2023-27
POWERLINK QUEENSLAND REVENUE PROPOSAL

Supporting Document – PUBLIC

Guide to Network Capital Expenditure Project Packs

Guide to Network Capital Expenditure Project Packs

1 Purpose

This document is a guide to the project packs included as supporting documents to our Revenue Proposal. The guide should be read in conjunction with the project packs to understand:

- the purpose of each of the documents included in the project packs; and
- the level of detail to expect, based on the approval status of each proposed investment.

2 Overview

Powerlink's 2023-27 Revenue Proposal adopts a Hybrid+ approach to establishing our forecast capital expenditure. This approach utilises a mix of bottom-up estimates and top-down forecasts to develop the forecast capital expenditure.

A significant portion of the forecast network capital expenditure is supported by project and program specific information contained across multiple project documents. These project documents have been collated into 'project packs' to demonstrate the current justification and assessment of the proposed investments.

The following sections outline the project governance cycle, the purpose of each document type in the project packs and the level of information that may be expected in these documents based on the stage in the project governance cycle of the proposed investment.

3 Project Governance Cycle

Our project governance cycle is outlined in our Regulated Network Capital Investment Approval–Guideline, which is included as a supporting document to our Revenue Proposal. Figure 3-1 illustrates the project governance cycle and demonstrates how we identify and validate a network need (proposed investment) and then develop and refine options to determine the preferred option for approval and subsequent implementation.

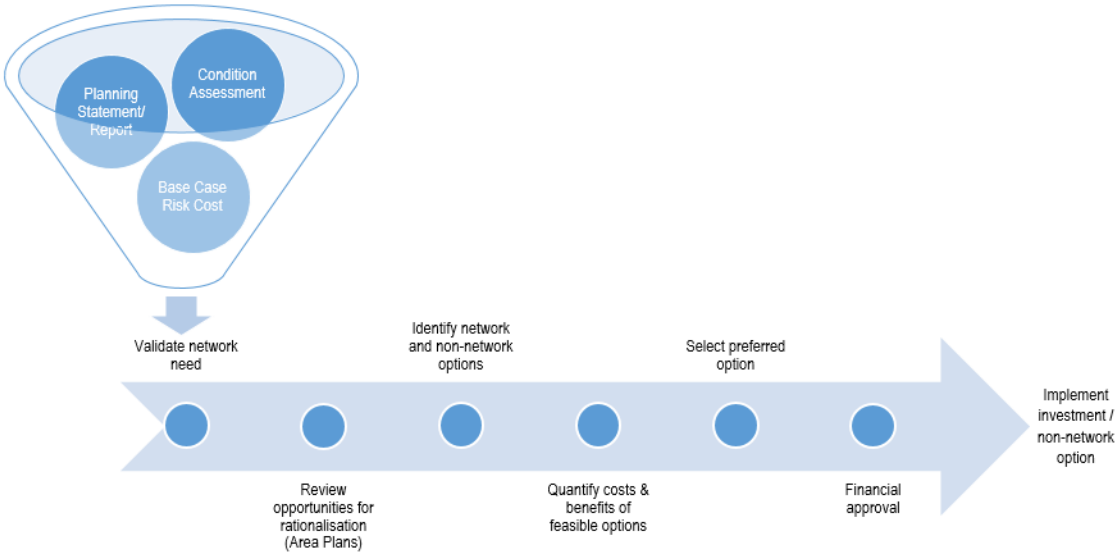

Figure 3-1 Project governance cycle

In addition to the general approach identified in Figure 3-1, we incorporate the requirements of the Regulatory Investment Test for Transmission (RIT-T) and undertake the associated public

consultation process[1], as appropriate, when identifying potential non-network options and determining the preferred option.

3.1 Proposed investment status and approval timing

Figure 3-2 illustrates the progression and timing of investment approvals under normal business practice. The figure identifies the percentage of total capital expenditure in each year attributed to projects in differing stages, or forecasting phases, of the project governance cycle, i.e. those that are, or will be, approved by January 2021, those for which work has commenced toward obtaining approval, and those that have not yet been commenced. For the purpose of the project packs, we have identified projects simply as either 'Approved' or 'Not Approved'.

