Powerlink Queensland

Transmission Annual Planning Report

2016

Please direct Transmission Annual Planning Report enquiries to:

Stewart Bell
Group Manager Strategy and Planning
Investment and Planning Division
Powerlink Queensland

Telephone: (07) 3860 2374
Email: sbell@powerlink.com.au

Contents

Contents

Executive summary

Planning and development of the transmission network is integral to Powerlink Queensland meeting its obligations under the National Electricity Rules (NER), *Queensland's Electricity Act 1994* and its Transmission Authority.

The Transmission Annual Planning Report (TAPR) is a key part of the planning process. It provides information about the Queensland electricity transmission network to everyone interested/involved in the National Electricity Market (NEM) including the Australian Energy Market Operator (AEMO), Registered Participants and interested parties. The TAPR also provides broader stakeholders with an overview of Powerlink's planning processes and decision making on potential future investments.

The TAPR includes information on electricity energy and demand forecasts, the capability of the existing electricity supply system, committed generation and network developments. It also provides estimates of transmission grid capability and potential network and non-network developments required in the future to continue to meet electricity demand in a timely manner.

Overview

The 2016 TAPR outlines the key drivers impacting Powerlink's business. Excluding the positive effect of high levels of liquefied natural gas (LNG) development in the Surat Basin, forecasts for both energy and demand across the balance of Queensland over the outlook period remains relatively flat.

An amended planning standard for the transmission network also came into effect on 1 July 2014, allowing the network to be planned and developed with up to 50MW or 600MWh at risk of being interrupted during a single network contingency. This provides more flexibility in the cost-effective development of network and non-network solutions to meet future demand.

The Queensland transmission network experienced significant growth in the period from the 1960s to the 1980s. The capital expenditure required to manage emerging risks related to assets now reaching the end of technical or economic life represents the majority of Powerlink's program of work over the outlook period. Considerable emphasis is placed on ensuring that asset reinvestment is not just on a like for like basis. Network planning studies have focused on evaluating the enduring need for existing assets in the context of a subdued demand growth outlook and the potential for network reconfiguration, coupled with alternative non-network solutions.

Powerlink's focus on stakeholder engagement has continued over the last year, with a range of engagement activities undertaken to seek stakeholder feedback and input into our network investment decision making. This included the Powrlink Queensland Transmission Network Forum incorporating related break-out sessions, including the revenue proposal, area planning of the network, and the impacts of new technologies on demand and energy forecasts.

Electricity energy and demand forecasts

The energy and demand forecasts presented in this TAPR consider the following factors:

- recent high levels of investment in LNG development in South West Queensland
- continued growth of solar photovoltaic (PV) installations
- continued slower Queensland economic growth
- continued consumer response to high electricity prices
- the impact of energy efficiency initiatives, battery storage technology and tariff reform.

In preparing its demand and energy forecast, Powerlink conducted a forum for industry experts to share insights and build on our knowledge relating to emerging technologies. As a result several enhancements were made to how these emerging technologies are forecast within this TAPR.

These forecasts are obtained through a reconciliation of two separate processes, namely top-down econometric forecasts derived from externally provided forecasts of economic indicators, and bottom-up forecasts from Distribution Network Service Providers (DNSPs) and directly connected customers at each transmission connection supply point.

Executive summary

Powerlink has developed its own econometric model for forecasting DNSP energy and demand which has been applied since the 2013 Annual Planning Report (APR)[1]. Discussion of this methodology can be found in Appendix B. Key economic inputs to this model include population growth, retail turnover and the price of electricity. DNSP customer forecasts are reconciled to meet the totals obtained from this model.

