Actual capital expenditure during the current regulatory period.

Project summary

This document provides a summary of the capital expenditure on large capital projects during the current regulatory period.

Categorisation

The Application framed in 2001 included a capital expenditure forecast. The capital expenditure forecast at that time was categorised into Approved projects, Scenario Dependent projects, Asset Replacements and Non-network capex. Going forward Powerlink is proposing a breakdown of capital expenditure into more categories.

There is a direct relationship between these proposed categories and those used in the previous revenue application which will facilitate a comparison with the capital expenditure forecasts made at that time. Approved projects and scenario dependent projects are part of the high level grouping of Load Driven capex, which consists of the categories augmentation, connection and easements. Asset replacement projects are now part of the high level grouping of Non-Load Driven capex which consists of the categories replacements, security/compliance and other. Collectively, Load driven capex and Non-Load driven capex includes all Network projects. The remainder are Non-network projects, consisting of Business IT and Support the Business capex.

Large Projects

All projects over $10 million are considered to be large projects. A discussion of each of these projects is included here.

Project No.	Project	Consultation	Outturn Cost (Capitalisations excl FDC) $m
CP.00771	Belmont 275kV Line Reinforcement	Reg Test	81.13
CP.00762	Darling Downs Transmission Reinforcement	Reg Test	80.94
CP.01002	Gold Coast Reinforcement	Reg Test	68.17
CP.00707 & 742	Cairns Reinforcement Stages 2 & 3	Consultation	49.15
CP.01094	Belmont Murarrie Transmission Reinforcement	Reg Test	47.69
CP.01081, 1121 & 1038	Algester, Goodna & Sumner 110kV Substation Establishments	Reg Test	39.32
CP.00753	Stanwell-Broadsound 275kV Line Reinforcement	Reg Test	37.37
CP.00384	Lilyvale 275kV Reinforcement	Reg Test	25.79

Project No.	Project	Consultation	Outturn Cost (Capitalisations excl FDC) $m
CP.00854	Loganlea 275kV Reinforcement	Consultation	23.55
CP.00667	Molendinar 275kV Establishment	Reg Test	23.36
CP.01136	Goodna 275kV Substation Establishment	Reg Test	20.74
CP.98201	Virginia Office Complex	Business Case	20.23
CP.01142	Molendinar 110kV Busbar establishment	Business Case	17.01
CP.00755	Murarrie 110kV Establishment	Business Case	16.13
CP.01092	South Pine 275kV Substation Refurbishment	Business Case	15.94
CP.00668	Woree 132kV SVC	Reg Test	14.79
CP.00177	Gladstone South Substation Rebuild	Business Case	13.61
CP.01068	Middle Ridge 110kV Substation replacement	Business Case	12.78
CP.00836	Cairns 132kV Substation Rebuild	Business Case	12.84
CP.00752	SVC 132kV Secondary System Refurbishment	Business Case	12.39
CP.01199	QR Mindi Establishment	Business Case	11.98
CP.00510	Alan Sherriff 132/11kV Substation Establishment	Business Case	11.40

Load driven projects

Belmont 275kV Line Reinforcement (CP.771)

The largest project capitalised during this regulatory period is the Belmont 275kV line reinforcement. Belmont is located in the southern suburbs of Brisbane and is a major supply point to the southern suburbs of Brisbane, including the Trade Coast area and into the Brisbane CBD via Murarrie. The project involved the construction of approximately 70 km of double circuit 275kV transmission line from Blackwall (near Ipswich) to Belmont via the Greenbank substation site. The need for the project was driven by demand growth. Planning analysis determined that the firm capacity of the 275kV transmission system supplying Belmont and Loganlea would be exceeded from the summer of 2003/04 onward without corrective action. A Regulatory Test conducted in 2001/02 found this solution to be the most efficient option to address the required need. The project was implemented at a cost of $81.13 million. This project was included in the 2001 application scenario dependent project CP.735 Greenbank 275 kV establishment.

