NETWORK DEVELOPMENT

ACHIEVING

- completed four major regulated (prescribed) transmission network development projects to replace transmission equipment reaching the end of its useful life
- completed two non-regulated customer connection projects
- work is progressing on construction of 10 major regulated (prescribed) transmission developments to be completed over the coming years, which include both new and replacement projects.

Assessing the need for network development

There are a number of drivers that trigger the need for Powerlink to develop our network. The main drivers include:

- the need to build new infrastructure or implement non-network solutions to meet electricity demand
- replacement of aged infrastructure to maintain security of electricity supply
- construction to directly connect a major industrial customer into the transmission network.

Non-regulated customer connections

New transmission lines and substations may be constructed when a major industrial customer (such as a generator or mine) needs to connect into the electricity network. When Powerlink constructs a new transmission line or substation as a non-regulated customer connection, the cost of acquiring easements, constructing and operating the transmission line or substation are paid for by the customer making the connection request, under a user-pays arrangement over the life of the agreement. For more information about our customer connection process, please refer to 16.

CASESTUDY

TRANSMISSION LINE WILL BOOST SUPPLY TO CENTRAL AND NORTH QUEENSLAND

The Calvale to Stanwell transmission line is currently being constructed to reinforce electricity supply in the Central and North Queensland regions, including Gladstone and Rockhampton, and to cater for growth in electricity demand in the resource, industrial and residential sectors.

The 100 kilometre line runs between Calvale Substation (near Biloela, adjacent to Callide A Power Station) and Stanwell Substation (near Rockhampton, adjacent to Stanwell Power Station). The early stages of the project involved removing a de-energised transmission line. Most of the new transmission line is being constructed on existing easements, which minimises the disruption to landowners, the environment and the wider community.

Kish Eleperuma, Project Manager, said construction of the new transmission line began in October 2011 and is tracking on schedule, despite heavy weather in the region.

"The Powerlink project team is working closely with all stakeholders including landowners to keep them informed about our activities and to minimise the impact of our construction works," Kish said.

"The Calvale to Stanwell transmission line will traverse varied landscapes, including areas of thick vegetation which require specific strategies for constructing access, with minimal environmental impacts.

"A new tower design has been developed to suit the terrain and requirements of this project, and meet Powerlink's design standards. It has been proven successful and may be used on future Powerlink projects."

Kish said regular audits were undertaken on the project and helped to reinforce the essential safety and environmental standards on site.

Regulated (prescribed) investment

Powerlink is required to deliver electricity transmission services to the reliability of supply standards set for it by the Queensland Government, at the lowest long-run cost for consumers. A key driver of the need for new transmission lines and substations is peak demand for electricity. Peak demand is the maximum electricity demand, which occurs at a specific point in time, and is different from overall or daily electricity demand. We have a legal obligation to develop our transmission network so that it can reliably meet peak demand.

New substations and transmission lines may also be needed as replacements for equipment which has reached the end of its useful life. When assessing the replacement of assets, we consider the most appropriate and economic options including complete replacement or life extension. About 36 per cent of our regulated (prescribed) 2011/12 capital works budget was invested in replacement and life extension projects.

Over the next five-year period about 50 per cent of the proposed regulated (prescribed) capital allowance will be invested in replacement and life extension works.

Prior to building a new transmission line or substation we undertake a thorough assessment of alternatives and options to ensure the solution selected is the lowest long-run cost to electricity consumers, while also meeting a balance of safety, environmental and social factors in accordance with the National Electricity Rules.

When identifying network augmentation solutions Powerlink is obliged under legislation to apply a comprehensive assessment process, known as the Regulatory Investment Test for Transmission (RIT-T), an economic benefit test developed by the AER. In applying the RIT-T a consultation process must be conducted, which calls for interested parties and NEM participants to provide feedback on Powerlink's potential network augmentation solution and put forward any credible alternative solutions such as demand-side management. All solutions are evaluated in accordance with the RIT-T economic benefit test to determine which solution can be delivered at the lowest long-run cost to consumers. Powerlink does not build any new regulated (prescribed) network augmentations without going through this process.