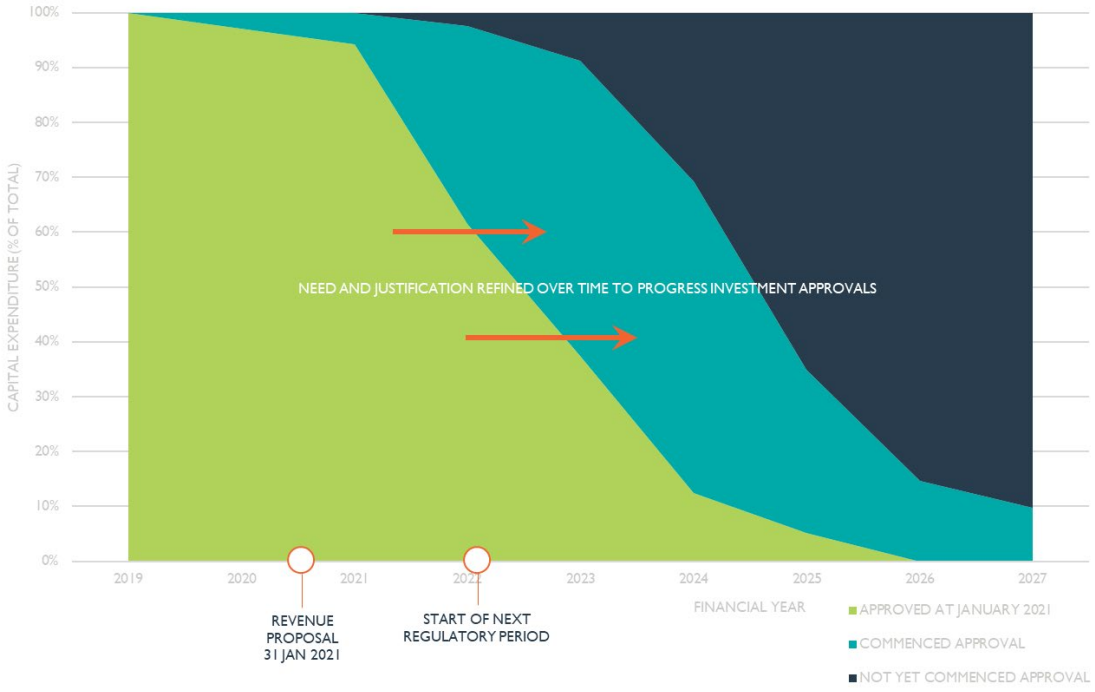

Figure 3-2 Capital expenditure forecasting phases

Capital expenditure in 2020/21 is overwhelmingly attributable to 'Approved' projects, which is as expected from our project governance cycle. The remainder of capital expenditure in 2021 is on preparatory works on projects in order to obtain approval, including the management of the RIT-T process. Beyond the current year, the proportion capital expenditure attributable to 'Approved' projects falls away sharply, reflecting that capital expenditure plans for future years are not fully approved and planned out.

3.2 Project packs and investment status

We have included 30 project packs for network capital projects as supporting documents to our Revenue Proposal. These project packs represent proposed investments with an expected value greater than approximately $12 million, or which have been specifically identified to be forecast using a bottom-up methodology, such as transformer reinvestments, together with a small selection of already fully approved projects.

The project packs account for a total network capital expenditure within the 2023-27 regulatory period of approx. $475 million, which is approx. 63% of the total network capital expenditure forecast for the period.

[1] RIT-T Consultation Process, Powerlink, https://www.powerlink.com.au/rit-t-consultation-process

Figure 3-3 highlights the current approval status of these proposed investments alongside their identified target commissioning date range.