Darling Downs Transmission Reinforcement (CP.762)

The Darling Downs is an area west of Brisbane around the major regional city of Toowoomba. Demand growth in the area required reinforcement of supply to the 275 kV Middle Ridge substation, located on the outskirts of Toowoomba, from late 2004 onward. A Regulatory Test conducted in 2002/03 demonstrated that construction of approximately 93 km of 330kV double circuit transmission line between Millmerran and Middle Ridge with associated substation works was the best-ranked option in all plausible market development scenarios. Additional costs arose as a consequence of delays associated with legal action. The outturn cost of the project was $80.94 million, and was re-confirmed to have satisfied the Regulatory Test at that cost. The need for reinforcement to the Darling Downs was included in the 2001 application. The scenario dependent project to install a third 275/132 kV transformer at Middle Ridge was also included in the scope of CP.762 as the timing coincided.

Gold Coast Transmission Reinforcement (CP.1002)

The Gold Coast area has experienced substantial growth in electricity demand. Joint planning between Powerlink, Energex, TransGrid and Country Energy identified that supply limitations to the Gold Coast/Tweed zone and in the Far North Coast area of New South Wales would occur from late 2005 onwards as the demand growth would result in unstable voltages and thermal limitations on 110 kV lines between Beenleigh and Coomera. A Regulatory Test undertaken in 2003/04 confirmed that the use of grid support from the owners of DirectLink for the summer 2005/06 followed by establishment of a 275kV switchyard at Greenbank and construction of 40 km of double circuit 275kV transmission line between Greenbank and Maudsland by late 2006 was the most efficient option. This network augmentation is being implemented for commissioning in late 2006 at an estimated cost of $68.17 million at completion. This project was included in the 2001 application scenario dependent project CP.735 Greenbank 275 kV establishment.

Cairns Reinforcement (CP.707 and CP.742)

Cairns is a major tourist destination located in Far North Queensland and is the northern extremity of the Powerlink network. Due to demand growth in Cairns and the surrounding area, it was forecast that the transmission network and local generation would not be able to reliably supply the area from late 2002. Powerlink developed a three-stage plan for reinforcement of supply to Cairns which was agreed in principle by the Far North Queensland Electricity Board (now Ergon Energy) and a route approved by State Cabinet prior to commencement of the National Electricity Market. Stage 1 of the plan was completed in June 1998. Powerlink consulted with market participants and interested parties in 1999/00 to determine that this project was still the most appropriate solution to supply the growing demand in Cairns. The analysis shows that construction of 73km of 275kV line between Chalumbin and Springmount and a 275/132 kV transformer at Woree was the most cost effective solution. This project was implemented within the required timeframe at an outturn cost of $49.15 million. Both CP.707 Cairns Reinforcement Stage 2 and CP.742 Cairns Reinforcement Stage 3 were approved projects at the time of the 2001 revenue application.

Belmont-Murarrie Line Transmission Line Reinforcement (CP.1094)

Joint planning studies between Powerlink and Energex identified that, from late 2005 onward, demand growth in the TradeCoast area (including the Port of Brisbane) and the Brisbane CBD would result in the thermal capacity of a number of 110kV circuits supplying the Brisbane CBD area (as well as transformers at certain Energex substations) being exceeded during n-1 contingencies. A 2003/04 Powerlink/Energex Regulatory Test established that a substantial upgrade of supply to the city from Murarrie at 110 kV was the best-ranked solution in all plausible market development scenarios. The Powerlink works associated with this upgrade involved rearrangement of the Belmont-Newstead and Belmont-Murarrie 110kV lines and construction of an 11 km 275 kV reinforcement between Belmont and Murarrie. This solution is currently being implemented for commissioning in late 2006 at an estimated cost of $47.69 million at completion. This project was included in the 2001 application as scenario dependent project CP.755 Establish Bulimba 275/110 kV substation. The Powerlink Bulimba site is now referred to as Murarrie.

Algester, Goodna and Sumner 110kV Substation Establishments (CP.1081, CP.1121 and CP.1038)

Powerlink and Energex identified that load growth would result in the thermal capacity of several Powerlink 110kV transmission lines and 110/33kV transformers supplying the South West Brisbane area being exceeded during single credible network contingencies from the 2006/07 summer onwards. An investigation and consultation by Powerlink and Energex in 2004 concluded that establishing new 110kV substations at Algester, Sumner and Goodna by late 2006 satisfied the Regulatory Test. These projects were not included in the 2001 revenue application. The need for the projects, arising from increased load growth in the South West Brisbane area, was identified in Powerlink's 2003, 2004 and 2005 Annual Planning Reports. The projects are currently being implemented for commissioning in October 2006, at a total estimated cost of $39.32 million.