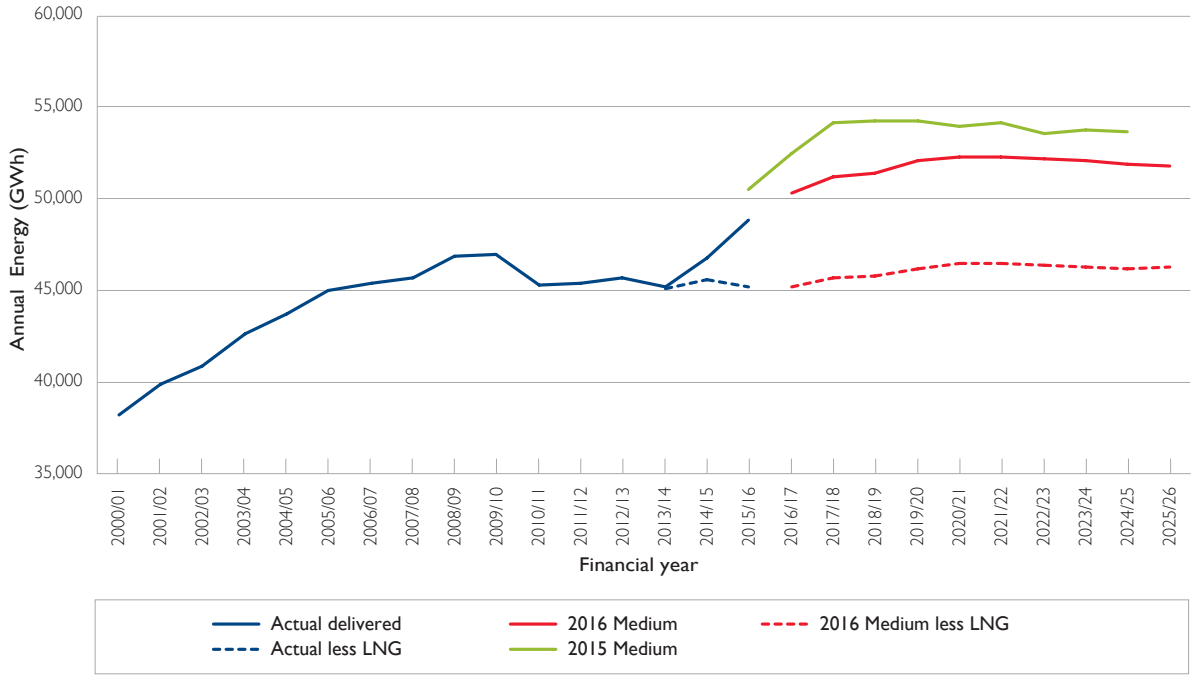
The 2015/16 summer in Queensland was hot and long lasting with a new record demand recorded at 5:30pm on 1 February, when 8,271 MW was delivered from the transmission grid. This corresponded to scheduled generation of 9,097MW, passing the previous record of 8,891MW in January 2010. This record was assisted by 439MW of new LNG load. It exceeded the 2015 Transmission Annual Planning Report forecast by around 1% and was mainly driven by load located in South East Queensland.

Electricity energy forecast

Based on the medium economic outlook, Queensland's delivered energy consumption is forecast to increase at an average of 0.6% per annum over the next 10 years from 48,965GWh in 2015/16 to 51,756GWh in 2025/26. Without the LNG sector, energy over the forecast period grows at 0.2% per annum. Continued uptake of solar PV and consumer concern regarding recent electricity price increases are expected to keep this growth rate relatively flat.

A comparison of the 2015 and 2016 TAPR forecasts for energy delivered from the transmission network is displayed in Figure 1. Energy delivered from the transmission network for 2015/16 is expected to fall short of the 2015 TAPR forecast by around 3%. This is mainly driven by slower than expected energy usage growth within the LNG sector.

Figure 1 Comparison of energy forecasts for the medium economic outlook



[1] This Transmission Annual Planning Report was formerly called the Annual Planning Report.

