory period (all other things being equal) and will carry a net negative EBSS carryover amount (penalty) into the subsequent regulatory period. The reverse is also true. If actual expenditure reduces below that included in the AER's operating expenditure allowance for these categories, it will incur a net gain in the current regulatory period (all other things being equal) and will carry a net positive EBSS carryover amount (bonus) for the subsequent regulatory period. In both cases, this is despite the fact that Powerlink had no control over the level of this expenditure.

Powerlink does not consider this represents a reasonable outcome for a network service provider or network users[17]. Hence, Powerlink asks the AER to reconsider its draft position on this matter and to treat insurance, self-insurance and the AEMC Levy as additional exclusions from the 2018–22 EBSS in its Final Decision.

Redundancy Costs

With respect to Redundancy Costs, Powerlink does not accept the AER's Draft Decision.

[14] Powerlink transmission draft determination 2017–22, Attachment 9 (Efficiency benefit sharing scheme), AER, p.14

[15] Explanatory Statement – Efficiency Benefit Sharing Scheme for Electricity Network Service Providers, AER, November 2013, p.19.

[16] National Electricity Rules, AEMC, clause 6A.6.5(b)(1).

[17] Ibid, clause 6A.6.5(b)(2).

In Section 6.6.1 of its Revenue Proposal, Powerlink explicitly identified that it had made an adjustment to its 2014/15 base year operating expenditure related to a workforce efficiency review. This adjustment removed Redundancy Costs resulting from changes in Powerlink's external operating environment that were outside Powerlink's control. By removing this expenditure from the base year, Powerlink's forecast operating expenditure does not include non-recurrent Redundancy Costs. Nevertheless, Powerlink expects to incur these Redundancy Costs during the 2018–22 regulatory period due to similar exogenous factors (in particular due to forecast reductions in the demand for prescribed transmission services).

If the timing of expenditure on Redundancy Costs during the 2018–22 regulatory period results in a net negative EBSS carryover amount into the 2023–27 regulatory period, Powerlink considers it will be unduly penalised as it had previously sought to exclude these costs from its forecast operating expenditure. Hence, Powerlink considers that it is appropriate for Redundancy Costs to be an additional exclusion from the 2018–22 EBSS.

If the AER maintains its draft position to retain Redundancy Costs within the 2018–22 EBSS in its Final Decision, Powerlink proposes that the AER should have regard to the actual timing of Redundancy Costs in each year of the scheme. Consistent with the AER's Version 2 EBSS[18], the AER should make the necessary adjustments to ensure that the scheme, in conjunction with the composition of forecast operating expenditure, provides a fair sharing between network service providers and network users of efficiency gains and losses made during a regulatory period.

3.7.2 CESS

Powerlink will be subject to Version 1 of the CESS during its 2018–22 regulatory period, based on revised total forecast capital expenditure set in Table 3.3 below.

Table 3.3: Capital expenditure sharing scheme ($m, 2016/17)

	2017/18	2018/19	2019/20	2020/21	2021/22	Total
Capital expenditure for CESS	171.7	173.6	178.1	186.2	176.6	886.3

3.7.3 STPIS

Powerlink accepts the AER's Draft Decision that it will be subject to Version 5 of the STPIS (hereafter referred to as Version 5) during the 2018–22 regulatory period. However, Powerlink has concerns with the AER's Draft Decision adjustments to Powerlink's historical performance under the Market Impact Component (MIC) of the scheme and has provided its response to a number of other detailed matters. These are outlined below.

Service Component (SC)

Powerlink accepts the AER's Draft Decision on the performance target, cap and floor values for the SC, which were consistent with Powerlink's Revenue Proposal. In its Draft Decision, the AER also verified that the methodology and proposed values for the SC were appropriate and complied with the requirements of Version 5[19].

Market Impact Component

The AER's Draft Decision noted that Powerlink's proposed methodology for calculating the performance target for the MIC was consistent with the requirements of Version 5. However, the AER also made some adjustments to Powerlink's performance history.

Powerlink accepts most of the adjustments made in the AER's Draft Decision[20] with the exception of the two matters set out below.

[18] Efficiency Benefit Sharing Scheme for Electricity Network Service Providers, AER, November 2013.

[19] Powerlink transmission draft determination 2017–22, Attachment 11 (Service target performance incentive scheme), AER, pp.11, 12.

[20] Powerlink accepts the AER's Draft Decision adjustments for the removal of 38 counts associated with generator constraints in 2015, the removal of one count in 2009 and 2010, the inclusion of one count in 2009, and the re-classification of 57 counts in 2010 to unplanned outages.

- Classification of the one count attributed as a planned outage

Powerlink does not accept the AER's draft position to adjust the classification of one count in 2011.

Prior to lodging its Revenue Proposal, Powerlink sought clarification from the AER regarding the definition of unplanned outages[21] as the term is not defined in the MIC sections of Version 5[22]. In response to Powerlink's request, the AER explained that unplanned outages are those which are taken with less than 24 hours' notice to AEMO.

Following its review of the AER's Draft Decision[23], Powerlink sought and obtained verification from the Australian Energy Market Operator (AEMO) that the outage on the Braemar Static VAr Compensator (SVC) on 27 October 2011 was submitted to AEMO with less than 24 hours' notice. The confirmation from AEMO is included as confidential Appendix 3.01. In light of AEMO's confirmation, Powerlink proposes that the AER reconsider its draft position on this single count in 2011 and instead, classify it as an unplanned outage and include it in the calculation of Powerlink's MIC performance target for the next regulatory period in its Final Decision.

- Removal of 100 counts related to planned network outages associated with affected generators

Powerlink does not accept the AER's Draft Decision to remove 99 counts in 2012 associated with the constraints Q_CPSA_44 and Q_CPSA_72 and one count in 2015 associated with Q_STSTN_863 from Powerlink's performance history.

In its Draft Decision, the AER stated that the counts were previously excluded from Powerlink's performance under Version 3 of the scheme and that nothing had changed with the MIC since then that would warrant any different treatment for these counts[24].

Powerlink reviewed Appendix C of Version 5 and concluded that none of the available exclusion clauses apply to the 99 counts in 2012 and one count in 2015[25]. However, Powerlink notes that the AER's Version 4 MIC Reference Guide[26] lists the following Scenario 16 and states that the outcome of the scenario should be included in Transmission Network Service Provider's (TNSP's) performance history for the purposes of calculating the MIC performance target.

Scenario	Description	Outcome	Rationale
Third party outage (Third parties include generators, large customers and DNSPs, exclude TNSPs that are subject to the scheme)			
16	TNSP initiate a planned outage of prescribed assets. This required unit1 to be offline.	All binding constraints related to the outage to be included as part of TNSP's performance count including unit1 <= 0 constraints.	The marginal cost of generator constraint reflects the impact of the outage to the market and is included as part of the scheme.

Source: AER Market Impact Component scenario Reference Guide (Version 4 STPIS), December 2013

Powerlink considers that the 99 counts in 2012 and one count in 2015 fit in this scenario as:

- Powerlink initiated the outages on prescribed assets, that were predominantly for the extension of the prescribed transmission network; and
- the outages required a power station unit to be offline.

21 AER Response to Powerlink request for clarifications regarding Final V5 STPIS, AER and Powerlink, November 2015.

22 Final STPIS Version 5 (corrected), AER, October 2015, Chapter 4, Appendix C Market Impact Component – Definition, Appendix F Market Impact Component – Application.

23 Powerlink transmission draft determination 2017–22, Attachment 11 (Service target performance incentive scheme), AER, p.16.

24 Ibid.

25 Powerlink notes that following the release of Version 5 and prior to submitting its Revenue Proposal it sought clarification from the AER regarding the treatment of third party outages (ref. November 2015, Reference 6). From this process, Powerlink concluded that none of the available exclusion clauses in Appendix C of Version 5 were applicable to the 99 counts in 2012 and one count in 2015, as the constraints were not initiated or caused by a third party, not for network support agreements, temporary configurations with notice to the AER, ramp constraints, or outages on a connection where a lower service standard has been negotiated.

26 Market Impact Component scenario reference guide (Version 4 STPIS), AER, December 2013, section A.2 scenario 16.

Powerlink considers that this scenario addresses the specific circumstances of the 99 counts in 2012 and one count in 2015. This reflects what appears to be a deliberate change in the AER's approach from Version 3, contrary to the AER's Draft Decision. Therefore Powerlink considers that these counts should be included in its performance history for the purposes of calculating the MIC performance target for the 2018-22 regulatory period.

Calculation of Revised MIC Values

Consistent with the Version 5 requirements, Powerlink has revised the MIC values set out in the AER's Draft Decision to include the counts discussed above in its performance history, which is shown in Table 3.4.

Table 3.4: MIC – Revised Raw Historic Performance

	2009	2010	2011	2012	2013	2014	2015
Planned Outage Events	70	1,320	36	105	81	3,936	27
Unplanned Outage Events	73	84	1	0	16	5	1
Total for the year	143	1,404	37	105	97	*3,941	*28

* The maximum and minimum counts.

Consistent with Version 5, Powerlink has excluded the years containing the maximum and minimum Dispatch Interval (DI) counts from its performance history and calculated the raw performance target as the average of the median five out of seven preceding calendar years[27]. The raw unplanned outage event limit was calculated as 17% of the raw performance target[28]. The calculated raw performance target and raw unplanned outage event limit are set out in Table 3.5.

Table 3.5: MIC – Revised Raw Performance Target and Unplanned Outage Event Limit

Raw Performance Target	Raw Unplanned Outage Event Limit
357	61

Version 5 provides for unplanned outage events for the preceding seven calendar years to be adjusted so that the contribution of MIC counts attributed to unplanned outage events in each year does not exceed the raw unplanned outage event limit[29]. The adjusted historical performance history is shown in Table 3.6.

Table 3.6: MIC – Revised Adjusted Historic Performance

	2009	2010	2011	2012	2013	2014	2015
Planned Outage Events	70	1,320	36	105	81	3,936	27
Unplanned Outage Events (17% cap applied)	**61	**61	1	0	16	5	1
Total for the year	132	1,381	37	105	97	*3,941	*28

* The maximum and minimum counts.

** Capped number of unplanned outage events.

[27] Consistent with clause 4.2(f)(1) of Version 5.

[28] Consistent with clause 4.2(f)(2) of Version 5.

[29] Consistent with clause 4.2(f)(3) of Version 5.

To calculate the adjusted performance target, Powerlink excluded the maximum and minimum DI counts from its 2014 and 2015 performance history then determined the average of the median five out of seven preceding calendar years[30]. The adjusted unplanned outage event limit was calculated as 17% of the adjusted performance target[31]. This information is shown in Table 3.6.

These calculations result in a change in Powerlink's performance target from its Revenue Proposal of 361 Dispatch Intervals, to 350 Dispatch Intervals in this Revised Revenue Proposal.

As required, the Dollar per Dispatch Interval amount was calculated using 1% of the MAR in the first year of Powerlink's 2018–22 regulatory period[32].

A summary of Powerlink's Revised Revenue Proposal values for the MIC of the STPIS is shown in Table 3.7.

Table 3.7: Powerlink's Revised MIC STPIS Values

	Performance Target	Unplanned Outage Event Limit	Dollar per Dispatch Interval Incentive
Market Impact Component	350	60	*$20,444

* Based on the revised MAR for the first year of the 2018–22 regulatory period.

Network Capability Component (NCC)

Powerlink has provided its response to a number of specific NCC matters.

- Increase the design temperature of two 275kV transmission lines

Powerlink accepts the AER's Draft Decision to allow this priority project.

In preparing its Revised Revenue Proposal, Powerlink reviewed this project to determine whether any new information had become available that would materially impact the information put forward in its Revenue Proposal. In light of further details regarding work practices to implement the project, Powerlink has updated the estimated cost and consequential pay-back period, as shown in Table 3.8.

Table 3.8: Powerlink's Revised NCC Priority Project Detail for Increased design temperature of Bouldercombe to Raglan and Larcom Creek to Calliope River 275kV transmission lines

Project	Revenue Proposal	Revised Revenue Proposal
Operating cost	$506k (real, 2016/17)	$606k (real, 2016/17)
Pay-back period	3.5 years	4.1 years

Powerlink provided information about the scope and cost of this project in response to an information request during the AER's review of its Revenue Proposal. Updated project information which outlines the reasons for the change in project cost is included in Appendix 3.02 of this Revised Revenue Proposal.

As provided for within Version 5, Powerlink will review, monitor and update its assessment of the need for and other associated details of this project prior to its proposed commencement in 2017, including the value of its market benefit. Among other things, this may include information relating to the latest profiles of power flows from Queensland's power system operation and outcomes from implementation of a standardised TNSP ratings methodology which Powerlink is currently reviewing.

[30] Consistent with clause 4.2(f) (4) of Version 5.

[31] Consistent with clause 4.2(h) of Version 5.

[32] Consistent with clause 4.2(j) of Version 5.

- Greenbank System Integrity Protection Scheme (SIPS) priority project

Powerlink accepts the AER's Draft Decision to exclude the Greenbank SIPS priority project from the NCC. Powerlink will consider the project in line with its normal works program.

- Load Model Enhancements and Validation

Powerlink accepts the AER's Draft Decision to exclude the Load Model Enhancements priority project from the NCC. However, Powerlink has taken this opportunity to respond to two matters raised in the AER's Draft Decision commentary on this project.

First, the AER rejected this project on the grounds that it was not fit-for-purpose for the Network Capability Incentive Parameter Action Plan (NCIPAP), nor were its benefits known. For the reasons outlined in its Revenue Proposal, Powerlink remains of the view that the project is suitable as a NCIPAP project. In terms of quantifying the benefits for an exploratory project such as this, Powerlink notes that such a definitive requirement is not reflected in the AER's Explanatory Statement[33]:

> *Exploratory projects can be approved as priority projects under the NCC provided that it can be shown that they results in a material benefit. While our preference is for projects to be quantified, we recognise that there are classes of projects which are difficult to quantify but which may be beneficial to undertake. Such projects may be justified on a qualitative basis and they would not be likely be ranked higher projects with quantifiable benefits.*

Powerlink is concerned with the definitive approach taken in the AER's Draft Decision, despite the expectation of flexibility created in statements such as that identified above.

Second, in its Draft Decision, the AER described Powerlink's existing load models as outdated and inferred (presumably from Powerlink's supporting project information) that they would lead to suboptimal reinvestment decisions. In doing so, the AER also claimed that "unlike Powerlink's proposal, ElectraNet's project sought to enhance an existing up-to-date model"[34].

For clarification, Powerlink's existing static load model has the same structure as the model used by ElectraNet for its system analysis (large and small disturbance analysis). Powerlink's proposed priority project involved enhancements to this model to develop a more physically based dynamic load model[35]. Powerlink considers that a model of this nature can predict the susceptibility of customer and consumer load to local transient voltage instability, which may be increasingly important in the context of future network requirements.

As Powerlink considers that the development of a physically based dynamic load model will provide significant benefits to the market, it plans to install the required equipment as part of normal business practice.

- Disproportionate incentive arrangement under the NCC component of Version 5

Prior to finalisation of the AER's Version 5 scheme, Powerlink raised its concern with the AER that the NCC incentive arrangements were materially disproportionate. In fact, Powerlink questioned whether the AER had made an error in its drafting of the final scheme. Specifically, while the incentive is 1.5 times the *total project cost*, the potential penalty is up to 3.5% of a TNSP's *MAR*. Based on the single NCC priority project approved in the AER's Draft Decision, this would equate to an incentive of $0.9m and a potential penalty of $27.2m.

Given its concern with the imbalance identified above, and the objective of the scheme to create incentives for TNSPs to respond, Powerlink considers that that the AER should have regard to the circumstances when assessing whether such a significant penalty should apply.

3.8 Pricing Methodology

In its Draft Decision the AER did not approve Powerlink's proposed Pricing Methodology for the 2018–22 regulatory period on the basis that one of three aspects of the proposed changes does not give effect to the pricing principles in the Rules. The AER accepted all other changes proposed by Powerlink.