Stanwell-Broadsound Line Reinforcement (CP.753)

Stanwell is located near Rockhampton in central Queensland. Broadsound is about 130 km north towards Mackay. The 275 kV transmission network north from Stanwell supplies most of the demand in North Queensland comprising the major cities of Mackay, Townsville and Cairns, as well as west to the major mining area of the Bowen Basin. Powerlink evaluated the supply arrangements to North Queensland through a Regulatory Test conducted in 2001 which took into account the stability limits on the transmission system and the mix of generation which also supplies demand in North Queensland. With demand growth, the level of local (NQ) generation which had to be run under directions from NEMMCO was forecast to increase. As part of the 2001 revenue decision, Powerlink applied for, and was provided, an allowance for grid support. Grid support was then able to be procured by Powerlink for supply to North Queensland which avoided the need for NEMMCO directions under intact network operation. The 2001 Regulatory Test evaluation determined that from late 2002 onward, a network augmentation could economically reduce the levels of grid support required to supply the growing demand in North Queensland. The augmentation consisted of approximately 130 km of 275 kV transmission line between Stanwell and Broadsound

substations. A reduced level of grid support was also required to avoid directions. The project was commissioned in November 2002 at a total cost of $37.37 million. This project was included in the 2001 application as a scenario dependent project.

Lilyvale 275kV Reinforcement (CP.384)

Lilyvale is located in the central west of Queensland and is the major electricity supply point for the Bowen Basin mining area. Planning analysis identified that, from late 2004 onward, the firm capacity of the existing transmission system supplying the inland Central Queensland area would be exceeded due to demand growth in the area. A Regulatory Test conducted in 2002/03 determined that the construction of a single circuit 275kV transmission line between Broadsound and Lilyvale (and associated substation works) was the best-ranked solution. The project was implemented at an outturn cost of $25.79 million. This was a scenario dependent project in the 2001 revenue application.

Loganlea 275kV Reinforcement (CP.854)

The southern side of Brisbane is predominantly supplied from the Belmont substation. In 2001 demand in the area was growing at 4.5% per annum giving rise to the need for reinforcement of supply due to forecast limitations in both the Powerlink and Energex networks, particularly major 275/110 kV transformer capacity. Consultation was undertaken with Energex on a number of options in terms of technical adequacy, costs and benefits. It was determined that the establishment of a 275/110kV substation at Loganlea was the most cost-effective option to address the developing network limitations. The project was implemented at an outturn cost of $23.55 milliion. This was an approved project at the time of the 2001 revenue application.

Molendinar 275kV Substation Establishment (CP.667)

Molendinar is located at the northern end of the Gold Coast and supplied at 110 kV. The region from Brisbane to Logan to the Gold Coast is rapidly being urbanized, creating increasing electricity demand. The 275 kV supply to the Gold Coast is from the Mudgeeraba substation located at the southern end of the Gold Coast. Powerlink and Energex undertook joint planning which determined that the demand growth would give rise to forecast supply limitations at Mudgeeraba 275kV substation and within the Energex 110kV system from late 2003. A Powerlink/Energex Regulatory Test conducted in 2002 demonstrated that the construction of a 13 km 275 kV transmission line between Maudsland and Molendinar, and establishment of 275 kV injection into Molendinar was the best-ranked solution to meet the growing demand. The project was implemented at an outturn cost of $23.36 million. This project was included in the 2001 application scenario dependent project CP.735 Greenbank 275 kV establishment.

Goodna 275kV Substation Establishments (CP.1136)

Goodna is located in the Ipswich area immediately to the west of Brisbane. Demand growth in the Ipswich area resulted in a need for additional 275 kV transformer capacity from late 2007 onward. A Regulatory Test carried out in 2005 concluded that establishing new 275/110kV substations at Goodna by late 2007 and Abermain by late 2008 provided the best-ranked solution to address the network need. The Goodna 275 kV substation is currently being implemented for initial commissioning in late 2006 at an estimated cost of $20.74 million. Abermain will be commissioned in the coming

regulatory period. These projects were not included amongst those in the 2001 revenue application. Substantial additional transformer capacity has been required due to demand growth in the region being substantially higher than the 2001 forecast on which the revenue application was based.

