Townsville Enterprise
Promoting North Queensland
REGIONAL DEVELOPMENT • TOURISM • CONVENTIONS • EVENTS

9 February 2007

Mr Mike Buckley
General Manager
Network Regulation North
Australian Energy Regulator
Via Email: Powerlinkreset@aer.gov.au

Dear Mr Buckley

Please find attached a submission from Townsville Enterprise regarding the draft decision by the Australian Energy Regulator on Powerlink Queensland's Revenue Reset. In particular, this submission addresses the draft decision by the AER to defer Powerlink's proposal for an upgrade of the transmission system between Strathmore and Ross in Queensland.

Townsville Enterprise is the peak regional development organisation for the North Queensland region. The development of energy generation and transmission has been a top priority for this organisation. Townsville Enterprise engaged respected energy forecaster Roam Consulting to conduct a complete review of energy infrastructure in North Queensland in 2005. The upgrade of the transmission line in question was recommended as part of the findings of this Review and was adopted by the Queensland Government and Powerlink.

In providing this submission, Roam Consulting was engaged to consider the recommendations in the AER Report and the findings of the Consultant engaged by the AER, PB. The Report attached demonstrates that the decision to proceed with this upgrade in the present time period will result in savings through loss reduction and lower marginal loss factor benefits for North Queensland consumers.

The analysis conducted demonstrates that, on an annual basis, the benefits of the Powerlink proposal to North Queensland exceed its costs by about $1 million per year, and therefore, deferment of the full proposed upgrade is not justified.

I urge you to consider the analysis in the submission and trust that you will agree with its findings.

Yours sincerely

Geoffrey Plante
Chairman

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Report (Tve00005) to

NATIONAL ELECTRICITY MARKET DEVELOPMENT / FORECASTING

Response to the AER Draft Decision on Powerlink's Proposed Strathmore to Ross Transmission Line Augmentation

9 February 2007

VERSION HISTORY

Version History		
Version Number	**Date**	**Description**
1.0	February 1st 2007	Draft Report to Townsville Enterprise
1.1	February 6th 2007	Updated Draft Report to Townsville Enterprise
1.2	February 7th 2007	Final Report to Townsville Enterprise

EXECUTIVE SUMMARY

Townsville Enterprise supports Powerlink's application to complete the third stage of its proposed three-stage line upgrade between Nebo and Ross, comprising a double circuit 275kV line augmentation between Strathmore (near Collinsville) and Ross (near Townsville).

In its draft determination on Powerlink's revenue reset application, released December 8 2006, the AER made their decision based upon a report prepared by PB Associates, *Powerlink Revenue Reset: Review of Capital Expenditure, Operating and Maintenance Expenditure and Service Standards*. In this report PB Associates examined the proposed line augmentation between Strathmore and Ross, and found the proposed project to be inefficient.

It was determined by PB that the use of a double circuit tower with a single low capacity circuit, combined with some additional shunt capacitor compensation, would be a more efficient option than Powerlink's.

After considering comments from PB, Powerlink and CHC, the AER, in its draft determination, has accepted PB's recommendation that the project should not be constructed in any of the high growth scenarios on the basis that a new generator would be planted in the following year removing any benefits of the line until beyond the next regulatory period. The AER also acknowledged CHC's views that the prudence of PB's proposed changes to the scope of the project are unclear. As such, the AER has sought further information from Powerlink that its recommended option is more efficient than that proposed by PB. For its draft decision though, the AER accepts PB's recommendation.

PB Power has stated that 'the 2007/08 10% and 50% PoE demand forecasts in the area are around 980MW and 890MW, respectively and there is approximately 670MW of generation in the area.' These figures were checked by ROAM Consulting by reference to Powerlink figures, and were found to be reasonable. There is no allowance made for either higher than 'normal' economic growth, or significantly more extreme weather conditions than in a 'normal' year. Furthermore, there is no allowance for any potential industrial load development in either zone. Up to 400MW of additional industrial base load could be developed in the Townsville area in the next decade provided power infrastructure is in place and prices are competitive with other locations.

The simultaneous maximum demand of the Ross and Far North zones is forecast by Powerlink to grow under medium growth conditions by about 30MW per annum for the next five years. These forecasts are of 'delivered' power to retail and industrial loads and do not factor in any transmission losses on the grid.

The cities of Townsville, Cairns and environs are collectively experiencing amongst the greatest population increases in regional Queensland. These population growth statistics underpin Powerlink's projected growth rates for the future and the potential for higher growth rates if further industrial development is encouraged by competitive long term power prices. Hence there is a strong possibility that the Powerlink medium growth forecasts will be exceeded in the next five years.