[33] Explanatory statement STPIS Version 5, AER, September 2015, p.37.

[34] Powerlink transmission draft determination 2017–22, Attachment 11 (Service target performance incentive scheme), AER, p.19.

[35] A physically based dynamic load model has components that represent the motor load, distributed PV, lighting and other load components as required (including an equivalent distribution system impedance) such that the composite model can best comply with the actual aggregate load performance for a range of system disturbances.

Powerlink does not agree with the AER's assessment of this one aspect of its proposed Pricing Methodology which related to setting interim locational prices. Powerlink's response to this matter is provided below.

3.8.1 Interim Locational Prices

In its Draft Decision, the AER's reasoning for not approving Powerlink's proposed minor amendments to Section 6.12 of its proposed Pricing Methodology was, in effect, that it would allow Powerlink to potentially circumvent requirements in the Rules that require:

- locational prices to be side constrained; and
- the AER's approval where load at a connection point had materially changed.

Based on this reasoning, Powerlink considers that the AER has either misinterpreted or misunderstood the nature of the proposed amendments.

Powerlink's discussions with the AER on this matter since release of the Draft Decision indicated that the AER appears to have misunderstood how these aspects of transmission pricing arrangements operate in practice. Powerlink also learned that the AER's concerns were not necessarily with the specific minor editorial amendments put forward in Powerlink's proposed Pricing Methodology. Instead, the proposed amendments provided an opportunity for the AER to review this currently approved section of the methodology in the broader context of how interim locational prices were established. It is this latter context, which appeared to be the real basis for the AER's rejection of Powerlink's proposed minor amendments, based on its view of how the Rules were given effect in practice.

To assist the AER, Powerlink provided further information to clarify the intent of Powerlink's amendments and how these sections of the Rules operate in practice, namely that:

- for a new connection point at a new point on the shared network, an interim locational price is established that would not be subject to the side constraint[36]. From a practical perspective, the side constraint cannot be applied to a locational price that did not exist at the time prescribed transmission prices were established for the relevant financial year; and
- at an existing connection point, where a customer's load had changed significantly between annual TUOS price publications, relevant Rules provisions[37] in relation to AER approval would apply.

Powerlink has provided a Revised Pricing Methodology with its Revised Revenue Proposal (Appendix 3.03) which Powerlink considers meets the requirements of the Rules. The revisions to Section 6.12 clarify that an interim locational TUOS price not subject to the side constraint will only apply where a previously calculated and published TUOS locational price does not exist. The Revised Pricing Methodology shows tracked changes for section 6.12 only, as all other proposed changes were accepted by the AER in its Draft Decision.

3.9 Negotiating Framework

In its Draft Decision the AER approved Powerlink's proposed Negotiating Framework for Negotiated Transmission Services for the 2018–22 regulatory period as lodged.

Powerlink accepts the AER's Draft Decision. For the purposes of its Revised Revenue Proposal, Powerlink refers the AER to its proposed Negotiating Framework lodged as part of its Revenue Proposal. No new document is provided herein.

3.10 Update on placeholder established in Revenue Proposal

In its Revenue Proposal, Powerlink flagged that it was investigating two issues that had the potential to impacts its Revised Revenue Proposal:

[36] National Electricity Rules, AEMC, clause 6A.23.4(b)(2).

[37] Ibid, clause 6A.23(b)(3).

- Powerlink noted that it was currently investigating a number of matters that may result in a requirement to make some adjustments to the RAB, for example, as part of the Queensland Government's strategic alignment review; and
- Powerlink raised the potential for acquiring additional responsibilities from the Queensland Government's strategic alignment review of its future business direction.

Powerlink has completed these investigations and confirms that there is no requirement for any adjustments to its Revised Revenue Proposal related to these matters for the 2018–22 regulatory period.

4. Forecast capital expenditure

4.1 Introduction

This chapter provides Powerlink's response to the AER's Draft Decision on forecast capital expenditure and sets out the basis of Powerlink's revised forecast capital expenditure.

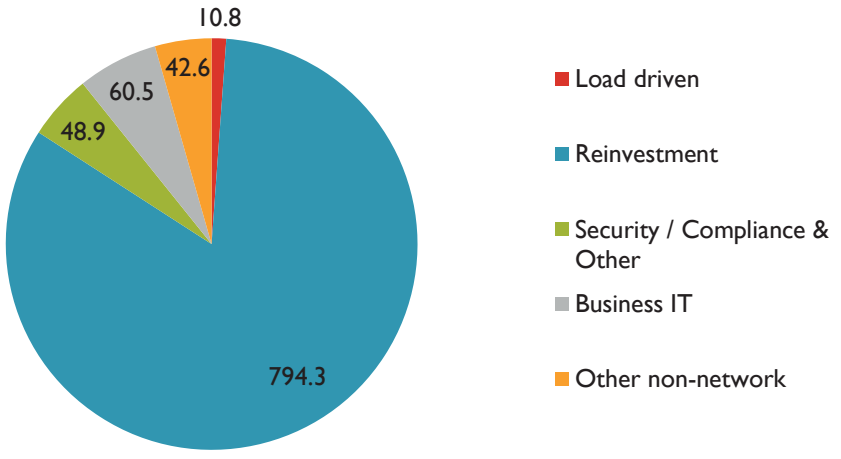
Key highlights

- Powerlink has continued to use its hybrid forecasting methodology which the AER has accepted in its Draft Decision as being generally reasonable.
- Powerlink does not accept the AER's Draft Decision for reinvestment capital expenditure and considers the AER's assessment approach and conclusions result in mean replacement lives for assets that are unrealistic. Powerlink accepts the AER's Draft Decision for other categories of capital expenditure.
- Powerlink has forecast revised total capital expenditure for the 2018–22 regulatory period of $886.3m. This is $70.8m (or 7.4%) lower than the $957.1m total capital expenditure in Powerlink's Revenue Proposal. It is based on updated inputs used by Powerlink's forecasting methodology to reflect Powerlink's current asset management strategies and forecast plans.
- Powerlink accepts the AER's Draft Decision to exclude the North West Surat Basin contingent project but does not accept the Draft Decision to exclude the Southern Galilee Basin contingent project. Powerlink has proposed an additional contingent project to support a proposed new Queensland to South Australia Interconnection.

4.2 Powerlink's Revenue Proposal

Powerlink's Revenue Proposal included forecast capital expenditure during the 2018–22 regulatory period of $957.1m. At the time of submission this was expected to be $423.9m or 31% lower than actual capital expenditure in the 2013–17 regulatory period. The breakdown of Powerlink's forecast capital expenditure is shown in Figure 4.1.

Figure 4.1: Breakdown of forecast capital expenditure ($m, 2016/17)



Source: Powerlink data

In developing its capital expenditure forecasts Powerlink adopted a hybrid forecasting methodology that uses a mix of top-down and bottom-up forecasting techniques. Load driven capital expenditure, which includes shared network augmentations, connections to distribution networks, and easement and land acquisitions, has been forecast on a bottom-up basis from cost estimates for individual projects using Powerlink's standard project estimating processes.

Non-load driven capital expenditure has been predominantly forecast using top-down forecasting techniques, but with some future expenditure forecasts based on individual cost estimates. The major part of this expenditure has been forecast using an enhanced version of the AER's Repex Model, as well as trend analysis techniques similar to the AER's base-step-trend approach.

In developing the Repex Model as a suitable tool for forecasting a business' capital expenditure requirements Powerlink devoted considerable time and effort to ensure the input parameters properly reflect Powerlink's condition drivers and asset management practices. Specific areas of focus have been:

- Asset population and age profile – As part of its normal asset management planning processes Powerlink has identified a number of existing assets that are unlikely to be required to be replaced once they reach their technical end-of-life. This is due to the current environment of little or no growth in network demand and the historical network development. To reflect this Powerlink removed assets identified as having no enduring need, including around 10% of the existing fleet of steel transmission towers;
- Historical asset replacement quantities – Powerlink has recognised that some drivers of historical asset replacement were not based on the condition of the assets being replaced, for example limitations due to the fault rating of the equipment. Powerlink removed historical asset replacement quantities that were not primarily condition based; and
- Corrosion zone modelling – Powerlink segmented the transmission tower population into different zones to allow for different replacement lives based on the dominant driver of asset condition, being the rate of degradation of the protective galvanizing on steel bolts and members. This ensures an appropriate spread of transmission tower replacement lives that genuinely reflect their operating environment and observed condition.

4.3 AER's assessment

This section provides a summary of the approach the AER took to assessing the forecast capital expenditure in Powerlink's Revenue Proposal. Powerlink's detailed response to the AER's assessment is set out Section 4.7 below.

In June 2015 the AER published its Final Framework and Approach for Powerlink for the 2018–22 regulatory period. In the Final Framework and Approach paper the AER stated it would apply its Expenditure Forecast Assessment (EFA) Guideline in assessing Powerlink's capital expenditure forecasts. In the Draft Decision the AER has adopted the approach set out in the EFA Guideline.

The EFA Guideline describes the range of techniques the AER may apply when assessing expenditure forecasts. To assess Powerlink's proposed forecast capital expenditure the AER has applied three of these techniques:

- Economic benchmarking;
- Trend analysis; and
- Methodology review.

4.3.1 Economic benchmarking

The AER considers that economic benchmarking can give an indication of how each TNSPs efficiency has changed over time, but also concludes that benchmarking is not currently robust enough to draw conclusions about relative efficiency. In considering Powerlink's efficiency over time the AER has focused on multilateral total factor productivity (MTFP) performance from the AER's annual benchmarking reports. The AER states that "these results show that Powerlink's cost efficiency has decreased slightly since 2012"[38].

However, MTFP inherently tries to measure relative efficiency between TNSPs, not the efficiency of a single TNSP over time. If a single TNSP dramatically improves over time the MTFP measure will show all other TNSPs performance decreasing[39], even though they may well be improving relative to their own previous performance.

[38] Powerlink transmission draft determination 2017–22, Attachment 6 (Capital expenditure), AER, p.23.

[39] MTFP measures each TNSPs performance relative to a hypothetical average TNSP.

Notwithstanding these observations, the AER has not relied on these benchmarking metrics other than to note that they generally support the outcomes of the AER's other assessment techniques.

4.3.2 Trend analysis

The AER has considered trends in capital expenditure across a range of levels, including the total level of expenditure, expenditure for reinvestment and non-network, and categories of expenditure within reinvestment and non-network. In assessing trends the AER seems to have focused on the historical level of expenditure, which captures both the quantity of assets requiring reinvestment and the solution that was adopted at the time of the reinvestment decision.

In an environment where there were previously high rates of demand growth and reasonable expectations of continuing growth reinvestment solutions were adopted that reflected that environment. That is, the prudent and efficient solutions adopted by Powerlink at that time included some ability to accommodate the expected future growth and this is reflected in the levels of expenditure. More recently there have still been similar levels of condition based triggers for reinvestment but the efficient solutions adopted by Powerlink reflect the current expectations of little or no demand growth.

Powerlink considers that the AER may have misinterpreted the expenditure trends and attributed them to changes in how Powerlink manages its assets through their life. However Powerlink has not made any appreciable recent changes to how assets are managed through their life. What has changed substantially in recent years is the nature of the solution to be adopted for reinvestment decisions made when the assets reach their end-of-life. This is discussed further in Section 4.7.1 below.

4.3.3 Methodology review

The AER has reviewed the methodology that Powerlink has used to determine its capital expenditure forecasts, including assumptions, inputs and models. In this respect the AER focused on reviewing a sample of historical replacement projects whose asset replacement quantities contributed to the inputs to Powerlink's Repex Model. This was done to test the validity of the assumption that Powerlink's historical practices represented prudent and efficient asset replacement decisions.

Similar to expenditure trend analysis it is important to recognise that these historical reinvestment decisions were often made in an environment of high rates of demand growth and an expectation that this growth would continue. Where the nature of the historical solution selected for a reinvestment decision would not be appropriate in the current environment Powerlink has reduced the inputs to the Repex Model in its Revenue Proposal and Revised Revenue Proposal to reflect this. This is discussed further in sections 4.6.3 and 4.7.2 below.

4.4 AER's Draft Decision

The AER's Draft Decision is to not accept Powerlink's total forecast capital expenditure of $957.1m and to substitute a forecast of $772.6m, a reduction of $184.5m or 19.3%. All of this reduction is in reinvestment capital expenditure.

The AER has accepted Powerlink's capital expenditure forecasts for each of the Augmentations, Connections, Easements, Security/compliance, Other, Business IT and Support the business categories. The AER has also accepted Powerlink's proposed unit costs and made no adjustments to the proposed real cost escalators.

Within the Reinvestment category of capital expenditure the AER has also accepted those aspects of Powerlink's capital expenditure that have been forecast on a bottom up basis or using trend analysis. This includes power transformer replacements, EMS replacement and other minor asset replacements.

The AER's Draft Decision made significant changes to the mean replacement lives in the Repex Model for a number of asset categories. These changes reduced the forecast capital expenditure from the Repex Model by 39%. As an offset to this significant reduction the AER has allowed an additional amount equal to 15% of Powerlink's Revenue Proposal forecast for those asset categories the AER has adjusted. This offset is to provide for additional preventative and corrective asset reinvestment.

The AER's Draft Decision on Contingent Projects, and Powerlink's response to the Draft Decision, are set out in Section 4.11 below.

4.5 Response to Draft Decision

4.5.1 Overall position

Powerlink accepts the AER's Draft Decision for load driven capital expenditure. This included $3.1m for augmentations, $0.0m for connections and $7.7m for easements. Powerlink has reviewed the load driven capital expenditure forecast in light of the 2016 demand forecasts and is satisfied that no change in forecast expenditure is required in this Revised Revenue Proposal.

Powerlink accepts the AER's Draft Decision for Security/compliance and Other non-load driven capital expenditure. These categories comprised $18.8m for Security/compliance and $30.1m for other non-load driven. Powerlink notes the AER's reservations regarding the proposed Wide Area Network telecommunications project and has provided updated information as part of this Revised Revenue Proposal. This is discussed further in Section 4.12.2.

Powerlink accepts the AER's Draft Decision for non-network capital expenditure. This included $60.5m for business IT, $24.5m for commercial buildings, $12.9m (net of disposals) for motor vehicles and $5.3m for tools and equipment.

Powerlink accepts the AER's Draft Decision for real cost escalators and unit costs.

Powerlink does not accept the AER's Draft Decision for reinvestment capital expenditure. Powerlink considers the Draft Decision is based on an incorrect understanding of Powerlink's repex modelling methodology and the AER's alternative forecast is insufficient to enable Powerlink to meet the capital expenditure objectives set out in the Rules.

4.5.2 Reinvestment capital expenditure

This section, together with sections 4.6 and 4.7 below, set out Powerlink's response to the AER's Draft Decision for those areas where Powerlink does not agree with the AER's draft positions, or disagrees with the information which the AER has used to inform its draft positions.

Powerlink does not agree with the AER's assessment of Powerlink's reinvestment capital expenditure. This includes the assessment techniques the AER has applied to form an alternative estimate of the capital expenditure required to reflect the capital expenditure criteria, as well as the manner in which the AER has interpreted and modified Powerlink's Repex Model. It also extends to how the AER has assessed the likely future impact of these adjustments using indirect indicators of network performance.

Specific areas of concern include:

- Trend analysis – the AER appears to have focused primarily on the level of expenditure and not on the quantity of asset reinvestments, both historical and forecast. Historical expenditure captures both the need for a reinvestment as well as the solution that was adopted.
- Calibration of the Repex Model – the AER and their consultants, Energy Market Consulting associates (EMCa), have erred in their assessment that Powerlink's calibration of the Repex Model uses actual historical replacement quantities.
- Mean replacement lives – the AER and EMCa have erred in their assessment of the calibrated mean replacement lives used in the Repex Model by assuming an observed replacement age for an existing asset is reflective of the mean replacement age of an entire population of new assets. This ignores the conditional probability analysis that is necessary when there is an existing population of similar assets, but all of different ages, and which is a fundamental basis of the proper application of the Repex Model.
- 15% offset – this item appears to be an arbitrary adjustment to correct for the AER's previous errors in the Repex Model. If the AER considers this item to be genuinely directed at extending asset lives by around five to eight years, a new asset class should be created with a similarly short life so that the associated revenue is recognised over an appropriate timeframe.