Current consultations on regulated (prescribed) network investment:

As at 30 June 2012, Powerlink was undertaking three consultations for proposed transmission augmentations:

- Supply to Bowen Basin coal mining area
- Supply to the southern Brisbane area
- Queensland/New South Wales Interconnector upgrade project.

Major network augmentation projects (regulated)

Major transmission developments: Completed in 2011/12				
Brief description	Project purpose	Milestones achieved	Delivered on or under budget	Delivered within approved schedule
North Queensland				
Yabulu South to Ingham replacement transmission line				
Construction of a 132 kilovolt transmission line to replace an ageing line between Ingham and Yabulu Substations.	To ensure continued reliability of supply to Far North Queensland.	Commissioned 2011.	Final costing is still under progression.	✓
Central Queensland				
Gin Gin Substation				
Replacement of 275/132 kilovolt transformers.	To ensure continued reliability of electricity supply to the Wide Bay area.	Commissioned progressively from 2010 to 2012.	✓	✗ Commissioning of the second transformer was delayed. The timing of outages was adjusted to meet the network need.
South Queensland				
Belmont Substation				
Replacement 275/110 kilovolt transformers and rebuilding and replacement of aged equipment at the 110 kilovolt Belmont Substation.	To ensure continued reliability of electricity supply to South East Queensland.	Commissioned 2011.	✓	✗ Significant weather and network outage constraints impacted on the complex and integrated schedule. However the project was still commissioned in time to meet the network need.
Blackstone Substation				
Replacement of aged equipment at the 110 kilovolt Swanbank A Substation at the new Blackstone Substation.	To ensure continued reliability of electricity supply to South East Queensland.	Commissioned 2011.	✓	✓

Major network augmentation projects (regulated) *continued…*

Major transmission developments: Under construction 2011/12				
Brief description	Project purpose	Construction timetable	Currently within budget	Currently within approved program
North Queensland				
Cardwell to Ingham transmission line				
Construction of a 132 kilovolt transmission line to replace an ageing line between Cardwell and Ingham substations.	To ensure continued reliability of electricity supply to North Queensland.	Construction to be completed in 2013/14.	✓	✓
Tully to Cardwell transmission line				
Construction of a 132 kilovolt transmission line to replace an ageing line between Tully and Cardwell substations.	To ensure continued reliability of electricity supply to North Queensland.	Construction to be completed in late 2012.	✓	✓
Central Queensland				
Bouldercombe Substation				
Installation of a 275/132 kilovolt transformer and replacement of aged secondary systems equipment.	To ensure continued reliability of supply to Central and North Queensland.	Construction to be completed in 2013/14.	✓	✓
Calvale to Stanwell transmission line				
Construction of a new 275 kilovolt transmission line between Calvale Substation and Stanwell Substation.	To ensure continued reliability of electricity supply to Central and North Queensland.	Construction to be completed in 2013/14.	✓	✓
Calliope River Substation				
Replacement of aged equipment at the Gladstone Substation at the new Calliope River Substation site.	To ensure continued reliability of electricity supply to the Gladstone area.	Construction to be completed 2015. Final commissioning works deferred to coordinate with generator outages.	✓	✓
South Queensland				
Columboola to Wandoan South transmission line and Wandoan South Substation				
Construction of a new 275 kilovolt Wandoan South Substation and a 275 kilovolt transmission line between Columboola and Wandoan South Substations.	To ensure continued reliability of electricity supply and increase capacity to meet growing electricity demand in South West Queensland.	Construction to be completed in 2012/13.	✓	✓
Columboola to Western Downs transmission line and Columboola Substation				
Construction of a new 275 kilovolt Columboola Substation and a 275 kilovolt transmission line between Columboola and Western Downs substations.	To ensure continued reliability of electricity supply and increase capacity to meet growing electricity demand in South West Queensland.	Construction to be completed 2013/14.	✓	✓