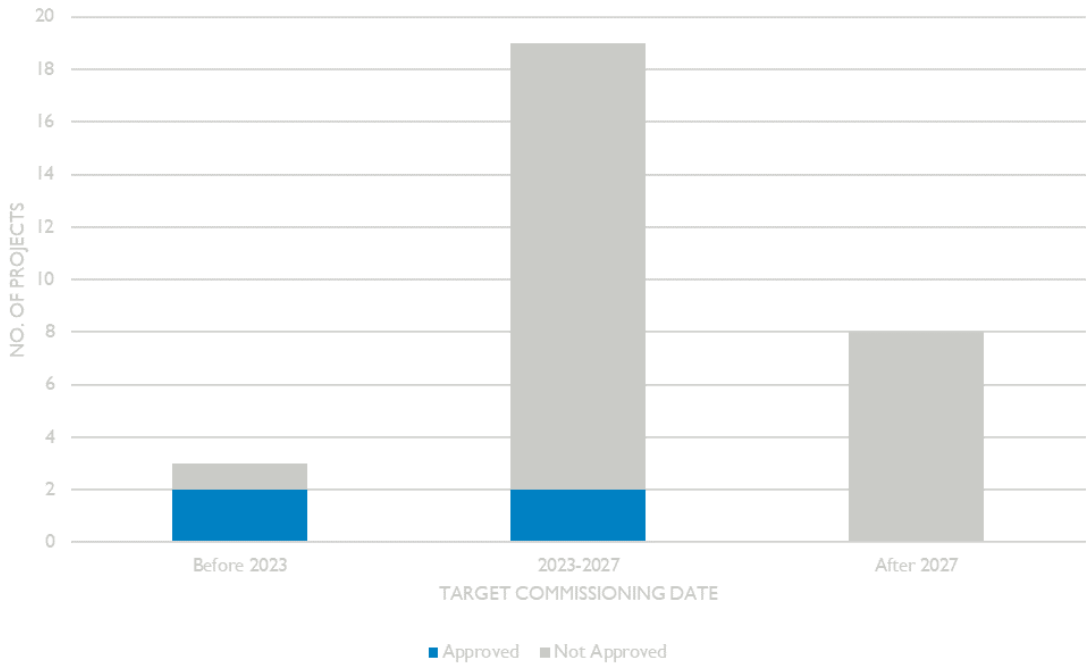

Figure 3-3 Project packs by investment status and expected completion

Four of the 30 project packs provided are for 'Approved' projects. The remaining majority are project packs for investments that are yet to finalise, or commence, the project approval process, i.e. are 'Not Approved'.

Of the project packs for projects that are 'Not Approved', 18 (60%) are for projects that are due to be commissioned (completed) before or within the 2023-27 regulatory period. The remaining eight (27%) are for projects that are not due to be commissioned until after the 2023-27 regulatory period, but which have substantial capital expenditure within the 2023-27 regulatory period..

Detailed option analysis and economic assessment will be progressively developed for these investments as they progress toward approval.

4 Contents of Project Packs

4.1 Project Pack Summary

The Project Pack Summary provides an overview of the proposed investment based on excerpts of the detailed documents that follow. The summary identifies the asset, condition and network drivers for investment, potential options, associated risk monetisation, proposed timing and estimated cost for the investment.

At the end of each summary, the list of documents included in the Project Pack for the proposed investment is provided in the order that the document appears in the Project Pack. Information sourced from Project Pack documents is referenced throughout the summary by means of superscript; where the superscript correlates to the document number in the summary document list.

4.2 Condition Assessment Report

The purpose of the Condition Assessment Report (CA) is to assess the condition and expected remaining life of the assets inspected. It defines the need, and expected future timing, for asset intervention where business-as-usual activities (e.g. routine inspections and corrective

maintenance) no longer enable the network asset to meet prescribed service levels due to the deterioration of asset condition or obsolescence of the asset.

A CA typically includes an assessment of the asset equipment based on visual inspection and available measurable data. This assessed condition is translated into a Health Index (HI) to provide a comparable tool to indicate the expected remaining life of each item of equipment based on its condition, rather than its nameplate age. A similar approach is used for each asset class of substation primary plant, substation secondary systems and transmission lines.

As an example, Table 4-1 illustrates the HI methodology used for substation equipment. For substation primary plant, the individual HI of each item of equipment within an asset (i.e. a substation bay) is used to derive a 'reinvestment index' (RI) for the entire asset. The RI provides an overall tool to compare primary assets (switching bays) within a substation to provide a guide to when intervention is expected to be necessary.

Table 4-1 Substation equipment health index methodology overview

HI / RI	Estimated Remaining Life (years)	Action (excl. routine and condition based maintenance activities)	Condition Overview
10	1 -2	Annual inspection and review of CA required or special maintenance regime implemented to manage condition risks.	Poor condition – needs urgent action.
9	2-3		Poor condition – needs prompt, planned action.
8	3 - 5		Poor condition – needs planned action (intervention or condition monitoring)
7	5 - 10	Review and update CA to monitor aging and degradation of equipment. Project scope initiated.	Deteriorating condition – future planned replacement required.
6	10 - 20	Detailed CA trigger.	Deteriorating condition – future planned replacement needs to be considered and timing confirmed.
5	20 - 25	Plan detailed CA in 5 years.	Satisfactory condition – may need some mid-life refurbishment activities.
4	25 - 30	Mid-life CA (desktop) trigger – review maintenance notifications.	Satisfactory condition
3	30 - 35	Annual review of HI and reinvestment index (RI) begins.	Good condition
2	35 - 40	Annual review of notifications – dealing with infant mortality issues.	Good condition
1	≥40	None	New

Based on the enduring need assessment of the asset, the intervention may take the form of decommissioning, significant refurbishment or life extension of existing assets, or selected/full replacement of assets on a like-for-like basis with modern equivalent equipment that is likely to have reduced failure consequences.