- Network performance indicators – the AER has not properly considered the impact of its Draft Decision on future network performance. Instead, where the AER has used indirect metrics based on RIN data to assess future network performance it appears to have inadvertently used data from another TNSP, rather than Powerlink's RIN data.

Further detail on these concerns is set out in the following sections.

4.6 EMCa Reports

In reviewing Powerlink's capital expenditure forecasts the AER sought advice from EMCa through two reports:

- Review of Forecast Non-load driven capital expenditure in Powerlink's Regulatory Proposal, Report to AER from EMCa, July 2016 (the first report). This report focused on the governance, management and forecasting processes of a sample of projects and programs; and
- Review of Forecast Non-load driven capital expenditure in Powerlink's Regulatory Proposal, Addendum Report to AER from EMCa, September 2016 (the addendum report). This report focused on technical advice to assist the AER with determining a reasonable allowance for Powerlink's replacement capital expenditure.

Powerlink has identified several issues and concerns with these two reports and their consequent influence on the AER's Draft Decision. These are:

- Significant inconsistencies in EMCa's assessment of the mean replacement lives between the first report and the addendum report;
- Over-reliance on historical expenditure trends as a basis for concluding the inputs to the Repex Model do not represent efficient replacement; and
- Lack of consideration given to the adjustments made from actual historical reinvestment quantities as input to the Repex Model.

4.6.1 Inconsistency between the first report and the addendum report

In Section 4 of the first report EMCa set out their assessment of Powerlink's repex forecasting methodology. Several pages were devoted to consideration of the mean replacement lives derived through the calibration model. For each of the major asset categories (transmission towers, substation switchgear and secondary systems) EMCa was satisfied that the lives produced by the Powerlink modelling were reasonable and were consistent with what EMCa had observed for other TNSPs.

In relation to transmission towers EMCa stated:

> *"The asset replacement ages are within a broad range of those that we have observed in other TNSP reviews."* [40]

For substation switchgear EMCa stated:

> *"… the expected lives of assets are broadly similar to those that we have seen in other TNSPs. Whilst CTs and VTs included in substation assets may have longer survival rates, these are normally replaced with other substation assets such as circuit breakers and therefore their lives are linked to these assets. Thirty-five years for a CB is not unreasonable and is consistent with what we have seen in other TNSPs."*[41]

EMCa also considered Powerlink's responses to the issues that had been raised by Nuttall Consulting, who had reviewed Powerlink's Repex Model methodology prior to Powerlink submitting its Revenue Proposal.

In relation to transmission towers EMCa concluded that:

> *"… Powerlink has addressed the Nuttall Consulting concern by calibrating each corrosion zone independently. We consider this to be an appropriate action to address this concern."*[42]

[40] Review of Forecast Non-load driven capital expenditure, EMCa, July 2016, p33.

[41] Ibid, p35.

[42] Ibid, p37.

For secondary systems:

> *"The post revision results support Powerlink's proposition that use of a single mean life is appropriate. Based on the information provided by Powerlink we consider that this position is reasonable."*[43]

Finally, in respect to other issues raised by Nuttall Consulting:

> *"We have reviewed Powerlink's advice on how it has addressed each of Nuttall Consulting's issues and we consider it has addressed them adequately."*[44]

While EMCa retained a concern that Powerlink's historical reinvestment had not been demonstrated to be prudent and efficient, they were nevertheless satisfied that the mean replacement lives established by Powerlink were reasonable and consistent with what EMCa had observed with other TNSPs.

After the first report EMCa were then tasked with providing technical advice to assist the AER in determining a reasonable allowance for Powerlink's non-load driven capital expenditure. This advice was the subject of the addendum report.

Despite the quite clear conclusions in the first report that Powerlink's mean replacement lives were reasonable and consistent with other TNSPs, EMCa reached a completely different conclusion only two months later in the addendum report. After reviewing a sample of 18 historical and currently active replacement projects, only 11 of which contributed to the calibration of the Repex Model, EMCa advised the AER to increase the mean replacement lives in the Repex Model by one standard deviation[45]. For the asset categories affected this was an increase in mean replacement life of between 13% and 22%. The AER applied EMCa's advice in the Draft Decision[46]. Powerlink considers these proposed changes to mean replacement lives to be a material shift and has provided a detailed response in Section 4.7.3 below.

4.6.2 Over-reliance on historical expenditure trends

In several sections of the addendum report it appears that EMCa has not fully understood how the inputs to Powerlink's Repex Model have been derived from historical projects. An example of this misunderstanding can be seen in Section 3.3 of the addendum report.

> *"Powerlink advises that it has used actual costs in its repex model after deducting a 9% allowance for the non-condition driven expenditure from the inputs to its repex model."*[47]

This statement was then reflected, in a modified form, in the AER's Draft Decision.

> *"While we found that several of Powerlink's historical repex projects used to calibrate its repex model inputs included expenditure to augment replaced assets, Powerlink advised that it had allowed for this by reducing historical replacement quantities, resulting in a reduction of approximately nine per cent from historical expenditure."*[48]

EMCa suggest that Powerlink deducted 9% from historical expenditure for use in the model while the AER considers that Powerlink adjusted historical quantities which resulted in a 9% reduction in historical expenditure.

Neither of these two interpretations is correct.

The sole use of these historical projects in the Repex Model is to provide the quantity of assets requiring reinvestment used for calibrating the model. The actual expenditure on the project is not used at all in the Repex Model as the unit rates for the forecast are determined separately. Nor does it matter if the historical projects included higher rated replacement components as Powerlink's Repex Model is only concerned with the quantity of assets that are in need of reinvestment.

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43 Ibid, p37.

44 Ibid, p38.

45 Review of Forecast Non-load driven capital expenditure - Addendum Report, EMCa, September 2016, p36.

46 Powerlink transmission draft determination 2017-22, Attachment 6 (Capital expenditure), AER, p48.

47 Review of Forecast Non-load driven capital expenditure - Addendum Report, EMCa, September 2016, p13.

48 Powerlink transmission draft determination 2017-22, Attachment 6 (Capital expenditure), AER, p50.

Powerlink has identified that the likely source of this misunderstanding appears to have arisen from Powerlink's response to an AER information request[49]. The AER requested, for each of the 18 sample projects, that Powerlink provide the project outcomes, including the quantification and explanation of all material variations from the approved business case (scope, cost, schedule). Powerlink's response noted that:

- *"The Repex Model is calibrated based on timing of asset capitalisations, reflecting the actual delivery of project works and any Board or management decision to vary project scope and/or timing.*
- *Unit rates applied in the Repex Model are based on actual project out turn costs derived from the Base Planning Objects maintained in Powerlink's central estimating system.*

In both cases, material variations in scope, cost or timing of project works are captured as inputs to the Repex Model. Powerlink's review of this raw calibration data has also revealed opportunities to reduce historic replacement quantities derived from these projects to ensure only condition driven asset replacements are captured in the Repex Model. Powerlink's modelling indicates these adjustments equate to a reduction of approximately 9% compared to historic reinvestment expenditure."

On reflection, Powerlink can see how EMCa and the AER have formed the view that the actual costs of the historical projects used to calibrate the Powerlink Repex Model have been directly used as part of the forecasting process. The second dot point quoted above should have clarified that the unit rates are derived from the actual materials and labour costs from all Powerlink projects, as reflected in the Base Planning Objects in the central estimating system.

The reference in Powerlink's response to a 9% reduction compared to historical expenditure was based on the following calculation for each type of asset:

*(calibration model replacement quantity – actual replacement quantity) * unit rate*

A more extensive consideration of the use of trend analysis by the AER is set out in Section 4.7.1 below.

4.6.3 Lack of consideration of input adjustments

Related to the above point is Powerlink's concern that EMCa and the AER have not given due consideration to the adjustments that Powerlink made to the inputs to its version of the Repex Model. These adjustments have been made to the raw RIN data to remove replacement quantities for non-condition based drivers, such as replacement due to fault level. For example, after discussing Powerlink's deduction for non-condition driven expenditure in respect of transmission towers, EMCa states that:

"While a deduction for this purpose is an appropriate step, from the information provided we are unable to verify whether the amount is appropriate nor were we able to verify how the deduction had been applied."[50]

Despite admitting that it had been unable to verify the amount or how it had been applied, EMCa nevertheless concluded that:

"Notwithstanding adjustments Powerlink advises it has made to its repex model, the inputs it has used are conservatively biased towards shorter asset replacement lives than Powerlink has actually obtained ..."[51]

Similarly for substation switchgear:

"Powerlink advises that it has removed load-driven expenditure from its inputs to the repex model. This is an appropriate step, however the accuracy to which this has been done has not been verified by EMCa as part of this review."[52]

This lack of appropriate consideration and assessment of Powerlink's adjustments to the Repex Model input data are then reflected in the AER's Draft Decision. The AER's assessment draws heavily on EMCa's advice and is summarised in a single paragraph:

[49] Powerlink's response PQ0178 (5 August 2016) which is cited by EMCa at p13 of the addendum report.

[50] Review of Forecast Non-load driven capital expenditure - Addendum Report, EMCa, September 2016, p13.

[51] Ibid.

[52] Ibid, p25.

"We recognise that Powerlink has made adjustments to the repex model input data, for example to exclude historical asset replacement quantities not driven by asset condition, and assets for which there is no enduring need. These modifications have reduced Powerlink's forecast repex compared to what the forecast would have been had Powerlink not made these adjustments. Nonetheless, we are not satisfied that these adjustments are likely to correct for the fundamental issues with Powerlink's historical asset maintenance and replacement policies and practices identified by EMCa, or account for the full impact that changes in policy and practice will have on actual work undertaken in the future."[53]

Powerlink provided extensive data with its Revenue Proposal setting out the adjustments that had been made from actual historical quantities to arrive at the final inputs to the Repex Model[54]. This data was also independently reviewed by KPMG prior to submission of the Revenue Proposal. The adjustments that were made as part of the Revenue Proposal are summarised in Table 4.1.

Table 4.1: Adjustments to Repex Model calibration quantities in the Revenue Proposal

Asset category	No. of actual replacements in calibration period	No. of replacements in the calibration volume for Repex Model	Difference (%)
Transmission towers	667	591	-11%
Circuit breakers	162	142	-12%
Isolators/Earth switches	605	518	-14%
VTs	326	276	-15%
CTs	473	383	-19%
Secondary systems	322	312	-3%

The table shows clearly that for most asset categories Powerlink made material reductions from the historic reinvestment quantities to arrive at the inputs used to calibrate the mean replacement lives. However, there is no evidence in the EMCa reports or in the AER's Draft Decision that this data was assessed when considering the prudency and efficiency of the inputs to Powerlink's Repex Model.

4.7 Reinvestment capital expenditure

This section sets out Powerlink's detailed response to its concerns with the AER's approach to assessing Powerlink's proposed reinvestment capital expenditure, as summarised in Section 4.5.2 above.

4.7.1 Trend analysis

The AER conducted a trend analysis of non-load driven capital expenditure to gauge how Powerlink's historical actual non-load driven capital expenditure compares to its expected non-load driven capital expenditure for the 2018–22 regulatory period[55]. In assessing trends the AER seems to have focused on the historical level of expenditure, which captures both the quantity of assets requiring reinvestment and the solution that was adopted at the time of the reinvestment decision. Given that Powerlink's expenditure forecasting methodology is based on a forecast of required quantities of reinvestment, together with forecast unit rates, it is concerning to Powerlink that the AER has focused only on trends in reinvestment expenditure and not had regard to trends in reinvestment quantities.

[53] Powerlink transmission draft determination 2017-22, Attachment 6 (Capital expenditure), AER, p48.

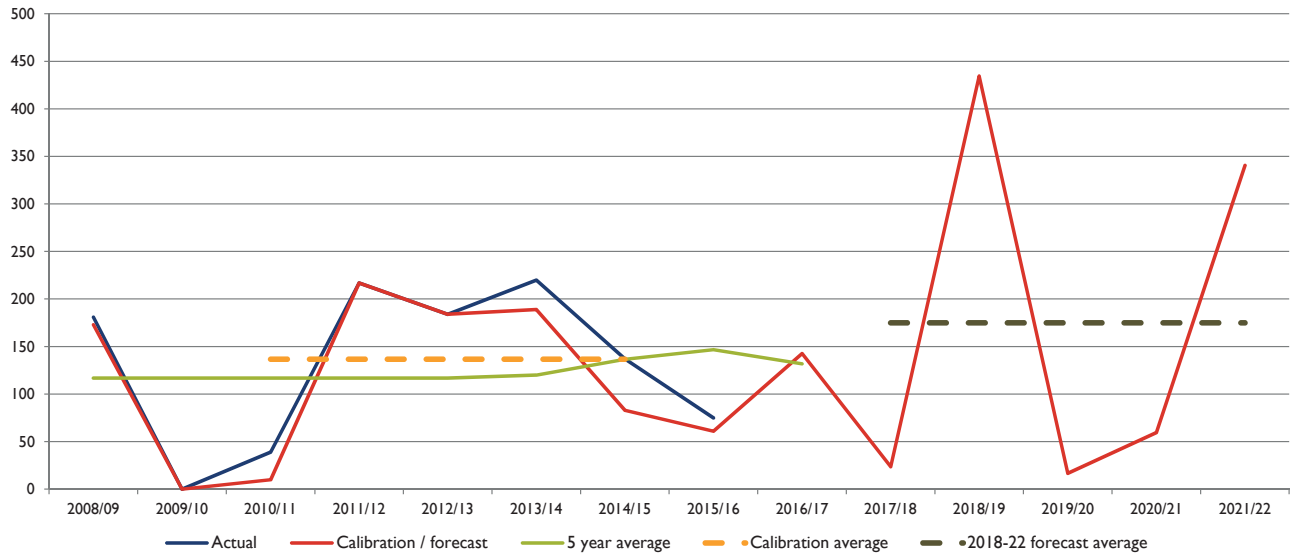
[54] See Powerlink Queensland Revenue Proposal, Appendix 5.05, Tables 6 and 7 together with submitted spreadsheets (Calibration Quantity – 1 – Towers, Calibration Quantity – 2- Switchgear, Calibration Quantity – 3 – Secondary Systems Telecommunications, Calibration Quantity – 4- Buildings Infrastructure).

[55] Powerlink transmission draft determination 2017–22, Attachment 6 (Capital expenditure), AER, p.37.

As noted in Section 4.3.2 above some of Powerlink's historical expenditure within the calibration period of Powerlink's Repex Model included the prudent and efficient reinvestments made in an environment of expected high demand growth. For example, specific reinvestment solutions either incorporated the facilities to support future uprating to provide additional capacity, or were configured so as to manage the expected future increases in fault levels. The cost of these types of solutions was greater than Powerlink would now forecast for a similar quantity of asset reinvestment needs due to the different solutions now being adopted in the context of an environment of little or no demand growth. However, the reinvestment quantity is still prudent and efficient to include in the calibration of Powerlink's Repex Model as the need for the reinvestment was driven by the asset end-of-life which was independent of the reinvestment solution that was historically adopted.