Major network augmentation projects (regulated) *continued…*

Major transmission developments: Under construction 2011/12				
Brief description	Project purpose	Construction timetable	Currently within budget	Currently within approved program
Loganlea Substation				
Installation of a new 110/33 kilovolt transformer and replacement of aged equipment at the 110 kilovolt Loganlea Substation.	To ensure continued reliability of electricity supply to South East Queensland.	Construction to be completed 2014.	✓	✓
Richlands Substation				
Replacement of aged equipment at the 110 kilovolt Richlands Substation.	To ensure continued reliability of electricity supply to South East Queensland.	Construction to be completed in 2013.	✓	✓
Western Downs to Halys transmission line and Western Downs and Halys substations				
Construction of new 275 kilovolt Western Downs and Halys substations and a 275 kilovolt transmission line between Western Downs and Halys substations.	To ensure continued reliability of electricity supply and increase capacity to meet growing electricity demand in South East Queensland.	Construction to be completed in 2012/13.	✓	✓

Major transmission developments: Committed but not yet under construction		
Brief description	Project purpose	Construction timetable
North Queensland		
Collinsville Substation		
Replacement of ageing 132 kilovolt equipment at Collinsville Substation.	To ensure continued reliability of electricity supply to North Queensland.	Construction to be completed in 2014.
Nebo Substation		
Replacement of 275/132 kilovolt transformers at Nebo Substation.	To ensure continued reliability of electricity supply to North Queensland.	Construction to be completed progressively from 2013 to 2014/15.
South Queensland		
Blackstone Substation		
Replacement of aged equipment at the 275 kilovolt Swanbank B Substation at the new Blackstone Substation.	To ensure continued reliability of electricity supply to South East Queensland.	Construction to be completed in 2014.
Bulli Creek Substation		
Replacement of aged secondary systems equipment at Bulli Creek Substation.	To ensure continued reliability of electricity supply to South East Queensland.	Construction to be completed in 2013/14.

Customer connection works (non-regulated – paid for by the customer)

Customer connection works: Commissioned in 2011/12			
Brief description	Project purpose	Customer	Milestones
North Queensland			
Goonyella Riverside Mine connection			
Construction of a 132 kilovolt switching station at Moranbah.	Increase electricity supply capability for coal mine expansion.	BHP Billiton Mitsubishi Alliance (BMA)	Commissioned June 2012.
Central Queensland			
Electrification of Blackwater rail system			
Construction of a 275 kilovolt substation at Raglan (south of Rockhampton).	Increase electricity supply capability to Raglan rail site.	QR National	Commissioned November 2011.

Customer connection works: Under construction in 2011/12			
Brief description	Project purpose	Customer	Construction timetable
North Queensland			
Eagle Downs Mine connection			
Construction of a 132 kilovolt switching station.	To supply electricity for the new Eagle Downs coal mine.	Eagle Downs Coal Management Pty Ltd (EDCM)	2012/13
Central Queensland			
Electrification of Blackwater rail system			
Construction of three new 132 kilovolt transmission lines to three new QR National substations at Bluff, Duaringa and Wycarbah.	To provide high voltage electricity supply to Wycarbah, Bluff and Duaringa rail sites and help reinforce the electrified CoalRail network in Central Queensland.	QR National	2012/13
South Queensland			
Kumbarilla Park connection			
Construction of a new 275 kilovolt transmission line between Braemar Substation and a new substation at Kumbarilla Park.	Provide high voltage electricity for coal seam methane and liquefied natural gas compression.	Queensland Gas Company (QGC)	2012
Woleebee Creek connection			
Construction of a short 132 kilovolt transmission line from Powerlink's future Wandoan South Substation to Woleebee Creek.	Provide high voltage electricity for coal seam methane and liquefied natural gas compression.	Queensland Gas Company (QGC)	2013
Columboola area connections			
Construction of three 132 kilovolt switching stations and new 132 kilovolt transmission lines between these switching stations and the Columboola Switching Station.	Provide high voltage electricity for coal seam methane and liquefied natural gas compression.	APLNG (Asia Pacific Liquefied Natural Gas)	Progressively during 2013/14.