Murrarie 110kV Substation Establishment (CP.755)

In 2001, Powerlink and Energex completed a major review of the security and reliability of supply to the major industrial area on the southern side of the mouth of the Brisbane River. Major industrial customers requested reinforcements to the electricity network to improve quality and security of supply following a series of supply interruptions to the area. As a result of this review, Energex proposed a new 110/33kV substation at Lytton and requested an improved connection arrangement through construction of a new 110kV substation at Murrarie. This project was included in the 2001 application as a scenario project, Bulimba substation Establishment. The need for the project arose from load growth and a supply security review, including agreement from Energex to meet the additional connection charges. The 110kV project was completed in April 2003 at an outturn cost of $16.13 million

Woree 132kV SVC (CP.668)

Woree 275/132kV substation, on the southern outskirts of Cairns, is the 275 kV substation supplying Cairns and areas of Far North Queensland. It is the most northerly part of Powerlink's 275 kV network. Investigations in 2003 concluded that continuing strong load growth would result in unacceptably low voltage levels under n-1 contingencies from late 2005. A Regulatory Test conducted in 2003 found that the installation of a 132kV static VAr compensator at Woree was the lowest cost option to meet the demand growth. The project was completed in October 2005 at an outturn cost of $14.79 million. This project was included in the 2001 application as scenario dependent project Cairns SVC.

QR Mindi Establishment (CP.1199)

Queensland Rail has requested Powerlink establish a 132/50kV substation at Mindi, between Coppabella and Wandoo rail substations. The additional substation is required to meet increasing railway traction load in the Bowen Basin coal mining area. The project involves construction of a 132kV substation at Mindi and a 132kV transmission line from Nebo 275/132kV substation to a QR site at Mindi. QR has agreed to meet the connection charges associated with this development. The project is in progress with expected completion by February 2007 at an estimated cost of $11.98 million. The need for the project was not identified by QR until 2005 so it was not included in the 2001 application.

Alan Sherriff 132/11kV Substation Establishment (CP. 510)

Alan Sherriff is located in Kirwan, a suburb of Townsville where there is continuing load growth. Joint planning by Ergon and Powerlink in 2002 showed that the existing 11kV network was heavily loaded and required augmentation to meet the forecast demand. Establishment of a new 132/11 kV substation in Kirwan (called Alan Sherriff) was assessed as the lowest cost solution. At the same time, Powerlink undertook a condition

assessment of the nearby Garbutt substation plant, which was up to 40 years old. Powerlink concluded that much of the Garbutt substation plant should be replaced to meet reliability and safety standards, although the 132/66kV transformers were still in serviceable condition. Two options were considered for Garbutt – to replace plant in situ or alternatively to establish 132kV switching functions at Alan Sherriff with the 132/66kV transformers retained at Garbutt. The cost of the two replacement options were similar but the option to locate the 132kV switching function at Alan Sherriff was less complex and hence a lower risk to supply reliability during construction. The project was completed in November 2004 at an outturn cost of $11.40 million. Replacement of Garbutt substation was included in the 2001 application as project 838 - T046 Garbutt 132kV Substation Refurbishment.

Non - Load driven projects

Virginia Office Complex (CP.98201)

Powerlink's staff numbers are increasing as a consequence of the growing size of the network to be managed and operated, and the major capital program. This has triggered the need for additional office accommodation . The construction of a new facility adjacent to the existing Edison building was considered the best option as it would enable the workforce to remain in one location, while establishing a suitable environment for Powerlink's ongoing business requirements. Construction works on the Virginia Office Complex project are expected to be completed in mid 2006, at an estimated cost of $20.23m.