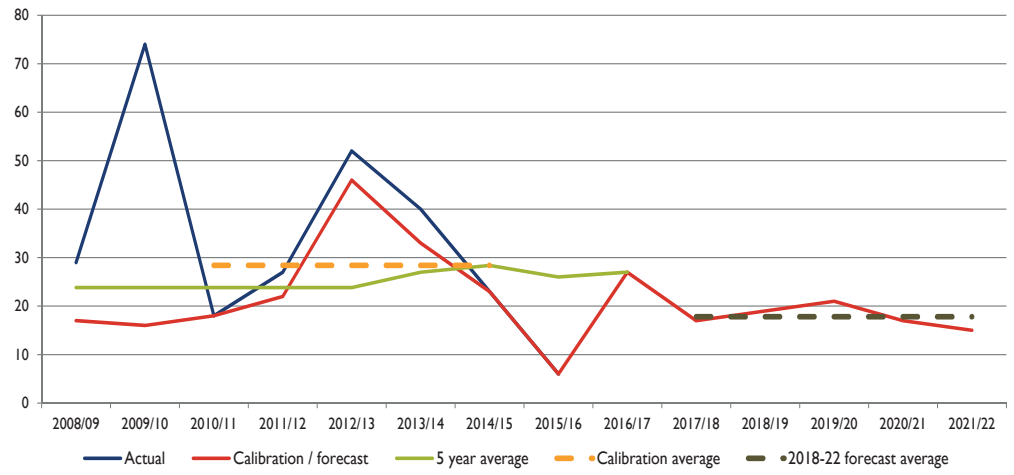
Figures 4.2 to 4.4 show the trends in reinvestment quantities (as commissioned) for major asset categories over time, both historical and forecast. Each figure shows the actual quantity of assets replaced (blue), the quantities used for calibrating the Repex Model together with the forecast quantities in the Revenue Proposal (red), the annual average quantity used for calibrating the Repex Model (orange), a five-year moving average of quantities to the end of the current regulatory period (light green), and the forecast annual average quantity in the Revenue Proposal (dark green).

Figure 4.2: Transmission towers – reinvestment quantities



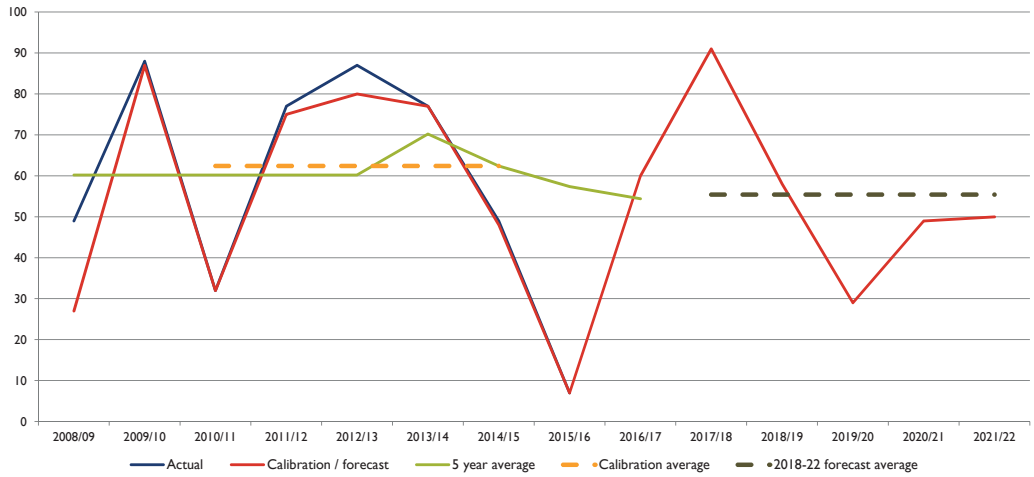
Source: Powerlink data

Figure 4.3: Circuit breakers – reinvestment quantities



Source: Powerlink data

Figure 4.4: Secondary systems – reinvestment quantities



Source: Powerlink data

These figures illustrate the following broad trends regarding Powerlink's management of transmission network assets:

- Transmission towers – Powerlink is currently on the leading edge of required reinvestments in its fleet of 21,000 structures. Given the rapid expansion of the transmission network from the 1960's into the 1970's Powerlink expects the annual quantity of reinvestments in transmission towers to also increase. This is reflected in the forecast reinvestment quantity for the 2018–22 regulatory period being higher than the historical trend. However, this has been offset to some extent by the removal of assets which Powerlink identified as having no enduring need and will not be replaced at their end-of-life. Overall Powerlink identified around 10% of the existing population of transmission towers for future removal and this has reduced the forecast capital expenditure by a similar amount.
- Circuit breakers – During the period of rapid demand growth through the mid-2000's a number of circuit breakers were replaced to manage rising fault levels on the network. But for these earlier interventions, which have been excluded from the Repex Model calibration, much of this equipment would now be approaching the need for reinvestment. As a result the quantity of substation assets forecast to be replaced in the 2018–22 regulatory period is materially lower than even the adjusted historical trend.

- Secondary systems – As these are shorter-lived assets Powerlink is already well established in a cycle of reinvestment in substation secondary systems. The forecast quantity of secondary systems replacements in the 2018–22 regulatory period is around 10% lower than the adjusted historical trend.

Powerlink does not agree with the AER's claim that Powerlink replaced assets earlier than was necessary in some cases unless there were valid reasons to do so, such as replacing circuit breakers in response to rising fault levels[56]. As has been noted previously, Powerlink has not made any appreciable recent changes to how assets are managed through their life. What has changed substantially in recent years is the nature of the solutions that are adopted for reinvestment decisions made when the assets reach their end-of-life. It is the change in approach to the solutions that has been captured in the adjustments that Powerlink has made to the historical replacement quantities and the asset age profile as inputs to its Repex Model. As a result of this approach to the calibration and use of the Repex Model Powerlink considers that the Repex Model forecast represents Powerlink's prudent and efficient reinvestment needs going forward.

This is consistent with the response Powerlink provided to the AER when queried what material changes in asset management strategies or practices occurred over the last 10 years (emphasis added)[57].

> ***The underlying approach to management of transmission assets has therefore been reasonably consistent over the last decade.*** *Changes in the external environment, in particular flat or falling demand growth observed since 2010, have significantly altered the conditions under which the asset management framework is being applied.* ***In the past reinvestment decisions may have been influenced by the capacity of network assets to support existing and future demand growth. This influenced both the investment need (eg. fault level limitations) and the feasibility of potential solutions.***
>
> ***It is for these reasons that Powerlink adjusted both its 2010 to 2015 RIN calibration quantities used in the Repex Model and populations of assets in the forecast model to ensure that forecast reinvestment capital expenditure related only to condition based replacement drivers for assets with a clear enduring need.*** *The Repex Model was adjusted to align with Area Plans documented in Volume 3 of the Asset Management Plan, to align with identified network reconfiguration and asset retirement opportunities.* ***Powerlink's supplementary response PQ0171–1 provided on 2 August 2016 illustrates the effect of these adjustments on reinvestment expenditure forecast in the 2018–22 regulatory period.***

The AER has also expressed concern that Powerlink will underspend its non-load driven capital expenditure forecast in the current regulatory period. The AER considers this suggests a bias towards over-forecasting the scope, timing and cost of work required[58]. Powerlink notes that the mean replacement lives in the Repex Model (and the level of forecast reinvestment expenditure it generates) are based on the quantity of asset reinvestment that actually occurred during the calibration period, not what was forecast at the time of the previous revenue determination. This means the basis for the reinvestment forecast in the 2018–22 regulatory period is independent of previous forecasting practices and takes into account the significant change in demand forecast outlook and operating environment. Powerlink considers this substantially addresses the AER's concerns regarding forecasting bias, as forecast reinvestment for the 2018–22 regulatory period is directly linked to the level of management restraint applied to actual reinvestment decisions in the current regulatory period.

4.7.2 Calibration of the Repex Model

At various places in the Draft Decision the AER has stated that Powerlink used actual historical replacement volumes to calibrate the Repex Model[59]. These statements are incorrect and do not reflect how Powerlink approached the task of calibrating the Repex Model. As was stated several times in Powerlink's Revenue Proposal[60] the historical replacement volumes were adjusted to ensure that any assets replaced due to non-condition based drivers (such as fault level uprating) were removed from the modelling calibration. Powerlink also provided detailed spreadsheet workbooks that demonstrated the adjustments that had been made from the replacement quantities reported in the annual RINs.

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56 Ibid, p.9.

57 Powerlink, Response to AER information request #017 – part 2, 9 August 2016, p2.

58 Powerlink transmission draft determination 2017–22, Attachment 6 (Capital expenditure), AER, p.39.

59 Ibid, p.37, p.43, p.47.

60 Powerlink Queensland Revenue Proposal, p56; Appendix 5.01, p7; Appendix 5.05, p iv, p22–26.

Powerlink is concerned that the AER's view that actual historical replacement volumes have been used for calibration, taken together with EMCa's view that some of Powerlink's historical replacement practices may have been inefficient, has led the AER to incorrectly assess the inputs used for Powerlink's forecast capital expenditure.

While the AER did acknowledge that Powerlink had made adjustments to the Repex Model inputs[61] it does not appear that a proper assessment has been made of whether or not these adjustments accommodated any or all of the views expressed by EMCa. There is no evidence presented in the AER's Draft Decision or supporting EMCa reports to support the AER's view that the adjustments made by Powerlink are insufficient to provide a reasonable forecast.

4.7.3 Mean replacement lives

Powerlink has significant concerns with the approach the AER has adopted in assessing the mean replacement lives derived through the calibration of the Repex Model. The AER's Draft Decision appears to have been heavily influenced by the advice received from EMCa which reviewed a sample of 18 historical reinvestment projects. It is worth noting at the outset that of these 18 sample projects reviewed by EMCa only 11 of these contributed asset quantities to the calibration of Powerlink's Repex Model. The remaining seven projects have all been approved and commenced but they are all targeted for completion in the future and so have not contributed to the calibration of Powerlink's Repex Model.

The basis for the AER's Draft Decision to extend the mean replacement lives by one standard deviation is their observation that for the sample projects the actual age of assets at replacement is greater than the mean replacement lives calibrated in the Repex Model. Powerlink considers that this approach is incorrect in that it assumes that the actual replacement age of a sample of a population of assets is equivalent to the mean replacement life across an entire population of new assets. The AER's Repex Model Handbook provides a similar note of caution when it states:

> *"The important point in this process is that, given we have an age profile that reflects the ages of the assets at a specific point in time; we know that some assets already have survived to a given age. Therefore the unconditional probability function needs to be transformed into a "conditional' probability function."*[62]

Independent Advice

Powerlink engaged Nuttall Consulting to review the AER's Draft Decision assessment in arriving at extended mean replacement lives. Nuttall Consulting originally developed the Repex Model for the AER and have previously advised the AER on the application of the Repex Model in reviews of other network business' Revenue Proposals. Nuttall Consulting also reviewed Powerlink's top-down forecasting methodologies as part of Powerlink's Revenue Proposal. In the opinion of Nuttall Consulting:

> *"It is not appropriate to use only actual ages, as the AER and EMCa have, to estimate the mean life of the asset population. This method can be very biased as it does not allow for the assets that have survived and the effect this information will have on the estimate of the mean life."*[63]

and

> *"My analysis indicates a greater level of consistency between the ages of actual replacements and what the model predicts via Powerlink's calibrated lives than suggested by EMCa and the AER. In my view, both EMCa and the AER have not sufficiently considered the age profile of the replacements, the age profile of the population, and the underlying survivor theory, when concluding that the actual replacement ages are not reflected by the model lives."*[64]

A copy of the Nuttall Consulting report is provided as Appendix 4.01.

[61] Powerlink transmission draft determination 2017–22, Attachment 6 (Capital expenditure), AER, p.48.

[62] Repex Model handbook, AER, November 2013, p15.

[63] Review of AER Draft Decision, Nuttall Consulting, November 2016, p3.

[64] Ibid.

In addition, Powerlink is uncertain how EMCa assessed the actual plant age at replacement for the 11 sample projects for substation switchgear and secondary systems. In most cases the replacement age derived by EMCa is older than suggested by Powerlink's asset data, and for some secondary systems projects the discrepancy is substantial.

Powerlink considers the Draft Decision to increase the mean replacement lives by one standard deviation is excessive and not supported by the data provided by Powerlink in its Revenue Proposal or in response to questions from the AER or EMCa prior to release of the Draft Decision. Table 4.2 shows the effect on the Repex Model forecast of applying the AER's proposed mean replacement lives.

Table 4.2: Impact of AER adjustments to mean replacement lives

Asset category	Sub-category	Powerlink mean replacement life (years)	Powerlink Repex Model forecast ($m)	AER Draft Decision mean replacement life (years)	AER Draft Decision Repex Model forecast ($m)	Percentage change in forecast
Transmission towers (rebuild)	All corrosion zones	40.3 – 71.4	$14.1	40.3 – 71.4	$14.1	0%
Transmission towers (refit)	Corrosion zone DEF	35.3	$129.3	41.6	$89.8	-31%
	Corrosion zone C	52.9	$128.3	60.5	$34.6	-73%
	Corrosion zone B	66.4	$7.6	74.9	$1.0	-87%
Transmission towers	Miscellaneous adjustments		-$12.3		-$12.3	0%
Substation primary plant	Circuit breakers	34.2	$36.9	40.2	$22.3	-40%
	Isolators/ earth switches	39.8	$31.0	45.8	$18.6	-40%
	Voltage transformers	34.6	$9.6	40.6	$6.0	-38%
	Current transformers	33.2	$32.5	39.2	$21.7	-33%
Secondary systems	Bay and non-bay	20.2	$182.6	24.7	$112.5	-38%
	Metering		$30.2		$18.6	-38%
Telecommunications		10.7	$44.6	10.7	$44.6	0%
Buildings and infrastructure		34.3 – 50.6	$35.8	34.3 – 50.6	$35.8	0%
Repex Model Total			$670.1		$407.3	-39%

Note: $'s are taken directly from the Repex Model and are real 2015/16.

Powerlink has also taken the AER's proposed mean replacement lives and determined what the historical calibration quantities would need to be in order to arrive at those lives, given the asset age profile in 2010. This analysis shows that the historical calibration quantities would need to be reduced by 40 – 50% for substation primary plant and secondary systems, by 43% for towers in corrosion zone DEF and by 82% for towers in corrosion zone C. This is in addition to the reductions already made by Powerlink in preparing the input data to the Repex Model.

Powerlink considers there is nothing in either of the EMCa reports or in the AER's assessment that would support such substantial reductions. This analysis is further evidence to support Powerlink's position that it is incorrect to equate the observed ages at replacement for a sample of projects with the mean replacement lives for existing populations of assets.

4.7.4 15% offset

In its Draft Decision, after applying the proposed mean replacement lives in the Repex Model, the AER appears to have recognised that the resulting expenditure forecast would be insufficient to allow Powerlink to meet the capital expenditure objectives in the Rules[65]. To correct for this shortfall the AER has then applied an offsetting allowance equivalent to 15% of Powerlink's original Repex Model forecasts to the relevant asset categories. The AER has based this aspect of the Draft Decision on advice from EMCa contained in a single paragraph in the EMCa Addendum Report.

In providing their advice EMCa cited the example of TransPower New Zealand who have adopted painting of transmission towers early in their life as a way to optimise the total cost over the life of the towers. EMCa estimated the cost of this early life painting as equivalent to 15% of Powerlink's forecast for transmission tower refits. The advice from EMCa, which has been adopted by the AER in the Draft Decision, is to then extrapolate this example from transmission towers across each of the other asset categories where the mean replacement lives have been adjusted.

It is not clear to Powerlink what activities this 15% offset could be usefully directed towards that would make any meaningful difference to those assets already approaching their end-of-life within the next regulatory period. For example, early life painting of transmission structures is unlikely to assist in extending the life of the 45% of Powerlink's structures that are already more than 30 years old. Furthermore, as noted by Nuttall Consulting, Powerlink is already planning to undertake life extension activities for the majority of transmission tower reinvestments[66].

Powerlink already uses operating expenditure to conduct preventative and corrective maintenance of equipment, where it is economic to do so, in order to achieve its actual asset lives. Powerlink is not satisfied that there are other, additional, capital expenditure options to achieve the extended replacement lives put forward by the AER.

Powerlink also notes that where the AER has previously made similar decisions for expenditure to support extending the life of existing assets, the AER has created a new asset class with a shorter life[67]. In the PTRM published with Powerlink's Draft Decision the AER has not followed this precedent and has simply included the 15% offset in the same asset classes as the original assets. If the AER considers this item to be genuinely directed at extending asset lives by around five to eight years, it should implement an additional class of assets with an equivalent asset life and the associated revenue should be recognised over a similar timeframe.

