Supplementary Revenue Proposal - Attachment

2006 Demand Forecast

The 2006 load forecast is summarised in Powerlink's Annual Planning Report (APR) 2006. An analysis of the standard weather (50% PoE[1]) forecast shows a slightly higher demand growth compared to that foreshadowed in the APR 2005. This change can be attributed to a number of factors:

- The summer demand growth rate for the first year is greater than the trend from temperature and diversity corrected demands over the last two summers, which can be attributed to new loads connecting to the network. Firstly, a new industrial load of around 20MW that was scheduled to connect into Energex's system prior to summer 2005/06 was delayed but will be in place before summer 2006/07. Secondly, a new load in the Gladstone area of around 20MW is scheduled to connect prior to summer 2006/07;
- The temperature and diversity corrected 2005/06 demand for south east Queensland (4251MW) has increased by 14MW compared with last year's forecast;
- ENERGEX, NIEIR and Queensland Government surveys all predict a more prolonged increase in new domestic air-conditioning installations than previously forecast, as well as a strong ongoing trend to upgrade older air-conditioning installations;
- Current observed levels of development proposals and construction activity in the south east Queensland area remain higher than in the 2000-2003 period;
- NIEIR predictions of Queensland economic growth rates have slightly increased over the next ten years, and remain substantially higher than in other States of Australia;
- An expanded coal handling facility at Dalrymple Bay by 2009;
- A second new coal handling port facility at Gladstone in 2009;
- Expected small increases in output at some existing major industrial loads (Gladstone and Townsville);
- Deferment of the previously proposed new industrial load within Swanbank Enterprise Park to 2008;
- Reduced forecast loadings at an alumina refinery at Yarwun (west of Gladstone);

[1] 50% PoE means 50% probability of exceedence, ie. the demand which is likely to be exceeded 50% of the time, or one in every two years.

- Changed forecast loadings at numerous existing and new coal mines in central Queensland with a net overall increase of 85MW by 2011;
- Little change in expected levels of embedded non-scheduled generation forecasts; and
- An expectation that under future average winter weather conditions, utilisation of the expanding domestic air-conditioning installations in heating mode will increase at a greater rate than in recent years. This expectation has now been delayed a few years due to recent air-conditioning increases in winter offsetting less efficient heating methods and not yet manifesting as increased loading.

Whilst these changes do not result in significant changes to the standard weather (50% PoE) state coincident forecast load levels, the state coincident standard weather loads do not accurately reflect when the capability of the main transmission network is forecast to be exceeded. A more detailed analysis of the load patterns is required.

Firstly, the main transmission system must be capable of meeting the net peak load demand of particular areas or zones. Diversity between zones means that an individual zone's peak demand can easily exceed the demand in that zone at time of the overall state peak load. Secondly, for the main transmission system, the trigger to address network limitations is based on the 10% PoE zone or area peak demand levels. It is in this 10% zone peak demand (rather than the 50% PoE demand) where there has been a significant increase compared to the 2005 forecast. The increase is due to a significant increase in the temperature sensitivity of the load.

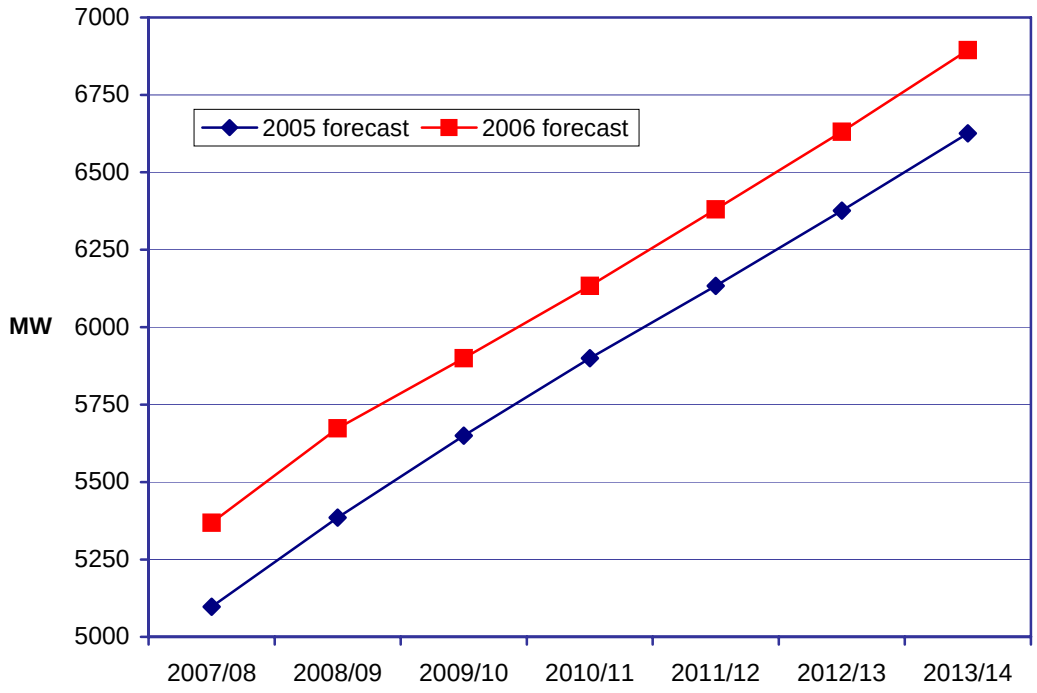
New installations of domestic air conditioning and upgrades of existing units in south-east Queensland have continued at record levels. The rate that occurred during 2005 even exceeded the record levels observed in 2004. Government surveys indicate the air conditioning penetration has increased from 31% to 56% over the period November 2001 to May 2005. A consequence of this increased penetration is an increase in the demand/temperature sensitivity of the load. Analysis has shown that in south east Queensland, the load sensitivity has grown from 67MW per˚C to 170MW per˚C over the same period. Since the 2005 load forecast, this sensitivity has increased substantially, from 118MW per˚C to 170MW per˚C, reflecting the higher rate of air conditioning penetration in 2005 compared to 2004[2].