Molendinar 110kV Busbar Establishment (CP.1142)

Molendinar, at the northern end of the Gold Coast, is one of two 275kV substations supplying the large and rapidly growing urban area on the Gold Coast. It consists of 275/110kV, 110/33kV and 110/11kV switchyards and transformers. 275 kV supply to Molendinar was established in 2003 to meet forecast load growth in the area. The 110/33kV equipment is over 40 years old. A joint Energex and Powerlink condition assessment in 2004 identified that the functionality and rating of these aged assets was insufficient to maintain a reliable supply to the northern part of the Gold Coast. Replacement of all plant within the existing site was assessed as the preferred solution. Powerlink will provide new 110kV substation and 110/33kV transformers at a cost of $17.01 million. In a coordinated project, Energex will replace the 33kV switchyard. The project will increase the rating of the 110/33kV transformers from two 60MVA units to two 100MVA units to provide for the forecast load growth. All works are planned to be completed by late 2006. This replacement project was not included in the 2001 application. The need for the project has arisen due to the condition of the plant, and the increase in forecast load on the Gold Coast reported in Powerlink's 2003, 2004 and 2005 Annual Planning Reports.

South Pine 275kV Substation Refurbishment (CP.1092)

South Pine 275/110kV substation in northern Brisbane is a major node in the 275 kV transmission system, and a major supply point for Energex to supply customers in northern Brisbane and nearby areas. In 2004, a condition assessment concluded that

much of the 275kV substation plant and secondary systems, which was installed in the 1970s, had reached the end of its technical life. A major replacement was required to continue to provide reliable transmission services and supply to customers. The project is in progress for completion in the third quarter of 2006 at an estimated cost of $15.94 million. Various replacement projects were included in the 2001 application project list. These have been grouped together under this larger capital project.

Gladstone South Substation Rebuild (CP.177)

Gladstone South substation was built in the mid-1960's and is a major 132kV connection point for significant industrial load, including the Queensland Alumina plant. A condition assessment in 2001 concluded that (apart from the two 100MVA transformers installed in 1998 and 2001) the substation plant and secondary systems were approaching the end of their technical life. Replacement of the substation on an adjacent site, with retention of the 100MVA transformers, was completed in October 2003 at an outturn cost of $13.61 million. The project was included in the 2001 application as Project 177 (T019 Gladstone South 132kV Sub Refurbishment).

Middle Ridge 110kV Substation Rebuild & Secondary Systems Replacement (CP.1068)

Middle Ridge 275/110 kV substation located on the outskirts of Toowoomba, is an important node in the transmission network and the main connection point for Ergon and Energex to supply the Darling Downs and nearby areas. It was first established in the 1960's, and was augmented in the 1980's and 1990's. A plant condition assessment in 2003 concluded that the 1960's vintage primary plant and most of the control and protection systems had reached the end of its technical life. Substantial replacement of the plant was required to maintain quality and reliability of supply. In situ replacement was the only feasible solution due to the location of the substation and surrounding landscape. The project was completed in June 2006 at an outturn cost of $12.78 million. The project was included in the 2001 application as SUB13 - H014 Middle Ridge 110kV Substation Refurbishment.

Cairns 132kV Substation Rebuild (CP.836)

Cairns 132/22kV substation is the main connection point from the transmission network to the Ergon distribution network supplying Cairns and nearby suburbs. The substation was originally built in the 1950's. Larger transformers, additional 132 kV switchgear and capacitor banks have been added to the substation over time. The substation site is physically constrained and cannot be further expanded to meet the continuing load growth in Cairns. A condition assessment in 2003 concluded that much of the old equipment and infrastructure had reached the end of its technical life and should be replaced as it represented a reliability and safety risk. Powerlink examined two options – one to rebuild the substation in situ and the other to provide 132kV switching functions at the nearby Woree substation in south Cairns, with the 132/22kV transformers retained at their present location. Powerlink concluded that the second option (switching at Woree) could be implemented at lower risk and lower cost. The project is in progress with an expected completion date of in the third quarter 2006, at an estimated cost of $12.84

million. The project was included in the 2001 application project 836 - Cairns 132kV Substation Refurbishment.

SVC 132 kV Secondary System Replacement (CP.752)

The electronic valves and secondary systems of nine (9) static var compensators (SVCs) supporting supply to Queensland Rail, and the SVC at Nebo are approaching twenty years old and are in need of replacement. These SVC's are required to maintain power quality within the allowable standards . Powerlink consulted with QR to develop a plan to undertake the replacements in the most efficient way and to minimise the impact on train operations. This project is expected to be completed in 2008 at an estimated cost of $12.39 million.