4.7.5 Network performance indicators

The AER's Draft Decision assessed indicators of average asset age, connection point capacity and unserved energy to conclude that its alternative estimate of reinvestment capital expenditure should be sufficient for Powerlink to meet its network service obligations[68]. This section sets out Powerlink's response to the AER's assessment of these network performance indicators, and provides additional analysis of the likely impact of the AER's Draft Decision on asset performance.

Average asset age

In extending the mean replacement lives in the Repex Model the AER has noted that this will, over time, result in an increase in the average age of Powerlink's network assets. The AER considers this position to be reasonable as Powerlink's existing assets are, on average, younger than those of other TNSPs.

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65 Powerlink transmission draft determination 2017–22, Attachment 6 (Capital expenditure), AER, p.49 – the AER recognises the extended lives will require an increase in reinvestment capital expenditure from the forecast produced by the repex model. This is the expenditure the AER considers is needed to achieve the capital expenditure objectives (per NER clause 6A.14.1(2) and 6A.6.7(c)).

66 Review of AER Draft Decision, Nuttall Consulting, November 2016, p12.

67 ElectraNet transmission determination final decision 2008–13, p101.

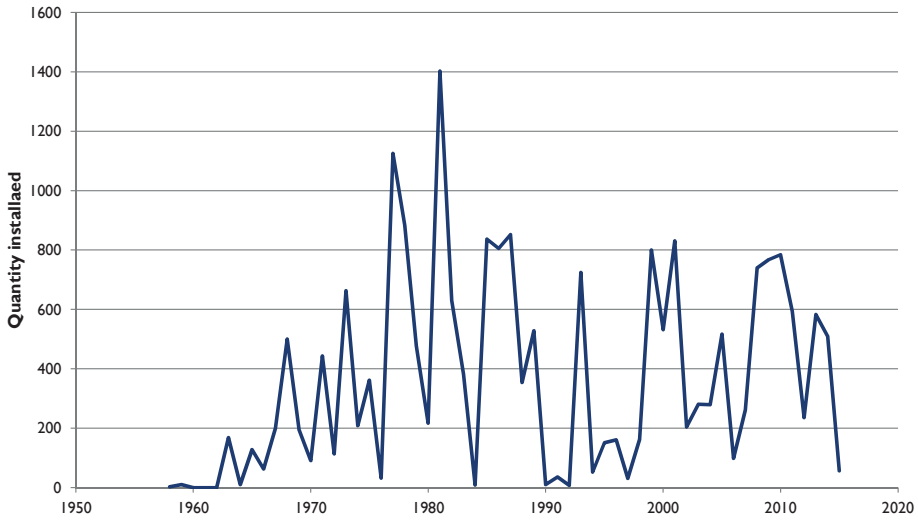
68 Powerlink transmission draft determination 2017–22, Attachment 6 (Capital expenditure), AER, p.52.

Powerlink does not consider that average asset ages, by themselves, are a useful indicator of the required level of reinvestment capital expenditure. The profile of the asset ages is also important. A simple example can illustrate this point. If one business owns two assets, both 25 years old, the average asset age is 25 years. A second business may also own two assets, one 50 years old and one brand new. The second business also has an asset base with an average age of 25 years. However the second business is likely to require a higher level of reinvestment capital expenditure to deal with the one asset that is 50 years old than the first business needs to manage two assets that are 25 years old.

Powerlink has installed a substantial quantity of new, additional assets over the last 10 – 15 years to meet increased demand on the network. This has had the effect of reducing the average age of Powerlink's asset base. At the same time the already existing network has continued to age and therefore requires reinvestment expenditure to manage end-of-life conditions.

This can be seen in Figure 4.5 in the age profile for transmission towers where there are a substantial number of towers that date from the year 2000 or later, but there are still a significant number of towers built in the 1960's that remain in service.

Figure 4.5: Transmission tower age profile



Source: Powerlink data

Connection point rating

The AER also considered the effect that the reduction in reinvestment capital expenditure may have on Powerlink's ability to meet the expected demand for prescribed transmission services, comply with applicable regulatory obligations and maintain the safety of the transmission system. In doing this the AER analysed trends in Powerlink's total connection point rating and maximum demand. On the AER's analysis the total connection point rating increased by 26% between 2008/09 and 2014/15 while maximum demand remained static.

The AER's analysis has taken connection point rating data from Powerlink's Category Analysis RINs. As explained in Powerlink's Basis of Preparation for that data, there are many instances where connection point ratings are set by substation switchgear ratings as Powerlink does not own the step-down transformer capacity. Increases in substation switchgear ratings are more strongly influenced by original equipment being replaced by its modern equivalent, at effectively no additional cost for the increased rating.

For example, the cost of replacement circuit breakers is more strongly influenced by the required fault rating, rather than thermal rating. As Powerlink has standardised on a limited number of thermal ratings for circuit breakers, any substation replacement projects are likely to result in consequential increases in connection point capacity with no additional redundancy in the systems and at no additional cost to consumers.

As a result the AER's assertion that there is an increased capacity margin that has provided more redundancy and that unplanned outages are therefore less likely to lead to customer interruptions is largely unfounded.

Transmission tower corrosion

Possibly the most significant impact of the extended mean replacement lives put forward by the AER is for transmission towers in corrosion zone C. This is a moderate corrosion zone and approximately 75% of Powerlink's 21,000 structures are located within this zone. As noted in Table 4.2 the AER increased the mean replacement life[69] by 14% (from 52.9 years to 60.5 years) and this had the effect of reducing the Repex Model forecast capital expenditure for these assets by 73% – by any measure this will have a very significant impact.

Powerlink has sought to better understand the implications of this extension of mean replacement life by modelling the extent of grade 3 and grade 4 corrosion on bolts across the fleet of transmission towers located in corrosion zone C. Grade 3 corrosion of nuts and bolts is an indicator of corrosion onset, and is taken as a forewarning that remedial action is required in the near future. Powerlink performs condition assessments to categorise the extent of bolt and member corrosion on all major tower sub-systems, such as tower legs, cross-arms and the superstructure.

The modelling and forecasts are based on the condition assessments of a sample of 628 towers across 17 different built sections aged between 34 and 49 years old. An average rate of corrosion per annum was determined using the average individual tower corrosion levels for each of the 628 towers. Powerlink uses data from the Galvanisers Association of Australia and AS4312 (Atmospheric corrosivity zones in Australia) to forecast corrosion rates. This approach is also adopted by Transpower New Zealand to model corrosion rates.

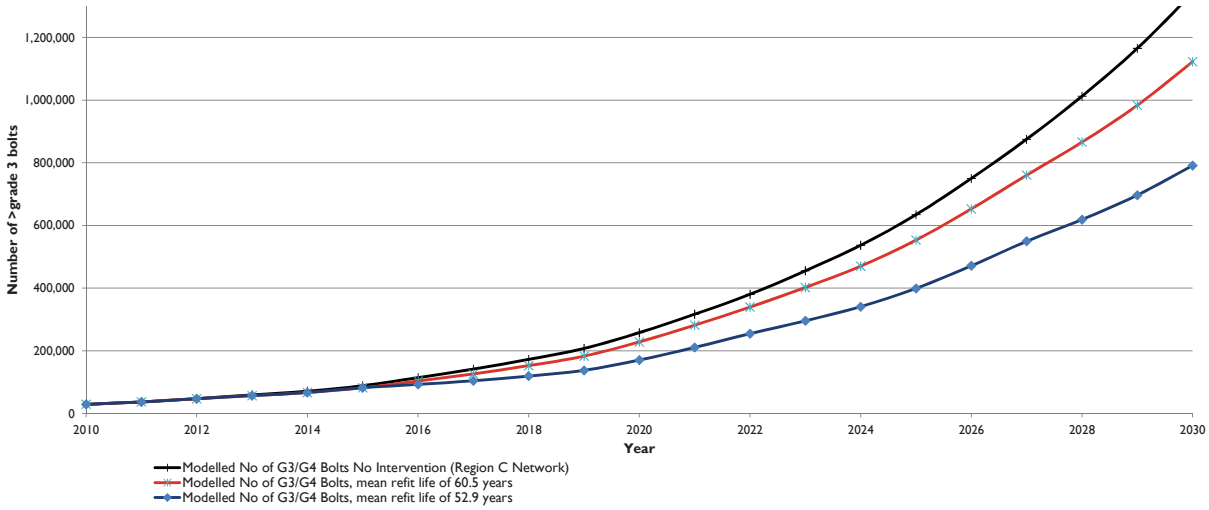
Figure 4.6 shows the projection of the quantity of bolts with corrosion level grade 3 or higher in region C until 2030. It is based on the actual bolt corrosion levels seen in the 628 sample towers, adjusted according to the sample tower age and then projected in line with the average corrosion zone C corrosion rates. The projected trend clearly demonstrates the acceleration in grade 3 and grade 4 corrosion that occurs for towers between 45 and 55 years old. This trend is exacerbated by the high rate of population increase for towers in this age bracket over the medium term.

The three curves in Figure 4.6 illustrate:

- in black, no intervention beyond the quantity that historically occurred under maintenance;
- in red, intervention based on the average annual quantities in future years for the AER's mean replacement life (60.5 years); and
- in blue, intervention based on the average annual quantities in future years for Powerlink's mean replacement life (52.9 years)

[69] In this situation, the mean replacement life is the age at which line refit works occur to extend the life of the existing asset.

Figure 4.6: Modelled corrosion – transmission tower region C



Source: Powerlink data

It can be seen from the corrosion diagram that the effect of the AER's extended mean replacement life on the total number of corroded bolts is relatively modest over the course of the 2018–22 regulatory period. However, beyond this time it is clear that the overall level of corrosion across the fleet of structure increases markedly. Overall the extended mean replacement life results in the number of corroded bolts being around 30% – 40% greater than under Powerlink's Revenue Proposal and only 10% – 15% fewer than under the "do nothing" scenario.

Powerlink considers that the effect of this increasing level of corrosion is unlikely to result in reduced levels of supply reliability in the short term. The most immediate impact of this corrosion would be seen in increasing operating expenditure to replace corroded bolts and members in order to ensure the structures remain safe for workers to access for future inspections, repairs and in the event of emergencies. However, over time the combined effect of an extended life prior to refit and the increasing population of towers reaching those ages (refer Figure 4.5) will see a potential runaway of corrosion across the fleet with consequent impacts on network availability and ultimately supply reliability.

Powerlink also notes that the level of productivity growth in its forecast operating expenditure included approximately $19m of savings associated with transmission line condition based maintenance and refurbishment. This productivity saving is as a result of the level of transmission line reinvestment capital expenditure put forward in Powerlink's Revenue Proposal.

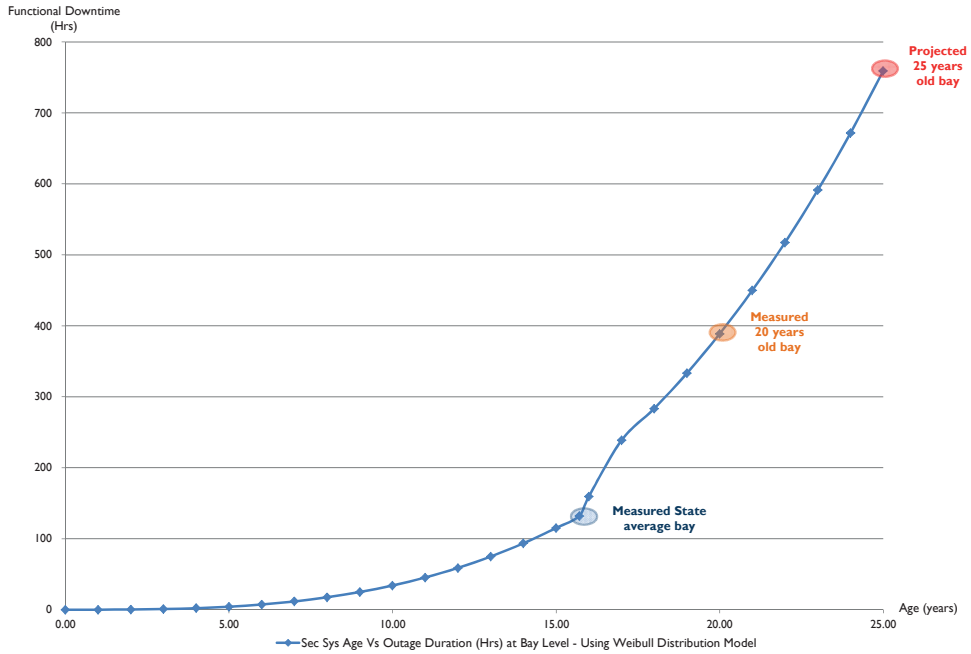
Secondary systems failure rates

The greatest percentage increase in mean replacement life in the AER's Draft Decision is for secondary systems assets. The AER's Draft Decision was to extend the mean replacement life by 4.5 years, or 22.3%. Powerlink has analysed the effect of this extended mean replacement life using a model based on data from over 2,300 secondary systems assets of varying ages over a 16 year period.

The model was used to predict the average outage duration at the bay level as a function of the age of the secondary systems. Figure 4.7 shows the average outage duration for a functional failure of the secondary systems. A functional failure does not necessarily result in an outage to a network element, but it does represent the loss of some of the normal functions of the protection and control system[70].

[70] The functions that could be unavailable include auto-reclose, automatic voltage control, emergency voltage control, protection signalling, SCADA, remote control or others.

Figure 4.7: Secondary systems outage durations



Source: Powerlink data

The effect of extending the mean replacement life from around 20 years to nearly 25 years (as determined by the AER and EMCa) is a near doubling of the annual duration of outages due to functional failures. The change in the shape of the curve after around 15 years of age is primarily due to obsolescence and lack of manufacturer support. A failure of a part of a secondary system asset, such as a relay, beyond this time generally means that a like for like replacement is not available and that some degree of re-design or re-engineering is required to install a replacement relay. The older the relay the more likely it will require a substantial re-design of the protection system, including changes at the remote end. This is what drives the substantial increase in expected outage duration as the secondary systems age.

This significant increase in the likelihood of loss of functionality for extended periods of time increases the risk that such failures will occur coincidently with other network events, whether planned or unplanned, and result in reduced reliability outcomes for consumers. It may also mean that Powerlink is unable to comply with the network performance requirements of the Rules to ensure a high level of availability of protection systems[71]. Powerlink is currently managing these risks in the 15 – 20 year range through spares holdings.

Asset failure trends

In its Draft Decision the AER provided analysis of Powerlink's asset failure performance over time. Powerlink has been unable to validate that data against its own, independently reviewed and audited Regulated Information Notice (RIN) data. Powerlink questions whether the AER has used the correct data, noting that the chart included in the AER's Draft Decision for Powerlink appears to be identical to the chart included in the AER's recent AusNet Services Draft Decision.

4.8 Benchmark asset lives

As much of the focus of this Revised Revenue Proposal is on the AER's extended mean replacement lives in the Repex Model, Powerlink has examined the typical lives expected by other transmission companies, both in Australia and overseas.

[71] National Electricity Rules, AEMC, clause S5.1.2.1(d).

4.8.1 Transmission towers

Powerlink notes that EMCa were of the view that Powerlink's calibrated mean replacement lives for transmission towers are within the range they have previously observed in other TNSP reviews[72]. Powerlink has adopted an approach similar to that of Transpower New Zealand and this was acknowledged by EMCa[73].

It is also important that any comparison of Powerlink's mean replacement lives is made against the tower age of other TNSPs when they perform their first major life extension work – not the life of the tower after this work has occurred. This point is further elaborated on by Nuttall Consulting[74].

Powerlink has also reviewed TransGrid's Network Management Plan and has identified that TransGrid has adopted similar life management practices for steel transmission towers as Powerlink[75].