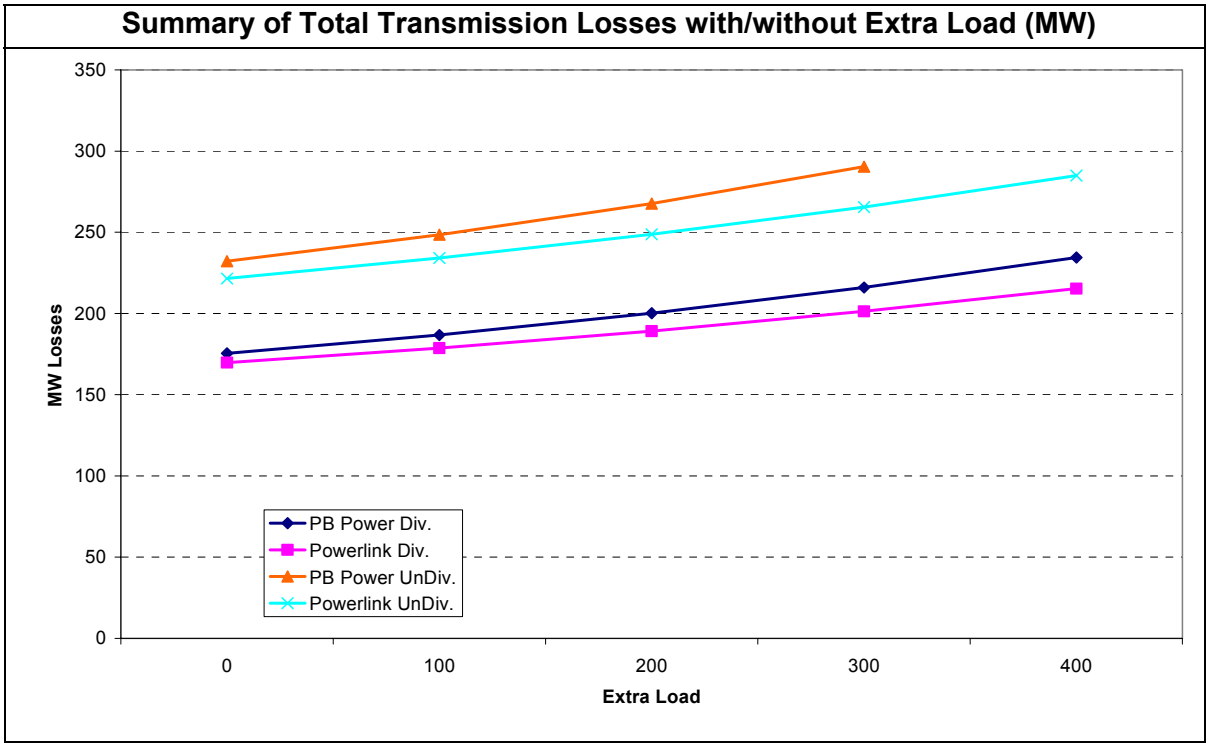
ROAM Consulting, on behalf of Townsville Enterprise, has identified a number of adverse impacts to electricity supply if the Powerlink proposal for a double circuit line from Strathmore to Ross is not approved. These are:

i. Inability to supply potential expanded industrial load development at market competitive prices due to transmission capacity limitations
ii. Higher transmission losses at all times but particularly peak times, even for medium growth conditions
iii. Adverse loss factors leading to higher energy prices for customers, even for medium growth conditions
iv. Reduced ability to attract major generators to North Queensland owing to lack of transmission capacity

The situation in North Queensland is that new industrial load cannot be attracted to North Queensland owing to the delivered electricity price to major consumers being about 25% higher than that in Central Queensland. This 25% increase is solely due to transmission factors since the wholesale price of electricity, as generated, is the same throughout the state. The 25% increase is split approximately equally between higher Transmission Use of System (TUOS) charges and higher marginal loss factors. While consumers in North Queensland will have to pay additional TUOS for a larger line, this should be more than offset by reductions in costs due to lower marginal loss factors.