[2] Annual Planning Report 2006, Appendix F.

There has also been recognition that resurgence in south east Queensland population growth rates over the period 2002-2004 to levels last seen in the early 1990's (2.5% to 3% per annum), has raised the level of underlying population growth expected for the next ten years.

Figure 1 shows both the 2005 and 2006 summer peak demand (10% PoE) forecasts for south east Queensland[3]. The net impact of the increased demand is about one year advancement in demand levels. That is, a certain level of peak demand occurs one year earlier in the 2006 forecast than it did in the 2005 forecast. This has a consequential timing impact of advancing the need for augmentation of the transmission network.

Figure 1: 2006 South East Queensland Summer Peak Demand Forecast



This has a material impact on the capex required by Powerlink for the 5-year period from 1 July 2007 to 30 June 2012.

[3] South East Queensland 10% PoE summer peak demand forecast for medium economic growth.

Due to time limitations, detailed review of the impact of the 2006 load forecast has been restricted to Powerlink's main grid sections:

- South West Queensland to South East Queensland (SWQ-SEQ) grid section;
- Central Queensland to North Queensland (CQ-NQ) grid section; and
- Central Queensland to Southern Queensland (CQ-SQ) grid section.

(a) Supply into South East Queensland

The increase in the southern Queensland 2006 load forecast is driven almost exclusively by south east Queensland. The result is that the peak south east Queensland load is advanced approximately 1 year compared to the level forecast in 2005.

The SWQ-SEQ grid section must therefore be capable of operating at higher transfer levels (both under N-1 and N-1 secure conditions) in order to meet mandated reliability of supply obligations to south eastern Queensland. This increased load further stresses this corridor and, on average, increases augmentation requirements across this grid section.

As in Powerlink's Revenue Proposal, augmentation needs within SWQ and between SWQ and SEQ were minimized for each scenario by first dispatching surplus generation in central and north Queensland up to the transfer limit available between central and southern Queensland (after allowing for the revised CQ-SQ augmentations). The remaining required generation in SWQ was then dispatched to maximise the thermal capability of the SWQ to SEQ transmission system. This dispatch methodology identifies the latest timings when augmentation within and out of SWQ is required to meet the mandated reliability standard.

Augmentation requirements were reassessed for each of the 40 scenarios. Depending on the scenario, either incremental augmentation options were viable initially (e.g. transformer augmentation at Middle Ridge) followed by further capacity upgrades later, or a larger scale augmentation was required initially to meet the required minimum transfer requirement. This is very much scenario dependent and the augmentation solutions therefore vary both in timing and quantum across the 40 scenarios.

Table 1 below compares the probability of the relevant projects for the 2005 and 2006 load forecasts across the 40 scenarios. This grid section contributes the most to the forecast capex increase.

Table 1: Impact of 2006 demand forecast on projects for augmentation of supply into south east Queensland[4].

Project	2005 forecast	2006 forecast
Middle Ridge 330/275kV Transformer Augmentation	24.5%	27.3%
Braemar to Halys 500kV Double Circuit line Operating at 275kV (Halys already established)	2.8%	12.7%
Establish Halys 275kV Substation and Braemar to Halys 500kV Double Circuit Operating at 275kV	73.3%	66.3%
South Pine 350MVAr SVC	69.3%	29.3%
Halys to Blackwall 500kV Double Circuit Operating at 275kV	29.5%	69%
Halys to Blackwall 500kV Double Circuit Operating at 500kV	-%	1%
Braemar to Halys 500kV Double Circuit Operating at 500kV	-%	1%

(b) Supply from Central Queensland to North Queensland

The 2006 forecast peak demand for north Queensland is advanced by more than one year advanced compared to the 2005 forecast, i.e. demand levels in the 2005 forecast are reached 1–2 years earlier in the 2006 forecast. This is due to stronger than anticipated economic growth rates across the region. Additional specific load developments include an expanded coal handling facility at Dalrymple Bay, new and expanding coal mines and increases to industrial plant in Townsville.