> *"Steel towers over 45 years are targeted for condition assessment to determine whether overhaul works are required to maintain serviceability. Items identified during these climbing assessments are deteriorating nuts, bolts, fittings, earthwire, conductor, steelwork, foundations and other items. These are classified in accordance with a photographic condition sheet, and life extension work is proposed, or the tower is assessed as requiring another condition assessment visit in a number of years.*
>
> *It is expected that towers located west of the Dividing Range will generally not require any life extension work, and that the next inspection would be in the order of 15–20 years' time. Towers over 45 years old in more coastal environments are exhibiting varying degrees of corrosion from nuts and bolts to extensive steelwork surface corrosion."*

As a specific example TransGrid has identified[76]:

> *"330 kV transmission line 11 Sydney South – Dapto is a coastal line constructed in the early 1960s with significant corrosion occurring on the tower steelwork and fittings. This line has commenced a life extension program involving painting with a zinc coating that has an expected effective life of 20–25 years. Due to various issues encountered during the work to date, reviews are underway to determine whether re-coating the entire tower is the most cost effective program for the life extension work. Most of the corroded nuts, bolts and fittings on this line have been replaced in preparation for steelwork life extension."*

Powerlink considers that its expected timing for the first life extension works on transmission towers (selected bolt and member replacement together with painting with a zinc coating) is consistent with that adopted by other TNSPs in similar operating environments.

4.8.2 Substation Switchgear

Similar to transmission towers, EMCa were of the view that the calibrated lives were broadly similar to those they have seen in other TNSPs[77].

In considering high voltage circuit breakers, Transpower note that[78]:

> *"Our outdoor circuit breakers are generally in good condition, but are vulnerable to corrosion in the New Zealand environment. Corrosion of SF6 circuit breaker models can cause gas leaks to develop.*
>
> *We have developed an asset health model for circuit breakers. This assumes an initial life expectancy of 35 years for SF6 circuit breakers, 45 years for bulk oil circuit breakers, and 40 years for others. We adjust this for factors such as the time to reach the operation count limit in the case of frequently operated circuit breakers. Many of the older (1970–1995) SF6 circuit breakers were designed and built with an expected life of 2,000 operations. Our recent circuit breaker purchases specify 10,000 operations."*

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72 Review of Forecast Non-load driven capital expenditure - Addendum Report, EMCa, July 2016, p33.

73 Ibid, p35.

74 Review of AER Draft Decision, Nuttall Consulting, November 2016, p13.

75 TransGrid Network Management Plant 2013 -2018, p57.

76 Ibid.

77 EMCa, July 2016, p35.

78 Transpower, Asset Management Plan, September 2015, p61.

Similarly TransGrid note that[79]:

> *"Small oil volume circuit breakers are considered to be obsolete technology and this type of circuit breaker is no longer manufactured. Maintenance costs for this type of circuit breaker are higher than for SF6 units, and a substantial level of maintenance knowledge and effort are required to ensure continued reliability of the circuit breakers. Support for these circuit breakers from manufacturers is limited as this type is no longer supplied.*
>
> *Poor performance on small oil volume circuit breakers usually relates to oil leaks, high contact resistance and operating times. TransGrid service experience indicates an expected economic life of circuit breakers to be up to 40 years. However, factors such as reliability and supportability may result in a shorter economic life for specific circuit breaker types.*
>
> *Although modern SF6 circuit breakers have proven to be reliable and need minimum maintenance, early generation SF6 circuit breakers supplied between 1975 and 1987 suffer from type faults leading to corrosion and SF6 gas leaks. Refurbishment programs to rectify these problems have been largely unsuccessful and plans are now in place to replace the affected circuit breakers."*

The operating environment for insulated equipment is another influence, where higher operating temperatures will reduce the life of the electrical insulation. Where equipment has been designed for a maximum operating temperature based on a maximum ambient temperature, if the average ambient temperature is greater in one location than another, then for the same temperature rise, the expected life of the equipment will also reduce[80].

The annual average temperatures for major centres in eastern Australia are shown in Table 4.3.

Table 4.3: Annual average temperatures

City	Annual average temperature (degrees Celsius)
Melbourne	15.9
Sydney	18.5
Brisbane	20.6
Townsville	24.7

Source: www.bom.gov.au – calculated as the average of the annual mean maximum temperature and annual mean minimum temperature, 30 years 1981 – 2010.

Powerlink considers that its' expected lives for substation switchgear are consistent with that experienced by other TNSPs. The impact of higher ambient temperatures across the Powerlink network suggests that Powerlink's lives should be also towards the lower bound of the reasonable range.

4.8.3 Secondary Systems

Transpower has identified that[81]:

> *"Condition assessments of relays are generally pass/fail assessments, with failure resulting in correction or replacement. This means protection relays are generally in a good condition. Their life expectancy is 40 years for electromechanical types and 20 years for all other types."*

It should be noted that Powerlink no longer has old electromechanical type relays in service as part of the primary network protection functions that are included in Powerlink's Repex Model.

TransGrid notes that the expected life of new relays is estimated at between 15 and 20 years and that repair of these new relays is possible during their 15 to 20 year lifetime[82].

Similar to the other major asset categories Powerlink considers that its expected life for secondary systems assets is consistent with other TNSPs.

79 TransGrid Network Management Plan 2013 -2018, p54.

80 http://w3.usa.siemens.com/us/internet-dms/btlv/PowerDistributionComm/PowerDistribution/docs_MV/TechTopics/ANSI_MV_TechTopics15_EN.pdf

81 Transpower, Asset Management Plan, September 2015, p104.

82 TransGrid Network Management Plan 2013 -2018, p60.

4.8.4 Conclusions

EMCa originally identified that Powerlink's mean replacement lives are within a broad range of those they had observed from other TNSPs. Powerlink has reviewed similar asset information from Transpower New Zealand and TransGrid and identified that Powerlink's calibrated lives are consistent with the experiences of those specific TNSPs.

The impact of the operating environment should not be discounted, particularly the impact of temperature on the expected life of electrical insulation in substation switchgear.

Based on the material issues that Powerlink has identified with the EMCa reports discussed in Section 4.6 above, the concerns with the AER's assessment approach set out in Section 4.7 above, and the evidence presented in this section regarding expected asset lives for other similar TNSPs, Powerlink considers that the mean replacement lives in Powerlink's Repex Model are reasonable. Powerlink considers its use of the Repex Model has been calibrated and adjusted in such a way that the historical replacement quantities represent a prudent and efficient quantity of reinvestment, and hence provide the basis for a reasonable forecast of future reinvestment quantities through the Repex Model.

Even if the AER retains some concerns about the level of the replacement quantities used to calibrate Powerlink's Repex Model, Powerlink considers that, based on the evidence presented in this Revised Revenue Proposal, the mean replacement lives adopted in the AER's Final Decision should remain materially closer to Powerlink's calibrated values than those values proposed in the AER's Draft Decision.

4.9 Customer and consumer feedback and input

In developing this Revised Revenue Proposal Powerlink has applied the same expenditure forecasting methodology as used for the Revenue Proposal. This methodology reflects the customer and consumer input that Powerlink received and which continues to influence the capital expenditure forecasts.

Table 4.4 summarises the feedback Powerlink received from its engagement with customers and consumers. The feedback was largely directed at the Revised Revenue Proposal providing additional information to assist stakeholders to better understand the AER's assessment approach as well as the cost/reliability trade-off. Details of how Powerlink has responded to this feedback are outlined in Table 4.4.

Table 4.4: Summary of feedback received and its use in the Revised Revenue Proposal

Focus area	Summary of feedback received	Revised Revenue Proposal reference
Cost v reliability trade-off – views on appropriate level of replacement capital expenditure to maintain reliability, balanced against reduction in electricity price.	Powerlink should focus on quantifying the impact of reduced replacement expenditure on customer reliability so that it can better describe the risk-cost balance for consumers	Section 4.7.5, particularly transmission tower corrosion and secondary systems failure rates
	Longer term impacts of the Draft Decision and reduced investment expenditure may be difficult to objectively assess. There is potential that any future pain may only be known "down the track" and used as a basis to support more expenditure	Section 4.7.5, particularly average asset age
	For many customers reliability is key – without power they "do not operate". Customers would need to have a clear view of the risks in relation to outages and network impacts from extending asset lives.	Section 4.7.5, particularly secondary systems failure rates
AER's assessment approach – views on AER's assessment of replacement expenditure related to extended replacement lives and further adjustments (15% offset).	Based on information presented to the panel, there was not strong evidence supporting the mean replacement life increase and the 15% offset – both look like they can be negotiated.	Section 4.7.4
	It would be useful to understand how Powerlink's mean replacement lives compared against other transmission entities	Section 4.8

4.10 Revised forecast capital expenditure

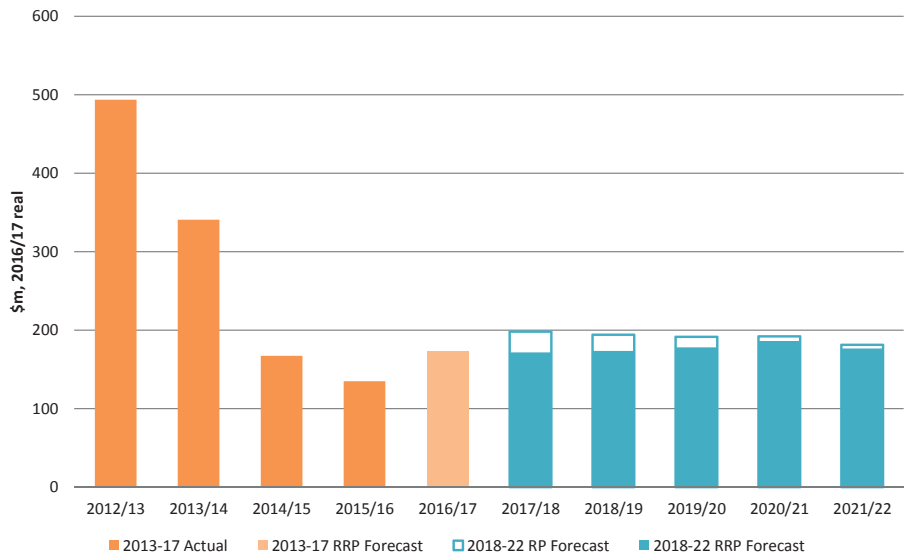
In preparing its revised capital expenditure forecast Powerlink has reviewed the full range of inputs to its capital expenditure forecasting methodology to ensure the resulting forecasts reflect current asset management strategies and plans. In addition to the changes to the Repex Model inputs noted in Section 4.10.1 below, Powerlink has updated cash-flows for approved projects that contribute to the forecast and has reviewed the scope of timing of the Wide Area Network (WAN) development stage 2 project[83].

The updates made to the Repex Model inputs have reduced the forecast capital expenditure from the Repex Model by $70.1 million compared to Powerlink's Revenue Proposal. The net effect of the other changes is to reduce forecast capital expenditure by a further $0.7 million.

Powerlink's Revised Revenue Proposal forecast capital expenditure is shown in Figure 4.8 and is set out in Table 4.5.

[83] In its Draft Decision the AER requested additional information to support the need for this project.

Figure 4.8: Powerlink's revised total forecast capital expenditure ($m, 2016/17)



Source: Powerlink data

Table 4.5: Revised forecast capital expenditure by category ($m, 2016/17)

Project category		2017/18	2018/19	2019/20	2020/21	2021/22	Total
Network							
Load driven	Augmentations	0.3	2.6	0.3	0.0	0.0	3.1
	Connections	0.0	0.0	0.0	0.0	0.0	0.0
	Easements	2.6	1.5	3.2	0.3	0.0	7.7
Non-load driven	Reinvestments	143.2	142.7	142.5	150.1	149.6	728.0
	Security/ compliance	3.7	3.7	3.8	3.8	3.8	18.8
	Other	4.0	4.0	4.0	7.8	5.8	25.6
	Total network	**153.8**	**154.6**	**153.7**	**161.9**	**159.2**	**783.2**
Non-network							
Business IT	Information Technology	12.4	11.3	12.5	12.5	11.8	60.5
Support the business	Commercial buildings	2.2	4.3	8.0	8.0	2.0	24.5
	Motor vehicles	2.3	2.4	2.8	2.7	2.7	12.9
	Moveable plant/tools and equipment	1.1	1.1	1.1	1.0	1.0	5.3
	Total non-network	**17.9**	**19.1**	**24.4**	**24.3**	**17.5**	**103.1**
Total capital expenditure		**171.7**	**173.6**	**178.1**	**186.2**	**176.6**	**886.3**

Note: This table is net of disposals.

4.10.1 Changes since Revenue Proposal

Since submitting its Revenue Proposal in January 2016 Powerlink has reviewed the full range of inputs to the capital expenditure forecasting methodology to ensure the resulting forecasts reflect Powerlink's current asset management strategies and forecast plans. As part of this review process Powerlink has identified two material changes to the Repex Model inputs:

- As part of its ongoing review of Asset Management Plans Powerlink has identified one transmission line built section that, based on its current condition and location and expected life plan, should be moved from corrosion zone DEF (severe) to corrosion zone C (moderate). Powerlink also identified an inconsistency between the asset age profile and the replacement quantities used for calibrating the mean replacement life for zone DEF which has been corrected; and
- In considering the observations made by EMCa in its review of historical reinvestment projects Powerlink has identified several power station switchyard replacement projects where the solution implemented varied substantially from the original substation configuration. As Powerlink does not expect any similar circumstances in the 2018–22 regulatory period these project quantities have been removed from the Repex Model calibration.

These changes to the Repex Model, together with other incremental changes in input data, are reflected in Powerlink's revised capital expenditure forecasts presented in this Chapter. Details of these updates to Powerlink's Repex Model are described below:

Updated input data

Powerlink's Repex Calibration Model is based on the asset age profile as at 30 June 2010 and the quantity of reinvestments in the period between 1 July 2010 and 30 June 2015. As part of the review of the AER's Draft Decision undertaken by Nuttall Consulting it was identified that for one of the 132kV lines in Far North Queensland that was replaced, the original line had been removed prior to 30 June 2010, but the replacement quantity was included in the 2010/11 to 2014/15 calibration period. The result was a mismatch between the starting asset age profile and the calibration quantities. Powerlink has corrected for this boundary issue which now increases the mean replacement life for transmission towers in corrosion zone DEF from 40.3 years to 45.0 years. The calibrations for the other corrosion zones are not affected.

As part of its ongoing review of Asset Management Plans Powerlink has identified one transmission line built section that, based on its current condition and location and expected life plan, should be moved from corrosion zone DEF (severe) to corrosion zone C (moderate).

Amended modelling approach

In considering the observations made by EMCa in its review of historical reinvestment projects Powerlink identified several power station switchyard replacement projects where the solution implemented varied substantially from the original substation configuration. As Powerlink does not expect any similar circumstances in the 2018–22 regulatory period these project quantities have been removed from the Repex Model calibration. This has the effect of slightly increasing the mean replacement lives for substation switchgear and secondary systems by around one year.

Alignment with 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 revised capital expenditure forecasts are consistent with this assessment.

4.11 Contingent projects

The AER has not accepted two of Powerlink's seven proposed contingent projects. For the remaining five contingent projects accepted by the AER, the AER requires changes to the proposed trigger events.

In relation to the specifics of the Draft Decision:

- Powerlink accepts the Draft Decision to exclude the North West Surat Basin Area project. Based on the latest demand forecast information available from existing and potential new customers Powerlink now considers this proposed contingent project is no longer required.
- Powerlink does not accept the Draft Decision to exclude the Southern Galilee Basin project. The most recent information suggests the relevant resource development projects are still progressing, albeit on a delayed timeframe.
- Powerlink has proposed amended trigger events for each of the proposed contingent projects. Powerlink considers that some aspects of the AER's requirements for specification of trigger events are not practicable or not supported by the regulatory framework. In developing these amended trigger events Powerlink considers it has met the AER's requirements within the relevant provisions of the Rules where it is practicable to do so.