The following chart shows forecast transmission losses on the Powerlink transmission system from Central Queensland north for several cases associated with system peak conditions in 2011/12. These compare the Powerlink and PB proposals:

Summary of Total Transmission Losses with/without Extra Load (MW)



Losses in these cases are also shown below:

Summary of Total Transmission Losses with/without Extra Load (MW)

Diversified	0	100	200	300	400
PB Power	175.5	186.8	200.2	216	234.5
Powerlink	169.8	178.7	189.2	201.4	215.4

Undiversified	0	100	200	300	400
PB Power	232.2	248.5	267.7	290.4	N/A[1]
Powerlink	221.5	234.2	248.7	265.5	284.9

The difference in losses of 10.7MW in the medium 'undiversified' load case with no extra load is expected to be exceeded every second year. Hence the generation capacity on the grid would in principle need to increase by at least 10.7MW to provide the same reliability of supply for the PB Power proposal, relative to the Powerlink proposal.

Annual costs of 10.7MW would be in the vicinity of $142/kW/a[2], being the cost of the gas turbine capacity, requiring an additional cost of $1.52million per annum owing to these higher losses.

As well as the peak generation costs there is the cost of additional energy required to meet transmission losses, which is in the vicinity of $20/MWh, being approximately the short run marginal cost of grid supplied power[3]. The additional losses for the PB proposal will average 2MW continuously based on an average import to Ross of about 400MW[4], with the following attributable annual costs:

$$2.0\text{MW} \times 8760\text{hrs} \times \$20/\text{MWh} = \$350{,}000$$

[1] N/A means that the PB Power proposal could not support this load level without additional support, the nature of which has not been assessed.

[2] The Western Australia Economic Regulation Authority has approved a value of $142.2/kW/a for 2009 (Decision on the Maximum Reserve Capacity Price Proposal for 2009/10, http://www.era.wa.gov.au/maximumReserveCapacityPrice.cfm).

[3] From Table 39 - SRMC of new entrant base/intermediate load CCGT's and coal-fired plant in the 17zones (nominal $/MWh), calculated as an average of CCGT and coal fired generation in Queensland, ACIL Tasman, 'Report on NEM generator costs (Part 2), prepared for IRPC and NEMMCO, February 2005.

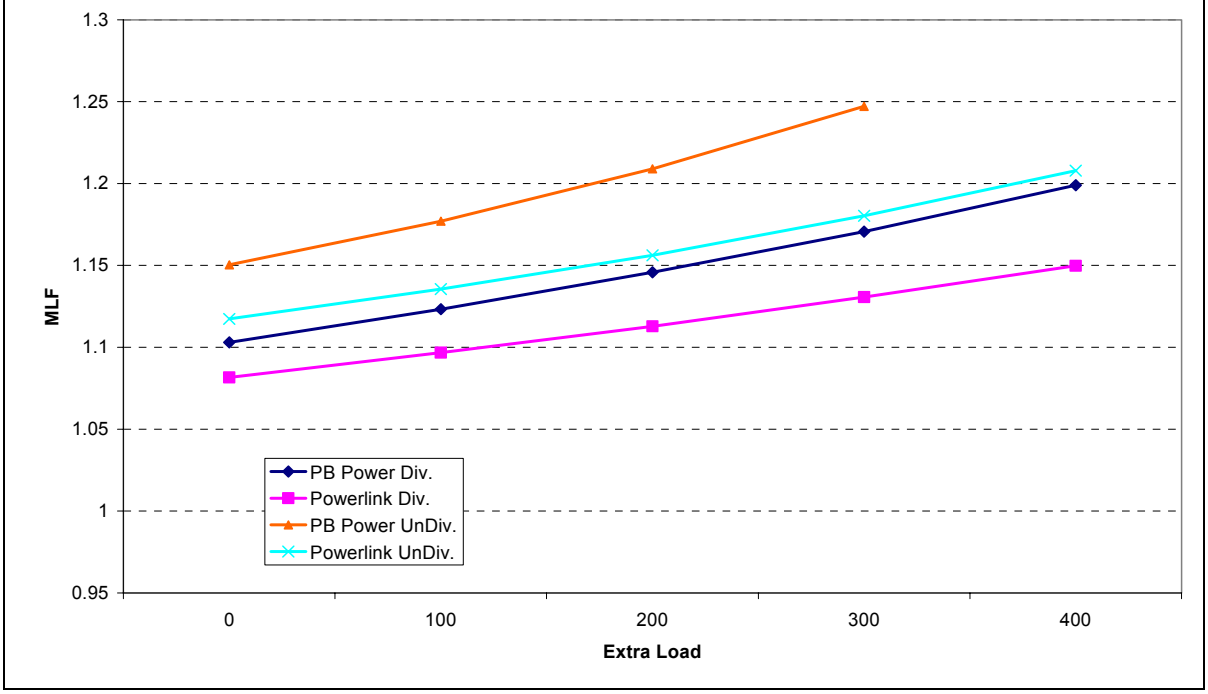
[4] The average import is calculated as the difference between forecast annual energy demand and forecast annual energy supply for the year 2011/12. The losses have been estimated based on average import conditions being maintained throughout the year, which provides an underestimate of the actual losses.