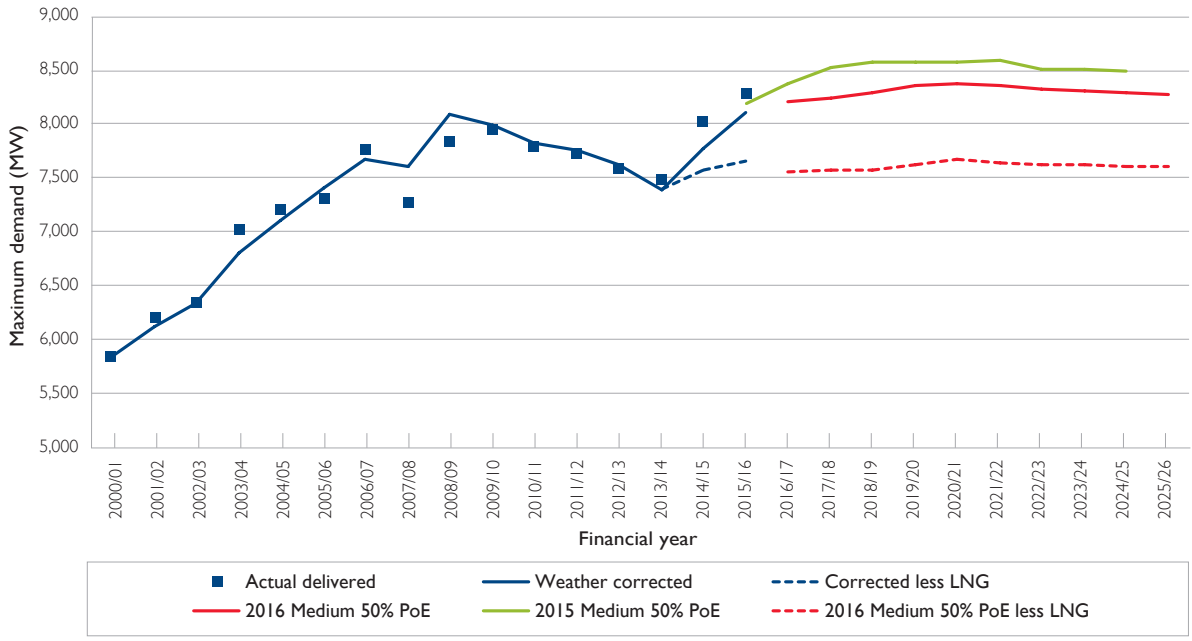
Electricity demand forecast

Based on the medium economic outlook, Queensland's transmission delivered summer maximum demand is forecast to increase at an average rate of 0.2% per annum over the next 10 years, from 8,101MW (weather corrected) in 2015/16 to 8,269MW in 2025/26. Without the LNG sector, maximum delivered summer demand is forecast to fall over the period at a rate of 0.1% per annum.

The transmission delivered maximum demand for summer 2015/16 of 8,271MW was a new record for Queensland and included 439MW of new LNG load.

A comparison of recent and current summer maximum demand forecasts for the medium economic outlook, based on a 50% probability of exceedance (PoE) is displayed in Figure 2. As with the energy forecasts, the latest demand forecast has been adjusted to take account of actual consumption and demands over the 2015/16 period and updated to reflect the latest economic projections for the State.

Figure 2 Comparison of summer demand forecasts for the medium economic outlook



Powerlink's asset planning criteria

There is a significant focus on striking the right balance between reliability and cost of transmission services. In response to these drivers, the Queensland Government amended Powerlink's N-1 criterion to allow for increased flexibility. This formally came into effect on 1 July 2014. The amended standard permits Powerlink to plan and develop the transmission network on the basis that load may be interrupted during a single network contingency event, within limits of unsupplied demand and energy that may be at risk during the contingency event.

Powerlink is required to implement appropriate network or non-network solutions in circumstances where the limits of 50MW or 600MWh are exceeded or when the economic cost of load which is at risk of being unsupplied justifies the cost of the investment. Therefore, the amended planning standard has the effect of deferring or reducing the extent of investment in network or non-network solutions required in response to demand growth. Powerlink will continue to maintain and operate its transmission network to maximise reliability to consumers.

Powerlink has established policy frameworks and methodologies to support the implementation of this standard, which are being applied in various parts of the Powerlink network to inform investment decisions.

Executive summary

Future network development

Based on the medium economic forecast outlook, the amended planning standard and committed network and non-network solutions, network augmentations are not planned to occur as a result of network limitations within the five-year outlook period of this TAPR.

There are several proposals for large mining, metal processing and other industrial loads that have not yet reached a committed development status. These new large loads are within the resource rich areas of Queensland and associated coastal port facilities. These loads have the potential to significantly impact the performance of the transmission network supplying, and within, these areas. Within this TAPR, Powerlink has outlined the potential network investment required in response to these loads emerging in line with the high economic outlook forecast.

As previously mentioned, the Queensland transmission network experienced significant growth in the period from the 1960s to the 1980s. The capital expenditure needed to manage the emerging risks related to this asset base, which is now reaching end of technical or economic life represents the majority of Powerlink's program of work within the outlook period. The reinvestment program is particularly focused on transmission lines where condition assessment has identified emerging risks requiring action within the outlook period.

Considerable emphasis has been given to an integrated approach to the analysis of future reinvestment needs and options. With the relatively flat demand forecast outlook, Powerlink has systematically assessed the enduring need for assets at the end of their technical or economic life and considered a broad range of options including network reconfiguration, asset retirement, non-network solutions or replacement with an asset of lower capacity. An example of this is the strategy to undertake minor works from Central Queensland to Southern Queensland to align the technical end of life of the 275kV transmission lines. This incremental development approach defers large capital investment and has the benefit of maintaining the existing topology, transfer capability and operability of the transmission network.