Powerlink is also proposing an additional contingent project, Queensland to South Australia Interconnection (Queensland Component). Following the recent System Black event in South Australia, as well as previously observed increases in price volatility, it has been recognised by policy makers and numerous stakeholder groups that increased levels of interconnection within the National Electricity Market (NEM) are likely to be necessary to allow Australia to make the transition to a lower emission electricity supply system without compromising reliability and security of supply. ElectraNet recently published a Project Specification Consultation Report (PSCR) where a new interconnection between Queensland and South Australia is put forward as a credible option. The recent events in South Australia have placed an urgency on this process and ElectraNet are proposing that the RIT-T consultation process, including approval by the AER under clause 5.16.6 of the Rules, be completed by the end of 2017 with energisation possibly as early as 2022. As this project could be largely completed by the end of Powerlink's 2018–22 regulatory period Powerlink considers it essential that these recent developments, and the industry's response to customer and consumer concerns, be accommodated as part of this Revised Revenue Proposal.

Appendix 4.02 provides further details on the individual contingent projects and their updated triggers. This is shown as a marked-up version of the original Appendix 5.13 that was provided with Powerlink's Revenue Proposal.

4.11.1 Southern Galilee Basin

In its Draft Decision the AER considered that the Southern Galilee Basin project is not reasonably required to be undertaken during the regulatory period. In reaching this view the AER noted that the coal mine developments required to trigger the contingent project have been subject to legal challenges to the environmental approvals.

In response to a query from the AER, Powerlink noted that in respect of GVK Hancock (the proponent of two of the three major mines proposed for the area), that the project proponents had determined to contest an appeal brought by environmental groups to the Queensland Court of Appeal. The appeal was from an original decision of the Queensland Land Court which determined that the proposed mine would not contribute to an increase in environmentally harmful emissions from the transportation and burning of coal after it was removed from the proposed mine (scope 3 emissions).

On 27 September 2016 the Queensland Court of Appeal unanimously rejected the appeal[84]. Powerlink considers this decision reinforces the view that these projects are still proceeding to development, albeit on a delayed timeframe. Overall, Powerlink considers it is still reasonable to expect that the contingent project could be triggered during the 2018–22 regulatory period.

[84] Coast and Country Association of Queensland Inc v Smith & Ors [2016] QCA 242.

4.11.2 Trigger events

In its Draft Decision the AER has set out what it considers to be the required indicative trigger events in order for it to be satisfied that a project should be included as a contingent project. The four indicative trigger events are[85]:

1. Specific detail about the amount and location of additional load required to trigger the contingent project;
2. Successful completion of the Regulatory Investment Test for Transmission (RIT-T) demonstrating positive net market benefits;
3. Determination by the AER under clause 5.16.6 of the Rules that the proposed investment satisfies the RIT-T; and
4. Powerlink Board commitment to proceed with the project prior to submitting an application to the AER seeking an amendment to the revenue determination.

Powerlink notes that the AER considers its four indicative trigger events should apply to both projects that are for reliability corrective action as well as those that deliver a positive net market benefit. Projects that are for reliability corrective action are still required to maximise the present value of net market benefits, but the net market benefit may be negative (i.e. a net economic cost)[86]. For this reason Powerlink considers that the second trigger event should require the RIT-T to demonstrate a maximising of net market benefits except where a proposed contingent project is for reliability corrective action in which case the trigger should note that the net market benefit may be negative.

The AER's third trigger event requires Powerlink to seek a determination by the AER, under clause 5.16.6 of the Rules, that the preferred option identified through the RIT-T consultation process satisfies the RIT-T. This provision in the Rules is only available to Powerlink in respect of those projects that are not for reliability corrective action[87]. As three of Powerlink's proposed contingent projects are for reliability corrective action (Southern Galilee Basin, Northern Bowen Basin Area and Bowen Industrial Estate) Powerlink is unable to apply clause 5.16.6 of the Rules in all cases. Similarly the AER is unable to make a determination that the preferred option satisfies the RIT-T.

Powerlink understands that the AER requires this trigger event as a determination by the AER that a preferred option satisfies the RIT-T gives the AER confidence that the contingent project will satisfy the capital expenditure objectives. While clause 5.16.6 cannot be activated for those proposed contingent projects that are for reliability corrective action, Powerlink will provide the AER with the Project Assessment Conclusions Report as soon as practicable after the expiry of the 30 day dispute period. This will allow the AER to consider the application of the RIT-T to the contingent project in advance of Powerlink applying for amendment of the revenue determination for the contingent project under clause 6A.8.2.

In its Draft Decision the AER has required Powerlink to specify the amount and location of additional load required to trigger the three contingent projects that are not for reliability corrective action[88]. This is consistent with the AER's first indicative trigger event. Powerlink is concerned that it is not practicable to identify specific loads and locations that could reasonably justify an upgrade to the capacity of the Queensland/New South Wales Interconnector (QNI). There are an almost infinite range of market developments outside Queensland that could lead to increased congestion across QNI. To try to enumerate all such possibilities into a trigger event would not only be futile but would almost inevitably result in omitting some combination of events that does actually occur. Powerlink also notes the AER has previously accepted the Heywood Interconnector Upgrade contingent project using the same form of trigger events as originally proposed by Powerlink in its Revenue Proposal for the QNI Upgrade. For these reasons Powerlink is not proposing any change to the trigger events for the QNI Upgrade contingent project.

For the same reasons Powerlink is proposing similar trigger events for the additional contingent project, Queensland to South Australia Interconnection (Queensland component).

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85 Powerlink transmission draft determination 2017–22, Attachment 6 (Capital expenditure), AER, p.79.

86 National Electricity Rules, AEMC, clause 5.16.1(b).

87 Ibid, clause 5.16.6(a).

88 Central to North Queensland Reinforcement, QNI Upgrade and Central West to Gladstone Area Reinforcement.

For the remaining two market benefit contingent projects Powerlink has updated the trigger events to be more specific regarding the amount and location of additional load (or reduction in generation) required to trigger the contingent projects. In doing this Powerlink has identified the threshold load at which network constraints are forecast to start to bind under system normal conditions. Powerlink is unable to specify in advance a load at which a contingent project will maximise the positive net market benefits as that will depend upon, amongst other things:

- load factor at the time of both existing loads on the network and any additional loads;
- retirement or new commitment decisions of generators in the relevant parts of the network; and
- relative operating costs of generators that are subject to network constraints.

4.11.3 Capital contributions

In assessing Powerlink's Revenue Proposal the AER asked for the following information in relation to each of the proposed contingent projects:

> *(P)lease provide information and assumptions on any capital contributions from connecting customers, including information on sole use and shared assets with their respective assets and works, and cost allocations.*

In response, Powerlink stated:

> *Powerlink's proposed contingent projects relate only to transmission network investments that augment the capacity of the network for the benefit of all network users in the relevant areas. Consistent with the framework set out in the National Electricity Rules, customers connecting to Powerlink's transmission network pay shallow connection charges and separate charges for the use of the shared network. As a result there are no capital contributions from customers attributable to Powerlink's proposed contingent projects.*

In the Draft Decision the AER expressed concern that "Powerlink has not provided any estimates or information about the associated customer contribution amounts for each project and the boundary between new connection assets and the existing shared network". The AER considers that:

> *The benefit of additional capacity for each customer should be weighed against the costs faced or incurred by each customer, and Powerlink has not demonstrated that the proposed costs will be shared efficiently among the new customer and existing customers.*
>
> *In addition, the capital contributions amounts that Powerlink will require from some of these major connecting customers may also be significant is they reflect large single block loads (e.g. a new mine or port). This may alter the decision (e.g. timing) for the connection customers to apply for the connection to the transmission network.*

In support of its position the AER referred to clause 5.3.6(b) and Schedule 5.6 of the Rules. Powerlink has reviewed these provisions and considers they do not support the AER's position. These provisions only cover terms and conditions for services provided at a connection point and do not extend to the prescribed shared network.

Clause 5.3.6(b) requires that the offer to connect must contain the proposed terms and conditions for connection to the network. Those terms and conditions must include the terms and conditions of the kind set out in Schedule 5.6[89].

Schedule 5.6 sets out a non-exhaustive list of conditions for inclusion in connection agreements. Most relevantly, the list includes connection service charges[90]. A connection service is defined as being either an entry service or an exit service. As is relevant for Powerlink's proposed contingent projects, an exit service is a service provided to a customer or group of customers at a single connection point.

These provisions are in contrast to the recently included clause 5.3.6(b2)[91], which relates to the connection of an embedded generator to a distribution network. This new clause specifically requires that an offer to connect include an itemised statement of costs including details of network augmentations and associated costs.

[89] National Electricity Rules, AEMC, clause 5.3.6(b)(2).

[90] Ibid, Schedule 5.6(d).

[91] These changes were introduced as part of the Connecting Embedded Generators Rule Change (2014 No. 3) and commenced operation on 1 October 2014.

For connection to the transmission network the Rules require that new network customers pay negotiated and non-regulated charges for their new connections. Transmission pricing already requires larger users to pay more for the use of the shared network. Importantly, transmission pricing does not discriminate between new and existing users of the network.

In summary Powerlink can find no basis in the existing Rules for Powerlink to charge a new large customer for their use of the prescribed shared network on a different basis from other existing customers.

Notwithstanding this, Powerlink can provide the following information to assist the AER. As Table 4.6 illustrates, for each contingent project the level of increase in demand required to trigger the project is no greater than the existing maximum demand in the relevant area. In most instances the required increase is significantly less than the current maximum demand.

Table 4.6: Contingent project trigger levels compared to current maximum demands

Contingent Project	Relevant area (TAPR zones or bulk supply points)	Current maximum demand (from 2016 TAPR)	Contingent project trigger load
Central to North Queensland	Far North zone, Ross zone, North zone	1,041	230
Southern Galilee Basin	Lilyvale, Dysart and Blackwater substations	270	195
Northern Bowen Basin	North zone (excluding Alligator Creek, Mackay, Pioneer Valley and Proserpine substations)	216	30
Bowen Industrial Estate	Bowen North Substation	20	10
QNI Upgrade	N/A	N/A	N/A
Central West to Gladstone	Gladstone zone	1,189	*550
Queensland to South Australia Interconnection	N/A	N/A	N/A

* Or a commensurate reduction in registered generating capacity in the Gladstone zone

4.12 Other matters

This section sets out Powerlink's response to other matters in the Draft Decision where either the AER has sought additional information or the AER appears to have misinterpreted the information put forward in Powerlink's Revenue Proposal.

4.12.1 Transformer replacement

While the AER accepted Powerlink's proposed transformer reinvestments in its Draft Decision it also queried whether there may be scope for Powerlink to prudently reduce replacement expenditure on power transformers through replacement of limited components, in order to extend the life before full transformer replacement. Powerlink does not consider the AER's position is realistic for the transformers that Powerlink proposes to replace. This is because:

- The transformers, especially the winding, core and internals are of an age and condition where there is a substantially increasing risk of in-service failure[92]; and
- This increasing level of inherent risk makes it less economic to incur expenditure to address some other immediate condition concerns such as bushing condition or oil leaks.

[92] This is consistent with the findings of Condition Assessment Reports that Powerlink submitted to the AER with its Revenue Proposal.

In addition, it is also the case that Powerlink has made material, non-routine investments in these transformers over the last 10 – 15 years, in order to ensure they have remained in service to this point. This expenditure, together with a description of the major items addressed, is shown in Table 4.7 for each of the proposed transformers to be replaced.

Regarding the repair/replace decision for power transformers, Powerlink has included a description of its transformer life cycle cost model in Appendix 4.03. This describes the key elements that influence the repair/replace decision and the concept of a spend limit for an aged transformer, which in conjunction with asset health indices and observation from site based condition assessments supports the replacement decision.

Table 4.7: Historical expenditure to extend transformers service life

Transformer	Major expenditure (2003 – 2016)	Major items addressed
Lilyvale T3	$303,000	Repairs following diverter switch failure, replacement of temperature monitoring systems, repair of on-load tap changer (OLTC) and repair of oil leaks (multiple)
Lilyvale T4	$189,000	Diverter switch repairs, low voltage (LV) bushing replacement, replacement of temperature monitoring systems and repair of oil leaks (multiple)
Dysart T1	$56,000	OLTC repairs (multiple) – this unit has been subjected to multiple through faults through tertiary connection to a rural distribution network
Dysart T2	$55,000	OLTC repairs (multiple) – this unit has been subjected to multiple through faults through tertiary connection to a rural distribution network
Kemmis T2	$246,000	Refurbishment prior to relocation to current site and LV bushing replacement
Ingham South T1	$155,000	Refurbishment prior to relocation to current site, LV bushing replacement and corrosive sulphur mitigation
Ingham South T2	$130,000	Refurbishment prior to relocation to current site and corrosive sulphur mitigation
Garbutt T1	$163,000	Transformer and tap changer refurbishment
Garbutt T2	$158,000	Transformer and tap changer refurbishment
Blackwater T1	$175,000	Transformer refurbishment, tap changer repair, LV bushing replacement and oil leak repairs
Blackwater T2	$283,000	Transformer refurbishment, tap changer repair, LV bushing replacement and oil leak repairs
Bouldercombe T1	$345,000	Transformer refurbishment, tap changer repair, LV bushing replacement, temperature monitoring replacement and oil leak repairs
Bouldercombe T2	$249,000	Transformer refurbishment, tap changer repair, temperature monitoring replacement and oil leak repairs

4.12.2 Wide Area Network deployment stage 2

The WAN deployment stage 2 project was included as a bottom-up component of Powerlink's forecast capital expenditure in the Other category of non-load driven network capital expenditure. The project is to extend Powerlink's MPLS (Multi Protocol Label Switching) network to provide Internet Protocol (IP) based communications for power system monitoring and control to those sites where the existing OpsWAN infrastructure will require replacement. The AER was concerned that Powerlink had not provided sufficient information to demonstrate the need for undertaking this project, or consideration of the alternatives, including the option of doing nothing.

Originally the stage 2 deployment was timed to support the movement of Powerlink's Operational Telephone Network (OTN) to a Voice Over IP (VOIP) solution. Technical investigations finalised since Powerlink submitted its Revenue Proposal have now identified a solution that allows the deployment of VOIP using the existing equipment at sites that are not already part of the core MPLS network. This reduces the cost and defers the required timing of the stage 2 deployment until obsolescence of that existing equipment triggers the need for the project. Powerlink has provided an updated implementation strategy and project cost estimates as Appendix 4.04.

4.12.3 Demand forecasts

The AER has stated that Powerlink's demand forecast is approximately 2,000 MW higher than AEMO's forecast and that Powerlink has advised this is likely due to different estimates of maximum demand from large direct connect end users. Powerlink disagrees with the AER view that Powerlink's demand forecast is appreciably higher than the AEMO forecast.

After submitting the Revenue Proposal the AER queried Powerlink regarding differences between Powerlink's and AEMO's demand forecasts. At that time the AER was examining the non-coincident demand forecasts and comparing Powerlink's Reset RIN data with AEMO's connection point forecast data. Powerlink advised the AER that these differences were primarily due to the definitions set out in the Reset RIN which are different from the definitions applied by AEMO. Powerlink advised the AER that the key reasons why Powerlink's non-coincident maximum demand appears higher than AEMO's are:

- Reset RIN includes QNI and Terranora Interconnectors as load connection points (+1332 MW);
- Reset RIN treats Boyne Smelter as two separate connection points each with its own non-coincident maximum demand (+320 MW); and
- Differences in two other direct connect customers (+120 MW)

Powerlink considers that these items fully account for the differences between the Powerlink and AEMO forecasts.

Powerlink also provided the AER with non-coincident demand forecasts excluding the Interconnectors and liquefied natural gas (LNG) loads for both 10% Probability of Exceedence (PoE) and 50% PoE summer maximum demands. A summary of this reconciliation is shown in Table 4.8.