The combined value of reduced losses associated with the Powerlink proposal is therefore about $1.87million per annum. This difference can be compared with the difference in annualised capital costs of the Powerlink and PB proposals. At a discount rate of 9%, the annual costs of the additional $38million in capital would be approximately $3.4million.

Hence, adjusting for transmission losses, the real gap in annual costs between the two schemes is $3.4m-$1.87m = $1.53m.

North Queensland has consistently had the highest marginal loss factors in the NEM since market commencement in 1998. The following chart shows forecast MLFs in 2011/12 for the same conditions as for the previous chart, which showed MW losses:

Forecast Peak Period Marginal Loss Factors for Ross in 2011/12 (MW)



The forecast difference in MLF at Ross between the Powerlink and PB Power proposed developments is 1.0817 vs 1.1030 for the diversified peak load case with no extra load, a difference of 0.0213, or 2%. While this value represents a single point of time in 2011/12 it is representative of the overall outcome in that year in terms of MLF difference[5].

Hence, all loads in North Queensland can expect to pay around 2% more for the PB proposal, whether on contract or exposed to pool price. The nett market benefit to North Queensland of a 2% reduction in loss factors associated with the Powerlink proposal is estimated to be $2.48million.

[5] A reliable forecast of absolute MLF for 2011/12 would require 17,520 separate power flow studies of the NEM to be undertaken for each development option which is beyond the scope of this submission.

Anticipated benefits from choosing the Powerlink proposal over the PB Power proposal have been estimated to include:

Loss reduction benefits	$1.87m/a
MLF benefits to NQ consumers	$3.88m/a
MLF costs to NQ generators	($1.4m/a)
Total	**$4.35m/a**

The only offsetting costs are the annual costs of building the Powerlink proposal compared with the PB proposal. The estimated annual costs of this difference are approximately 9% of $38million, or $3.42million per annum. The resulting nett benefit to North Queensland is in the vicinity of $1.0million per annum. This would be larger for higher loads, which may result from a combination of higher economic growth, new industrial loads, increased population growth or more extreme weather conditions.

The analysis conducted demonstrates that, on an annual basis, the benefits of the Powerlink proposal to North Queensland exceed its costs and therefore deferment of the second line is not justified.

Importantly, Powerlink advises that the deferment proposed by PB would not be indefinite and would be needed within 6 years. Deferment of the second circuit would also introduce additional capital and other operating costs which would narrow the gap between the capital costs of the two options and further improve the case for Powerlink's proposal, on a whole of life economic basis.

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1) INTRODUCTION

Townsville Enterprise has commissioned ROAM Consulting to assist in preparation of a submission to the Australian Energy Regulator (AER) in support of Powerlink's revenue reset application.

In particular, Townsville Enterprise supports Powerlink's application to complete the third stage of its proposed three-stage line upgrade between Nebo and Ross, comprising a double circuit 275kV line augmentation between Strathmore (near Collinsville) and Ross (near Townsville).

2) BACKGROUND

In its draft determination on Powerlink's revenue reset application, released December 8 2006, the AER made their decision based upon a report prepared by PB Associates, *Powerlink Revenue Reset: Review of Capital Expenditure, Operating and Maintenance Expenditure and Service Standards*. In this report PB Associates examined the proposed line augmentation between Strathmore and Ross, and found the proposed project to be inefficient.

Powerlink's proposed project is the third stage in a three-stage line augmentation to improve transmission flow between Central and North Queensland. The third stage of this project involves the construction of approximately 190km of 275kV double circuit transmission line from Strathmore to Ross (double circuit twin sulphur conductors), substation works at either end of the line and five new 275kV circuit breakers. The project has undergone the regulatory test.

The need for Powerlink to meet its mandated reliability obligations to supply all demand under a critical transmission outage with limited generation availability in the Ross and Far North zones is a primary driver for the proposed line augmentation. Powerlink proposes that once completed, the augmentation will:

- provide an additional power path between Central and North Queensland and increase dynamic voltage support for the region;
- reduce loadings on the existing transmission lines, addressing both thermal limitations in the existing network and voltage stability limitations associated with an outage of a large generating unit in North Queensland or 275kV line between Central and North Queensland; and
- increase the maximum secure transfer capacity between Central and North Queensland by around 300MW.

