Appendix F TAPR templates methodology

This appendix provides information about Powerlink's Transmission Annual Planning Report Templates.

The National Electricity Rules (NER) require a Transmission Annual Planning Report (TAPR) to be consistent with the Australian Energy Regulator's (AER's) Transmission Annual Planning Report Guidelines (TAPR Guidelines)[1]. The TAPR Guidelines set out the required format of TAPRs, including the provision of TAPR Templates to complement the TAPR document. The purpose of the TAPR Templates is to provide a set of consistent data across the National Electricity Market (NEM) to assist stakeholders to make informed decisions.

Readers should note the data provided is not intended to be relied upon explicitly for the evaluation of investment decisions. Interested parties are strongly encouraged to contact Powerlink in the first instance.

The TAPR template data may be directly accessed on Powerlink's TAPR Portal. Alternatively, contact NetworkAssessments@powerlink.com.au for assistance.

F.1 Context

While care is taken in the preparation of TAPR Templates, data is provided in good faith. Powerlink accepts no responsibility or liability for any loss or damage that may be incurred by persons acting in reliance on this information or assumptions drawn from it.

The proposed preferred investment and associated data is indicative, has the potential to change and will be technically and economically assessed under the Regulatory Investment Test for Transmission (RIT-T) consultation process as/if required at the appropriate time. TAPR Templates may be updated at the time of RIT-T commencement to reflect the most recent data and to better inform non-network providers[2]. Changes may also be driven by the external environment, advances in technology, non-network solutions and outcomes of other RIT-T consultations which have the potential to shape the way in which the transmission network develops.

There is likely to be more certainty in the need to reinvest in key areas of the transmission network which have been identified in the TAPR in the near-term, as assets approach their anticipated end of technical service life. However, the potential preferred investments (and alternative options) identified in the TAPR Templates undergo detailed planning to confirm alignment with future reinvestment, optimisation and delivery strategies. This near-term analysis provides Powerlink with an additional opportunity to deliver greater benefits to customers through improving and further refining options. In the medium to long-term, there is less certainty regarding the needs or drivers for reinvestments. As a result, considerations in the latter period of the annual planning review require more flexibility and have a greater potential to change or adapt to the external environment as the NEM evolves and customer behaviour changes.

Where an investment is primarily focused on addressing asset condition issues, Powerlink has not attempted to quantify the impact on the market; for example, where there are market constraints arising from reconfiguration of the network around the investment and Powerlink considers that generation operating within the market can address this constraint.

Groupings of some connection points are used to protect the confidentiality of specific customer loads.

F.2 Methodology/principles applied

The TAPR Guidelines incorporate text to define or explain the different data fields in the template. Powerlink has used these definitions in the preparation of the data within the templates.

For connection point templates, the expected unserved energy (EUSE) has been calculated using aggregated failure statistics for network assets, considering both momentary and sustained failures by the following expression:

$$\text{EUSE} = \text{Probability of Asset Failure} \times \text{Median Restoration time} \times \text{MW @ Risk}$$

For line segment templates, the expected unserved energy should be interpreted as the annual energy that cannot be supplied by that asset under system normal conditions.

Further to the AER's data field definitions, Powerlink provides details on the methodology used to forecast the daily demand profiles. Table F.1 provides further context for some specific data fields.

The data fields are denoted by their respective TAPR Guideline Rule designation, TGCPXXX (TAPR Guideline Connection Point) and TGTLXXX (TAPR Guideline Transmission Line).

1 National Electricity Rules, clause 5.12.2(c)(1). See also Australian Energy Regulator, Transmission Annual Planning Report Guidelines, December 2018.
2 Separate to the publication of the TAPR document which occurs annually.

F.3 Development of daily demand profiles

Forecasts of the daily demand profiles for the days of annual maximum and minimum demands over the next 10 years were developed using VISION forecasting and planning (by Blunomy). These daily demand profiles are an estimate and should only be used as a guide. For further context and explanation of the methodology used to develop minimum and maximum demand profiles refer to Appendix D.2.

The 10-year forecasts of daily demand profiles that have been developed for the TAPR Templates include:

- 50% probability of exceedance (PoE) Maximum demand, MVA (TGCP008)
    - Where the megawatt (MW) transfer through the asset with emerging limitations reverses in direction, the megavolt amperes (MVA) is denoted a negative value
- Minimum demand, MVA (TGCP008)
    - Where the MW transfer through the asset with emerging limitations reverses in direction, the MVA is denoted a negative value
- 50% PoE Maximum demand, MW (TGCP010)
- Minimum demand, MW (TGCP011).

The maximum demand forecast on the minimum demand day (TGCP009) and the forecast daily demand profile on the minimum demand day (TGCP011) were determined from the minimum (annual) daily demand profiles.

Table F.1 Further Definitions for Specific Data Fields

Data Field	Definition
TGCP013 and TGTL008 Maximum load at risk per year	The load at risk takes into account both the network topology and aggregated outage and asset failure statistics for lines, transformers, and switching assets across the network. Where detailed project scopes and project requirements have not been determined, the aggregation of impacted loads were deemed at risk.
TGCP016 and TGTL011 Preferred investment - capital cost	The timing reflected for the estimated capital cost is the year of proposed project commissioning. RIT-Ts to identify the preferred option for implementation would typically commence three to five years prior to this date, relative to the complexity of the identified need, option analysis required and consideration of the necessary delivery timeframes to enable the identified need to be met. To assist non-network providers, RIT-Ts in the nearer term are identified in Table 5.4.
TGCP017 and TGTL012 Preferred investment - Annual operating cost	Powerlink has applied a standard 2% of the preferred investment capital cost to calculate indicative annual operating costs.
TGCP024 Historical connection point rating	Includes the summer and winter ratings for the past three years at the connection point. The historical connection point rating is based on the most limiting network component on Powerlink's network, in transferring power to a connection point. However lower downstream distribution connection point ratings could be more limiting than the connection point ratings on Powerlink's network.
TGCP026 Unplanned outages	Unplanned outage data relates to Powerlink's transmission network assets only. Forced and faulted outages are included in the data provided. Information to date is based on historical outage data.
TGPC028 and TGTL019 Annual economic cost of constraint	The annual economic cost of the constraint is the direct product of the annual expected unserved energy and the Value of Customer Reliability (VCR) related to the investment. It does not consider cost of safety risk or market impacts such as changes in the wholesale electricity cost or network losses.
TGTL005 Forecast 10-year asset rating	Asset rating is based on an enduring need for the asset's functionality and is assumed to be constant for the 10-year outlook period.
TGTL017 Historical line load trace	Due to the meshed nature of the transmission network and associated power transfers, the identification of load switching would be labour intensive and the results inconclusive. Therefore, the data provided does not highlight load switching events.