Although the HI and RI are used to trigger subsequent actions, the timing of intervention is based upon a risk cost analysis, while the nature of the intervention is determined by undertaking an economic assessment of all identified feasible options to address the condition risks. To be clear, the conclusions reached in the CA are based on the underlying asset condition and current performance, with the Health Index providing a convenient summary of the findings.

Where the remaining expected life of an asset is not readily assessable through visual inspection and measurable data, or are dependent predominantly on technological obsolescence that requires action on a coordinated fleet level, e.g. telecoms assets, the asset need is detailed in a strategy document.

4.3 Planning Statement / Planning Report

The Planning Statement, or Planning Report, defines the investment need and network risk arising from non-investment in the asset. Projects that have significantly progressed toward approval will typically include a Planning Report, while projects at a more conceptual phase will include a Planning Statement.

Where an asset is identified as reaching its end-of-life, this document conceptually identifies both network and non-network options that enable the required level of transmission services to be met (regardless of the asset deployed). This document also identifies levels of unserved energy at risk, and any non-compliances that would arise with reliability obligations and/or system standards, if the asset is removed or fails in service.

4.4 Base Case Risk & Maintenance Costs Summary Report

The purpose of this document is to quantify the base case risk cost profile for the asset, providing risk monetisation for safety, network, financial and environmental risks posed by the condition or obsolescence of the asset. It effectively identifies the escalating risk value should no material intervention in the asset, other than routine maintenance activities, occur.

The methodology used to quantify risks associated with network assets approaching the end of their life is based on the AER Industry Practice Application Note for Asset Replacement Planning[2]. Within this document type, risk cost has been calculated by multiplying the following attributes:

- probability of failure;
- likelihood of consequence; and
- cost of consequence.

Risk cost forecasts are calculated typically over a ten year period and then extrapolated as necessary to support an appropriate assessment timeframe in relation to the expected life of the asset. Full details of the attributes used in the risk calculation methodology are described in our Risk Cost – Basis of Preparation and Asset Risk Management – Framework, which are included as supporting documents to our Revenue Proposal, and in summary on our website[3].

4.5 Project Scope Report

The Project Scope Report (PSR) defines the high level, functional requirements of the recommended option that is required to achieve the project need and objectives derived from the Planning Statement. The PSR also defines any assumptions and special considerations affecting project scope options, e.g. current standards and compliance requirements that need to be addressed within the project.

Where the project is progressing through business-as-usual activities in preparation for full option assessment, as part of the RIT-T process, a PSR may also provide details of alternative options and RIT-T 'modelled projects' in order to effectively cost and assess all options and investment paths over an appropriate assessment timeframe.

The PSR is a formal document that is used to request an estimate for one or more options described in the document.

[2] Industry practice application note for asset replacement planning, AER, https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/industry-practice-application-note-for-asset-replacement-planning
[3] Overview of Asset Risk Cost Methodology, Powerlink, https://www.powerlink.com.au/sites/default/files/2019-05/Overview%20of%20Asset%20Risk%20Cost%20Methodology.pdf

4.6 Concept Estimate / Project Management Plan

A Concept Estimate, or Project Management Plan, provides a financial estimate of the labour, materials, equipment and subcontracts required to achieve the project scope. Project estimates are developed using a first principles approach, where the estimate is calculated based upon the specific resources and quantities required to complete the defined scope of works.

Class 5 (-50% to +100% accuracy) estimates are developed for projects with high level scopes early in their development life. These may be presented in a Concept Estimate document or a Project Management Plan, depending upon the level of consideration applied to project staging, outage requirements and project delivery strategy.

Class 3 (-20% to +30% accuracy) estimates are developed for projects where the scope is more defined, and support full financial approval. These are typically presented in a Project Management Plan, which details the project staging, outage requirements and project delivery strategy.

Further details of the estimating process are provided in Appendix 7.03 Cost Estimating Methodology of our Revenue Proposal.

4.7 RIT-T documents

RIT-T documents are included in the project packs where the formal RIT-T consultation process has commenced or concluded.