Powerlink's Revenue Proposal included the Strathmore to Ross 275kV augmentation in 8 of the 40 scenarios with a cumulative probability of 28%. The 2006 load forecast does not increase the incidence of this project across the 40 scenarios but its timing is advanced to 31/10/2008 (high growth) and 31/10/2009 (medium growth).

Due to the higher demand, another limitation has been identified between Stanwell and Broadsound, where one circuit on a double circuit 275kV transmission line was commissioned in 2002. The violation is forecast to occur in 2014. A combination of transient and voltage stability limits is forecast with an overriding thermal limitation. The thermal limitation means that it is uneconomic to address this through means other than stringing the second circuit. While violation of the transmission limitation is outside the coming regulatory period, due to the requirement for stringing the second circuit with the first circuit de-energised, this must be undertaken in advance of the need for the line, when the demand in shoulder periods allows for the necessary extended outage. The time for stringing of the second circuit is determined by flows exceeding the winter rating of the Bouldercombe to Broadsound transmission line

[4] All probabilities in this table assume zero percent probability for the PNG theme set.

during a contingency. For the 2006 forecast, this stringing occurs in 2012 in 4 of the 40 scenarios. The project is CP.01156 and is estimated at $23.5 million ($2005/06).

(c) Supply into Southern Queensland

The 2006 forecast peak demand for southern Queensland is one year advanced compared to the 2005 forecast. This is due to stronger than anticipated economic growth across southern Queensland which is underpinned by resurgence in south east Queensland population growth rates and subsequent construction activity. In addition, the installation of new domestic air-conditioning units and upgrades of existing units have continued at record levels. The rate that occurred during 2005 even exceeded the record levels in 2004. The consequence is that demand/temperature sensitivity has increased dramatically to 170MW per ˚C compared to 118MW per ˚C in 2004/05.

The CQ-SQ transmission capability must at a minimum meet the shortfall between southern Queensland load and southern Queensland generation (including maximum secure northern flow from NSW). The 2006 load forecast (10% PoE) is on average (across the next revenue reset period) 240MW higher in southern Queensland compared to the 2005 load forecast. As a result, the CQ-SQ grid section must be capable of operating at higher transfer levels (both under N-1 and N-1 secure conditions) in order to meet mandated reliability of supply obligations to southern Queensland. This increased load further stresses this corridor and on average increases the augmentation requirements across this grid section.

Augmentation requirements have been reassessed for each of the 40 scenarios. Depending on the scenario, transmission capacity upgrades of the CQ-SQ grid section (in order to meet reliability obligations in SQ) are expected to be required from 2008/09. Incremental augmentation options may be viable initially depending on the required capacity increase, followed by further capacity upgrades later. Alternatively a larger scale augmentation may prove to be the most economic option initially. This is very much scenario dependent and the augmentation solutions vary both in timing and quantum across the 40 scenarios. Only options that address both the N-1 and N-1 secure minimum transfer levels are considered viable for each generation scenario.

The analysis identified solutions for inclusion in a network development plan for each of the relevant scenarios which delivered the most economic augmentation needed for that scenario.

Table 2 below compares the probability of the relevant projects for the 2005 and 2006 load forecasts across the 40 scenarios.

Table 2: Impact of 2006 demand forecast on projects for augmentation across the CQ – SQ grid section[5].

Project	2005 forecast	2006 forecast
Establish Halys 275kV Substation and Calvale to Halys 2nd 275kV Double Circuit 1st Stage (single circuit strung)	2.8%	11.9%
Calvale to Halys 2nd 275kV Double Circuit single circuit strung (Halys already established)	0.6%	-%
Establish Halys 275kV Substation and Calvale to Halys 2nd 275kV Double Circuit 1st Stage (both circuit strung)	-%	0.7%
Gin Gin 250MVAr SVC	2.1%	20.8%
Auburn River Switching Station (2 switched circuits)	5.2%	23.4%
Auburn River Switching Station (3 switched circuits)	0.7%	-%
Auburn River Switching Station (4 switched circuits)	-%	-%
Easement Acquisition for Calvale to Halys 2nd 275kV Double Circuit Line (TE)	3.6%	12.7%
Easement Acquisition for Calvale to Halys 2nd 275kV Double Circuit Line (Compensation)	3.6%	12.7%

[5] All probabilities in this table assume zero percent probability for the PNG theme set.