Table 4.8: Summary of non-coincident demand forecast data (MW)

Variable/Connection Point	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
TOPSD0105 (Reset RIN, Table 3.4.3)	12,204	12,433	12,692	12,756	12,681	12,672	12,716
TOPSD0106 (Reset RIN, Table 3.4.3)	11,551	11,767	12,017	12,071	11,988	11,973	12,010
- QNI (Reset RIN, Table 5.4.1)	(1,127)	(1,127)	(1,127)	(1,127)	(1,127)	(1,127)	(1,127)
- Terranora (Reset RIN, Table 5.4.1)	(205)	(205)	(205)	(205)	(205)	(205)	(205)
- LNG loads	(545)	(709)	(963)	(964)	(877)	(861)	(882)
= Total (10% PoE)	**10,327**	**10,393**	**10,396**	**10,460**	**10,472**	**10,479**	**10,502**
= Total (50% PoE)	**9,673**	**9,727**	**9,721**	**9,774**	**9,779**	**9,780**	**9,796**

In its Draft Decision the AER appears to have taken these non-coincident maximum demand figures and compared them to AEMO's coincident maximum demand forecast to suggest that Powerlink's forecast is still around 2000 MW higher than AEMO's forecast[93].

The AER is correct to say that Powerlink's forecast has a lower rate of growth than AEMO's forecast, and that the demand forecast is not a significant driver of forecast capital expenditure. However, it is also the case that Powerlink's demand forecast is not higher than AEMO's.

[93] Powerlink transmission draft determination 2017–22, Attachment 6 (Capital expenditure), AER, p.73, Figure 6.15.

5. Maximum Allowed Revenue

5.1 Introduction

This chapter outlines Powerlink's revised MAR for the 2018–22 regulatory period, based on the building-block approach in the Rules, the PTRM, Powerlink's revised forecast capital expenditure and updates for other variables (for example, forecast inflation).

Key highlights

- Powerlink's revised MAR for the 2018–22 regulatory period is $3,742.2m in total.
- In the transition to the 2018–22 regulatory period, smoothed revenue for 2017/18 is 31.4% lower than revenue forecast for 2016/17.
- This reduction in revenue results in a nominal 31.0% reduction in indicative transmission price in 2017/18.
- For the average Queensland residential electricity consumer, Powerlink's Revised Revenue Proposal is expected to reduce the average electricity bill by about 2.9% in 2017/18. On the basis of assumed tariffs and consumption, this represents an estimated initial saving of between $25 and $41 in the first year.
- Indicative transmission prices over the balance of the 2018–22 regulatory period are expected to remain within CPI.

5.2 Building-block components

The following sections set out each element of Powerlink's revised building-blocks to establish revenue requirements for the 2018–22 regulatory period.

5.2.1 Regulatory asset base

Opening RAB

In this Revised Revenue Proposal, Powerlink has adjusted the opening RAB value for the 2018–22 regulatory period for:

- Actual capital expenditure incurred in 2015/16;
- Updated forecast capital expenditure for 2016/17;
- Actual inflation for 2015/16 and forecast inflation for 2016/17;
- Capitalised movements in provisions for 2015/16; and
- Proceeds of assets disposed for 2015/16.

Using the AER's RFM and taking into account these adjustments, Powerlink has calculated a revised opening RAB as at 1 July 2017 of $7,082.1m. This is shown in Table 5.1.

Forecast RAB

Powerlink's forecast RAB for the 2018–22 regulatory period has also been updated to reflect revisions to:

- Forecast capital expenditure for the 2018–22 regulatory period;
- Depreciation rates determined by the AER's PTRM based on the adjusted opening RAB value and forecast capital expenditure; and
- Forecast inflation.

The revised forecast RAB for the next regulatory period is summarised in Table 5.1.

Table 5.1: Revised forecast regulatory asset base ($m, nominal)

	2017/18	2018/19	2019/20	2020/21	2021/22
Opening RAB	7,082.1	7,168.3	7,236.5	7,296.4	7,358.3
Capital expenditure as incurred*	178.7	185.0	194.3	208.0	202.0
Regulatory depreciation	(92.5)	(116.8)	(134.3)	(146.2)	(154.0)
Closing RAB	7,168.3	7,236.5	7,296.4	7,358.3	7,406.4

* Adjusted for 1/2 WACC allowance and movement in provisions.

5.2.2 Return on capital

The return on capital has been calculated by applying the nominal vanilla WACC to the revised opening RAB balance for each year of the 2018–22 regulatory period.

Powerlink has applied a nominal vanilla WACC of 5.48% consistent with the estimate established in the AER's Draft Decision, as discussed in Section 3.3.

Powerlink has calculated the return on capital in line with the PTRM, which is summarised in Table 5.2.

Table 5.2: Summary of return on capital ($m, nominal)

	2017/18	2018/19	2019/20	2020/21	2021/22
Opening RAB	7,082.1	7,168.3	7,236.5	7,296.4	7,358.3
Return on capital	387.8	392.5	396.2	399.5	402.9

5.2.3 Return of capital

The return of capital provided by regulatory depreciation has been calculated on the basis of the depreciation methodology and standard asset lives accepted by the AER in its Draft Decision. The calculation also reflects revisions to Powerlink's opening RAB value, forecast capital expenditure and forecast inflation for the 2018–22 regulatory period.

A summary of the annual regulatory depreciation forecast is provided in Table 5.3.

Table 5.3: Summary of return of capital ($m, nominal)

	2017/18	2018/19	2019/20	2020/21	2021/22	Total
Regulatory depreciation	92.5	116.8	134.3	146.2	154.0	643.7

5.2.4 Operating expenditure

Powerlink's total operating expenditure forecast is consistent with the AER's Draft Decision (adjusted for revised forecast inflation of 2.40%) and is summarised in Table 5.4.

Table 5.4: Summary of forecast operating expenditure ($m, nominal)

	2017/18	2018/19	2019/20	2020/21	2021/22	Total
Total operating expenditure	201.6	205.6	209.5	213.7	218.7	1,049.2

5.2.5 Tax allowance

Powerlink's revised tax allowance forecast has been determined in accordance with the PTRM and adopts the value of imputation credits (gamma) in the AER's Draft Decision of 0.4. The summary of the tax allowance is set out in Table 5.5.

Table 5.5: Summary of tax allowance ($m, nominal)

	2017/18	2018/19	2019/20	2020/21	2021/22	Total
Corporate tax	20.6	24.3	29.8	32.2	32.5	139.4
Less value of imputation credits	(8.2)	(9.7)	(11.9)	(12.9)	(13.0)	(55.7)
Tax allowance	12.4	14.6	17.9	19.3	19.5	83.6

5.2.6 Efficiency Benefit Sharing Scheme

Revenue increments and decrements arising from the EBSS in the 2013–17 regulatory period are carried over as an adjustment to the MAR in the 2018–22 regulatory period. In its Draft Decision, the AER accepted Powerlink's proposed net carryover amounts, which are summarised in Table 5.6.

Table 5.6: Summary of the EBSS carryover ($m, nominal)

	2017/18	2018/19	2019/20	2020/21	2021/22	Total
EBSS carryover	(0.8)	(7.1)	(3.2)	3.0	-	(8.1)

5.3 Maximum Allowed Revenue

Table 5.7 outlines the revised MAR for each year of the forthcoming regulatory period. Powerlink's revised unsmoothed revenue requirement for the 2018–22 regulatory period is based on the building-blocks outlined in the previous sections.

Table 5.7: Summary of revised unsmoothed revenue requirement ($m, nominal)

	2017/18	2018/19	2019/20	2020/21	2021/22	Total
Return on capital	387.8	392.5	396.2	399.5	402.9	1,978.9
Return of capital	92.5	116.8	134.3	146.2	154.0	643.8
Total operating expenditure	201.6	205.6	209.5	213.7	218.7	1,049.2
Tax allowance	12.4	14.6	17.9	19.3	19.5	83.6
EBSS carryover	(0.8)	(7.1)	(3.2)	3.0	-	(8.1)
Unsmoothed revenue requirement	693.4	722.3	754.7	781.8	795.1	3,747.4

5.4 X-factor smoothed revenue

The revised smoothed revenue requirement and X-factors for each year of the 2018–22 regulatory period are presented in Table 5.8.

Table 5.8: Revised smoothed revenue requirement and X-factor ($m, nominal)

	2017/18	2018/19	2019/20	2020/21	2021/22	Total
Unsmoothed revenue requirement	693.4	722.3	754.7	781.8	795.1	3,747.4
Smoothed revenue requirement	715.6	731.6	748.1	764.9	782.1	3,742.2
X-factor	–	0.15%	0.15%	0.15%	0.15%	–

In real terms, Powerlink's revised smoothed revenue for 2017/18 is forecast to reduce by 31.4% compared to the revenue forecast in 2016/17. In subsequent years of the regulatory period annual revenue is forecast to reduce by 0.15% per annum.

Overall the total revised MAR for the 2018–22 regulatory period is forecast to be 19% less in real terms than the allowed MAR for the 2013–17 regulatory period.

5.5 Shared assets

In its Draft Decision, the AER accepted that Powerlink's forecast of shared asset unregulated revenues (SAUR) for the 2018–22 regulatory period were reasonable[94]. Having assessed Powerlink's forecast SAUR against its Draft Decision MARs, the AER also determined that the 1% of MAR materiality threshold had not been met in any year of the next regulatory period. As a result, the AER did not apply a shared asset revenue adjustment to Powerlink's MAR.

Powerlink has reassessed its Revenue Proposal SAUR forecasts against its revised MAR in each year of the next regulatory period, as set out in Table 5.9. The assessment reconfirms that SAUR are not forecast to be material in any year of the 2018–22 regulatory period. Therefore, Powerlink has not adjusted its revised annual revenue requirements in this Revised Revenue Proposal.

Table 5.9: Materiality of forecast SAUR

$m	2017/18	2018/19	2019/20	2020/21	2021/22	Total
Proposed smoothed ARR ($m)	715.6	731.6	748.1	764.9	782.1	3,742.2
Average annual SAUR ($m)	2.9	2.9	2.9	2.9	2.9	14.5
SAUR as % of ARR	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Material?	N	N	N	N	N	N

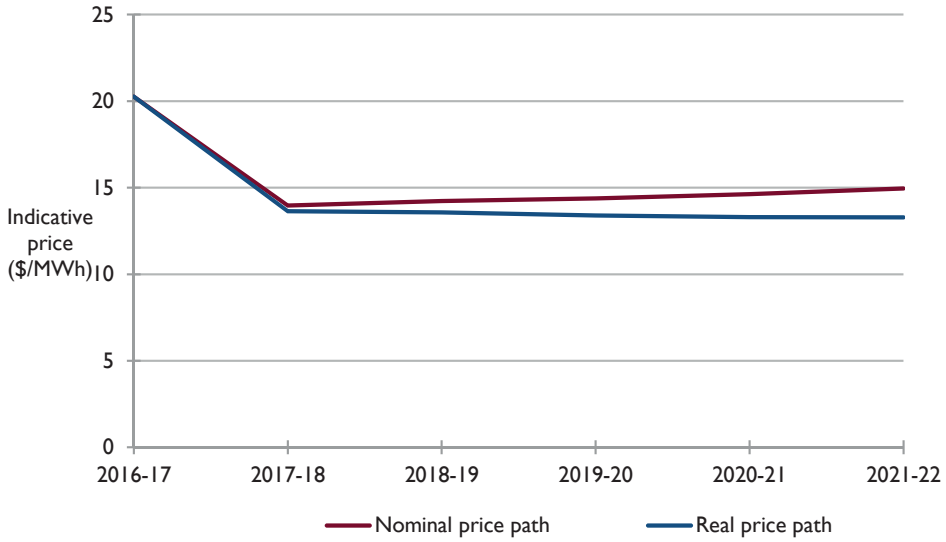
5.6 Average price path

Powerlink has estimated the indicative effect of its Revised Revenue Proposal on average indicative transmission prices by taking the revised MAR and dividing it by its most recent forecasts for energy delivered in Queensland[95]. The resulting indicative transmission price path is shown in Figure 5.1.

[94] Powerlink transmission draft determination 2017–22, Attachment 1 (Maximum allowed revenue), AER, p.19.

[95] Transmission Annual Planning Report 2016, Powerlink, 2016, p.30.

Figure 5.1: Revised indicative price path from 2016/17 to 2021/22 ($/MWh)



Transmission charges comprise approximately 9% of an average residential household's electricity bill each year. The impact of Powerlink's Revised Revenue Proposal on residential electricity consumers each year will depend on a number of factors, which include:

- actual energy delivered from Powerlink's network;
- the proportion of annual prescribed revenue to be recovered from the DNSPs (Energex and Ergon Energy, both part of the Energy Queensland group);
- the particular tariff arrangements applied by the DNSP and retailers; and
- the individual customer's electricity usage.

For a residential electricity consumer, Powerlink's Revised Revenue Proposal is expected to reduce the average electricity bill by about 2.9% in the first year. On the basis of assumed tariffs and consumption, this represents an estimated annual saving of between $25 and $41.

Table 5.10 provides a revised estimate of how the transmission component of a typical residential and business electricity bill will be impacted by the Revised Revenue Proposal.

Table 5.10: Revised indicative electricity bill impacts ($, nominal)

		2013–17 regulatory period		2018–22 regulatory period
		2015/16	2016/17	2017/18
Average annual residential electricity bill[(a)] (based on annual usage range of 2,500kWh and 5,173 kWh)	Transmission Component	$77 – $129	$80 – $134	$55 – $93
				(-31.0%)
Average annual business electricity bill[(b)] (based on annual usage range of 10,000kWh and 20,000 kWh)	Transmission Component	$270 – $470	$280 – $488	$193 – $337
				(-31.0%)

(a) 2015 AEMC Electricity Price Trends, AEMC, December 2015, p.105.

(b) Energy Made Easy, AER, https://www.energymadeeasy.gov.au/.

6. Glossary

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
CCP	Consumer Challenge Panel
CESS	Capital Expenditure Sharing Scheme
CPI	Consumer Price Index
DI	Dispatch Interval
DNSP	Distribution Network Service Provider
EBSS	Efficiency Benefit Sharing Scheme
EFA	Expenditure Forecast Assessment
IAP2	International Association for Public Participation
IP	Internet Protocol
kV	Kilovolt
KWh	Kilowatt hour
LNG	Liquefied Natural Gas
LRET	Large-scale Renewable Energy Target
LV	Low Voltage
MAR	Maximum Allowed Revenue
MIC	Market Impact Component
MTFP	Multilateral Total Factor Productivity
MW	Megawatts
MWh	Megawatt hours
NCC	Network Capability Component
NCIPAP	Network Capability Incentive Parameter Action Plan
NEL	National Electricity Law
NEM	National Electricity Market
NEO	National Electricity Objective
PSCR	Project Specification Scope Report
PTRM	Post-Tax Revenue Model
QNI	Queensland/New South Wales Interconnector

RAB	Regulatory Asset Base
Repex	Replacement Capital Expenditure
RFM	Roll Forward Model
RIN	Regulatory Information Notice
RIT-T	Regulatory Investment Test for Transmission
RoR	Rate of Return
SC	Service Component
SIPS	System Integrity Protection Scheme
STPIS	Service Target Performance Incentive Scheme
SVC	Static VAr Compensator
TNSP	Transmission Network Service Provider
TUOS	Transmission Use of System
WACC	Weighted Average Cost of Capital

7. Appendices

Appendix 1.01	Powerlink 2018–22 Revised Revenue Proposal – Director's Certification Statement – Revised Forecast Capital Expenditure
Appendix 2.01	Powerlink – Transmission Network Forum Summary Report
Appendix 2.02	Stakeholder Perception Survey 2016 - Summary
Appendix 3.01	STPIS – AEMO advice on unplanned outage classification (email) – confidential
Appendix 3.02	Project Proposal for Increase Design Temperature Bouldercombe to Raglan and Larcom Creek to Calliope River 275kV Transmission Lines
Appendix 3.03	Revised Pricing Methodology
Appendix 4.01	Nuttall Consulting – Review of AER Draft Decision
Appendix 4.02	Revised Contingent Project Plan
Appendix 4.03	Future Wide Area Network Implementation Strategy
Appendix 4.04	Transformer Life Cycle Cost Model

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Further information

Full details of Powerlink's Revenue Proposal and Revised Revenue Prposal are available on the Determinations and Access Arrangements section of the AER's website: www.aer.gov.au

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