A Project Specification Consultation Report (PSCR) is included in the project pack where the project has recently commenced the RIT-T process. This document provides details of the identified need, credible options, technical characteristics of non-network options, and categories of market benefits addressed in the assessment. In particular, it encourages submissions from potential proponents of feasible non-network options to address the identified need.

A Project Assessment Conclusions Report (PACR) is included where the project has concluded the RIT-T process. It provides details of the identified asset need, credible options, technical characteristics of non-network options, and categories of market benefits addressed. It summarises the assessment undertaken to compare network and non-network options to address the network need, and confirms the ‘preferred option’ to address network requirements at the lowest net cost to electricity customers.

4.8 List of Project Packs

Table 4-2 Summary of project pack document project pack document contents

Project No.	Description	Summary	CA	Planning	Base Case	Scope	Estimate	RIT-T
CP.01656	Calliope River to Larcom Creek 275kV Transmission Line Refit	✓	✓	✓	✓	✓	✓	×
CP.02356	Lilyvale Transformers 3 and 4 Replacement	✓	✓	✓	✓	✓	✓	✓
CP.02360	Nebo Transformers 3 and 4 Replacement	✓	✓	✓	✓	✓	✓	×
CP.02369	Blackwater Transformers 1 and 2 Replacement	✓	✓	✓	✓	✓	✓	✓
CP.02370	Tully Transformer 2 Replacement	✓	✓	✓	✓	✓	✓	×
CP.02371	Bouldercombe Transformers 1 and 2 Replacement	✓	✓	✓	✓	✓	✓	✓
CP.02392	Woolooga Secondary Systems Replacement	✓	✓	✓	✓	✓	✓	×
CP.02415	Greenbank to Mudgeeraba 275kV Transmission Line Refit	✓	✓	✓	✓	✓	✓	×
CP.02478	South Pine Transformer 5 Life Extension	✓	✓	✓	✓	✓	✓	×
CP.02512 CP.02513 CP.02514 CP.02822	OpsWAN Replacement	✓	✓(1)	×	×	✓	✓	×
CP.02584	Tarong Transformers 2 and 3 Replacement	✓	✓	✓	✓	✓	✓	×
CP.02644	Calliope River to Wurdong Tee 275kV Transmission Line Refit	✓	✓	✓	✓	✓	✓	×
CP.02649	Redbank Plains Transformers Upgrade	✓	✓	✓	✓	✓	✓	×
CP.02694	Gladstone South to Callemondah 132kV Transmission Line Rebuild	✓	✓	✓	✓	✓	✓	×
CP.02723	Ross 275kV Primary Plant Replacement	✓	✓	✓	✓	✓	✓	✓
CP.02727	Gladstone South Secondary Systems Replacement	✓	✓	✓	✓	✓	✓	✓
CP.02750	Ross to Chalumbin 275kV Transmission Line Refit	✓	✓	✓	✓	✓	✓	×
CP.02751	Murarrie Secondary Systems Replacement	✓	✓	✓	✓	✓	✓	×
CP.02754	Davies Creek to Bayview Heights 275kV Transmission Line Refit	✓	✓	✓	✓	✓	✓	×

Project No.	Description	Summary	CA	Planning	Base Case	Scope	Estimate	RIT-T
CP.02756	Molendinar Secondary Systems Replacement	✓	✓	✓	✓	✓	✓	×
CP.02760	Middle Ridge Secondary Systems Replacement	✓	✓	✓	✓	✓	✓	×
CP.02765	Broadsound Bus Reactor	✓	×	✓	✓	✓	✓	✓
CP.02771 CP.02811 CP.02812 CP.02813	Telecommunication Network Consolidation	✓	✓(1)	×	×	✓	✓	×
CP.02778	Calliope River to Wurdong Tee 275kV Transmission Line Rebuild	✓	✓	✓	✓	✓	✓	×
CP.02796	Goodna Secondary Systems Replacement	✓	✓	✓	✓	✓	✓	×
CP.02814	Managing South East Queensland Voltages	✓	×	✓	✓	✓	✓	×
CP.02817	Teebar Creek Secondary Systems Replacement	✓	✓	✓	✓	✓	✓	×
CP.xxxxx	Calvale Selective Primary Plant Replacement	✓	✓	✓	✓	✓	✓	×
CP.xxxxx	Greenbank Secondary Systems Replacement	✓	✓	✓	✓	✓	✓	×
CP.xxxxx	Woree to Kamerunga 132kV Transmission Line Rebuild	✓	✓	✓	✓	✓	✓	×

(1) The asset need is detailed in a strategy document.