PB's review confirmed the need for expenditure during the next regulatory period on the augmentation, however in a number of cases (namely the high growth scenarios) they concluded that there were more efficient or more optimally timed options that still allowed Powerlink to achieve its reliability requirements.

PB were not satisfied that the project was needed under any of the high growth scenarios detailed by Powerlink on the basis that it was assumed by Powerlink (under its

probabilistic methodology) that a generator would commence operating in this area in the following year, removing any further benefits of the line until the next regulatory period. They determined that it was inefficient to undertake the proposed project to avoid one year of potential and marginal (approximately 107 per cent) overloads in the high growth scenarios. They also indicated that should the high growth scenario be realised Powerlink could negotiate with one of its connected parties for a temporary lesser supply standard, implement a control scheme or consider various small scale demand side responses. On this basis PB recommended that the probability of the line being needed in the next regulatory period be reduced from 28.1 per cent to 21.8 per cent because of the removal of the high growth scenarios.

It was determined by PB that the use of a double circuit tower with a single low capacity circuit, combined with some additional shunt capacitor compensation, would be a more efficient option than Powerlink's. Then, if Powerlink still considered it needed the second circuit, it could be strung on the towers in the 2012-2017 regulatory period during times of low demand.

The AER's other consultants, CHC, supported PB's recommendation that the line should not be constructed in the next regulatory period for the high growth scenarios, but questioned whether the savings through the choice of a smaller conductor and deferral of stringing the second circuit (as proposed by PB) would be greater than the calculated increased grid support costs. PB had proposed a capital cost for the first stage (one circuit strung) of $100million, compared with $138million for Powerlink's double circuit proposal. CHC considered that the differential cost of grid support would probably be less than $20 million, but the cost of the second circuit still needs to be considered. Consequently, CHC considered that the difference would be small, and therefore the prudence of PB's recommended scope change was not clear.

After considering comments from PB, Powerlink and CHC, the AER, in its draft determination, has accepted PB's recommendation that the project should not be constructed in any of the high growth scenarios on the basis that a new generator would be planted in the following year removing any benefits of the line until beyond the next regulatory period. The AER also acknowledged CHC's views that the prudence of PB's proposed changes to the scope of the project are unclear. As such, the AER seeks further information from Powerlink that its recommended option is more efficient than that proposed by PB. For its draft decision though, the AER accepts PB's recommendation.

3) SUPPLY AND DEMAND FROM TOWNSVILLE NORTH

PB Power has stated that 'the 2007/08 10% and 50% PoE demand forecasts in the area are around 980MW and 890MW, respectively and there is approximately 670MW of generation in the area.'

ROAM Consulting has compared these values, which are assumed to have been provided directly to PB from Powerlink in discussions, with Powerlink's forecasts contained in its Annual Planning Report 2006.

Table 3.16 of the APR provides the following MW contribution by 'Far North' and 'Ross' zones to the annual peak 'delivered from grid' MW demand in Queensland.

Year	Far North	Ross	Far North + Ross	State Total
2007/08	334	474	808	8615

Table 3.13 provides a multiplying factor for all zones to estimate the ratio of 'zone peak demand to zone demand at time of Queensland region peak.' This provides the following ratios for summer:

Zone	Summer
Far North	1.06
Ross	1.30

Applying the factors from Table 3.13 to the values in the previous table, and making the reasonable assumption that 'Far North' and 'Ross' will peak at the same time, the expected peak demand for Far North plus Ross would be:

$$1.06 \times 334 + 1.30 \times 474 = \mathbf{970MW}$$

The value of 970MW accords reasonably closely with the PB supplied value of 980MW. However, the value of 970MW is derived from Powerlink's 50% PoE forecast and may be higher for the 10% forecast. Therefore the value of 980MW stated by PB may be on the low side of the 10% PoE forecast.

With regard to PB's statement that generation in the area is approximately 670MW, Powerlink's APR Table 6.1 provides the following data for generation capacity in the zone:

Station	MW
Mt Stuart	288
Yabulu	230
Barren Gorge	60
Kareeya	93
Total	**671**

The Invicta Sugar Mill has capacity of 39MW, however may not be necessarily in operation at time of system peak. Furthermore, the Barron Gorge power station relies heavily on 'run of river' flows and is often constrained to 30MW or less, even at peak times.