The integrated planning approach has revealed a number of opportunities for reconfiguration of Powerlink's network within the outlook period. Powerlink has also sought to include additional information in the TAPR relating to long-term network reconfiguration strategies that in future years are likely to require further stakeholder engagement and consultation.

Committed and commissioned projects

During 2015/16, the majority of committed projects provided for reinvestment in transmission lines and substations across Powerlink's network.

In terms of network augmentation, Powerlink completed the construction of additional feeder bays at Pioneer Valley to increase voltage stability in the Mackay area.

Powerlink also has transmission augmentation projects in progress to manage localised voltage limitations in the Northern Bowen Basin and North zones, requiring the installation of 132kV capacitor banks in the Moranbah area.

Grid section and zone performance

During 2015/16, the Powerlink transmission network supported the delivery of a summer maximum demand of 8,271MW, 252MW higher than that recorded in summer 2014/15.

Most grid sections showed greater levels of utilisation during the year. Reduction in Bulli zone generation and increased Bulli zone load are the predominant reason for the lower energy transfers across the South West grid section.

The transmission network in the Queensland region performed reliably during the 2015/16 year, including during the summer maximum demand. Queensland grid sections were largely unconstrained due in part to the absence of high impact events as well as prudent scheduling of planned transmission outages.

Additional stakeholder consultation for non-network solutions

In March 2016, Powerlink initiated a Non-network Solution Feasibility Study process to further improve consultation with non-network providers and to seek potential alternate solutions for network developments outside of NER consultation requirements. This new process will help in achieving the right balance between reliability and cost by providing opportunities to exchange early information on the viability and potential of non-network solutions and how they may integrate with the transmission network. Through the recently initiated Non-network Solution Feasibility Study for Garbutt transformers, Powerlink is continuing to build upon its engagement process with non-network providers and where possible expand the use of non-network solutions to address future needs of the transmission network, particularly as an alternative option to like for like replacement or to complement an overall network reconfiguration strategy, where technically and economically feasible. Powerlink will also continue to request non-network solutions from market participants as part of the Regulatory Investment Test for Transmission (RIT-T) process.

Customer and consumer engagement

Powerlink is continuing to implement its consumer engagement strategy to support the considerable work already being undertaken to engage with stakeholders and seek their input into Powerlink's business focus and objectives.

The consumer engagement strategy focuses on education, encouraging consumer input and appropriately incorporating input into business decision making to improve planning and operational activities. A primary aim is to ensure Powerlink's service better reflects consumer values, priorities and expectations.

In early 2015, Powerlink undertook additional targeted customer and consumer research to gain a stronger understanding of stakeholder views and better respond to matters of importance.

The results from this survey represented the views from a range of stakeholders including customers, consumer organisations, government/regulators and industry associations. An additional 'health check' of key stakeholder groups in late 2015 supported this research, and highlighted that perceptions of Powerlink largely remain positive.

Powerlink has also established a Customer and Consumer Panel, which meets quarterly. This panel provides a face-to-face forum for stakeholders to provide input and feedback regarding Powerlink's decision making, processes and methodologies. It also provides Powerlink with an additional avenue to keep stakeholders better informed about operational and strategic topics of relevance.

Focus on continuous improvement in the TAPR

As part of Powerlink's commitment to continuous improvement, the 2016 TAPR builds upon the integrated approach to future network development introduced in the 2015 TAPR and contains detailed discussion on key areas of future expenditure.

The 2016 TAPR includes the following enhanced or additional information:

- discussion on the potential for generation developments (in particular renewable generation) including new information on available network capacity at various locations in the transmission network (refer to Chapter 7)
- incorporation of updated information explicitly relating to the future impacts of emerging technologies into Powerlink's forecasting methodology (refer to Appendix B)
- Revenue Proposal alignment – information regarding Powerlink's Revenue Proposal which was submitted to the AER in January 2016 and its relationship to the proposed capital expenditure discussed within the TAPR outlook period (refer to Section 4.1.2)
- non-network solutions – ongoing improvement of information and engagement practices for non-network solution providers (refer to Section 1.8.2 and Section 4.2)

Executive summary