Customer connection works (non-regulated – paid for by the customer) *continued…*

Customer connection works: Committed but not yet under construction as at 30 June 2012			
Brief description	Project purpose	Customer	Construction timetable
North Queensland			
Wotonga rail connection			
Construction of 132 kilovolt switching station.	To supply the new rail electrification project in the Bowen Basin.	QR National	2014/15
Central Queensland			
Galilee connection			
Construction of a new 275 kilovolt transmission line from Powerlink's Lilyvale Substation to the Galilee Basin.	Provide high voltage electricity for the proposed Alpha and Kevin's Corner coal mines.	Hancock Coal Pty Ltd	2014/15
South Queensland			
Orana connection			
Construction of a new 275 kilovolt substation at Orana (SSW of Chinchilla).	Provide high voltage electricity for coal seam methane and liquefied natural gas compression.	APLNG (Asia Pacific Liquefied Natural Gas)	2014/15
Wandoan Coal Mine connection			
Construction of a 132 kilovolt transmission line between Powerlink's future Wandoan South Substation and Xstrata's Wandoan Coal Mine.	Provide high voltage electricity for the proposed Wandoan Coal Mine.	Xstrata	2014/15
North West Surat connection			
Construction of three new 132 kilovolt switching stations and new 132 kilovolt transmission lines between these switching stations and Powerlink's future Wandoan South Substation.	Provide high voltage electricity for coal seam methane and liquefied natural gas compression.	APLNG (Asia Pacific Liquefied Natural Gas)	Progressively in 2014/15.

CASESTUDY

CAREFUL SCHEDULING TO DELIVER THE CALLIOPE RIVER SUBSTATION

The completion of the Calliope River Substation in May 2012 marks the first stage in a complex project to replace the original Gladstone Power Station Substation. As well as connecting the Gladstone Power Station to the transmission network, the substation is an important link in the supply of electricity to the growing Central Queensland and Gladstone region.

With power station operations scheduled to continue past 2029 and increasing electricity demand in Central Queensland – driven by growth in the industrial, coal mining and minerals processing sectors – the original substation needed to be replaced.

The Calliope River Substation, comprising 14 substation bays and 17 transmission feeders, is located 2.5 kilometres to the west of the original Gladstone Substation.

The replacement project will in the future deliver a new switchyard for the power station on the original Gladstone Substation site, and associated cabling between the switchyard and the Calliope River Substation.

Paul Woods, Project Manager, said close liaison with Gladstone Power Station owners and operators ensured the construction program did not impact the operations of the power generator.

"Our construction works are carefully scheduled to fall into line with planned outages at the power station," Paul said.

"The first stage of the project was delivered on time and met our target of no significant technical, safety or environmental incidents.

"We prioritised the safety and wellbeing of on-site workers. At times, the conditions at Gladstone were hot and humid, so we introduced strategies to successfully combat heat and fatigue.

"The project Environmental Management Plan guided the work in the flat and swampy environment on Black Harry Island, including importing 146,000 cubic metres of fill to create an elevated substation platform.

"We also carefully planned a series of sediment ponds on site, planted more than 3,500 trees and installed 300 bird boxes. These initiatives are working well in the local environment and attracting wildlife."

The planned 500 kilovolt network

To efficiently meet the forecast long-term electricity demand in South East Queensland, Powerlink has plans to construct a 500 kilovolt transmission network in Southern Queensland. One 500 kilovolt transmission line is capable of carrying about the same amount of electricity as three 275 kilovolt transmission lines, with a much smaller land use requirement. Most of the easements for the future 500 kilovolt network have been progressively acquired over the past two decades, as part of our long-term planning processes.

Since 2009, we have regularly reviewed the timing of the Halys (near Kingaroy) to Blackwall (near Ipswich) 500 kilovolt transmission line, which is the first of Powerlink's future 500 kilovolt projects, to take account of electricity demand forecasts and electricity generation outlook. Our 2012 Annual Planning Report has identified on current forecasts there is sufficient capability in the transmission network and the need for the Halys to Blackwall project is not expected to be triggered until 2018/19.

LOOKINGFORWARD

In 2012/13 and beyond, we will:

- undertake consultation for transmission investments for supply to north of Rockhampton
- progress our capital works program, with about 50 per cent of the regulated (prescribed) component comprising replacement or life extension projects for equipment which has reached the end of its useful life
- complete construction of:
  - Tully to Cardwell replacement transmission line
  - Columboola to Wandoan South transmission line and Wandoan South Substation
  - Western Downs to Halys transmission line and Western Downs and Halys substations.