Hence the PB assessment of 670MW of total capacity in the two zones is reasonable.

Moving now to later years, and applying the same data from the Powerlink APR Tables 3.16 and 3.13, the following estimates of demand (MW) are obtained:

Year	Far North	Ross	Far North × 1.06	Ross × 1.30	Simultaneous Region Demand
2007/08	334	474	354	616	970
2008/09	348	485	369	631	1000
2009/10	362	497	384	646	1030
2010/11	377	507	400	659	1059
2011/12	392	519	416	675	1091

The simultaneous maximum demand of the Ross and Far North zones is therefore forecast to grow by about 30MW per annum for the next five years. These forecasts are of 'delivered' power to retail and industrial loads and do not factor in any transmission losses on the grid. Transmission losses effectively have to be imported from generation in Central Queensland along with delivered power to customers and therefore have to be added to the values in the above table. They can only be estimated by detailed power flow studies taking into account the pattern of generation and demand throughout North Queensland.

The forecasts are also stated by Powerlink in Table 3.16 to be based on the 'State Summer 50% Peak Demand – Average Weather and Diversity Conditions, Medium Growth Scenario.' There is no allowance made for either higher than 'normal' economic growth, or significantly more extreme weather conditions than in a 'normal' year.

Furthermore, there is no allowance for any potential industrial load development in either zone. Powerlink's APR states the following are 'not included in the forecast' (see Powerlink APR Table 3.3):

Zone	Type of Plant	Possible Load
Ross	Zinc	0-120MW

The forecast also does not include other potential loads considering locating in the area, including a second zinc smelter, and the Chalco alumina refinery, both of which would involve loads in the ten's to hundreds of Megawatts.

Hence, up to 400MW of additional industrial base load could be developed in the Townsville area in the next decade provided power infrastructure is in place and prices are competitive with other locations.

4) EVIDENCE OF RECENT HIGHER GROWTH RATES

The Twin City of Townsville / Thuringowa is experiencing the greatest population growth in regional Queensland (**Figure 4.1**). It is also the 8th fastest growing area in Australia by population. When combined, the twin Local Government Areas (LGA) of Townsville / Thruingowa, has the highest annual population growth of any local government area in Queensland followed by the Cairns LGA. Total population growth in the three cities presently exceeds 6,500 per annum as shown in Figure 4.2.

Figure 4.1 - Combined Townsville / Thuringowa Population Growth (% on previous year) 1991 to 2004.

Source: ABS 3218.0

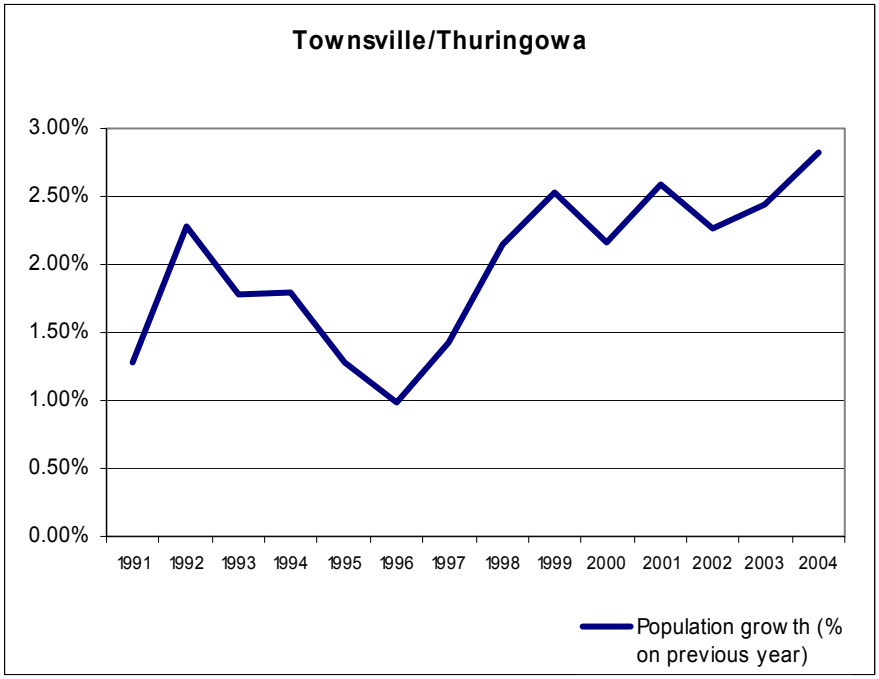
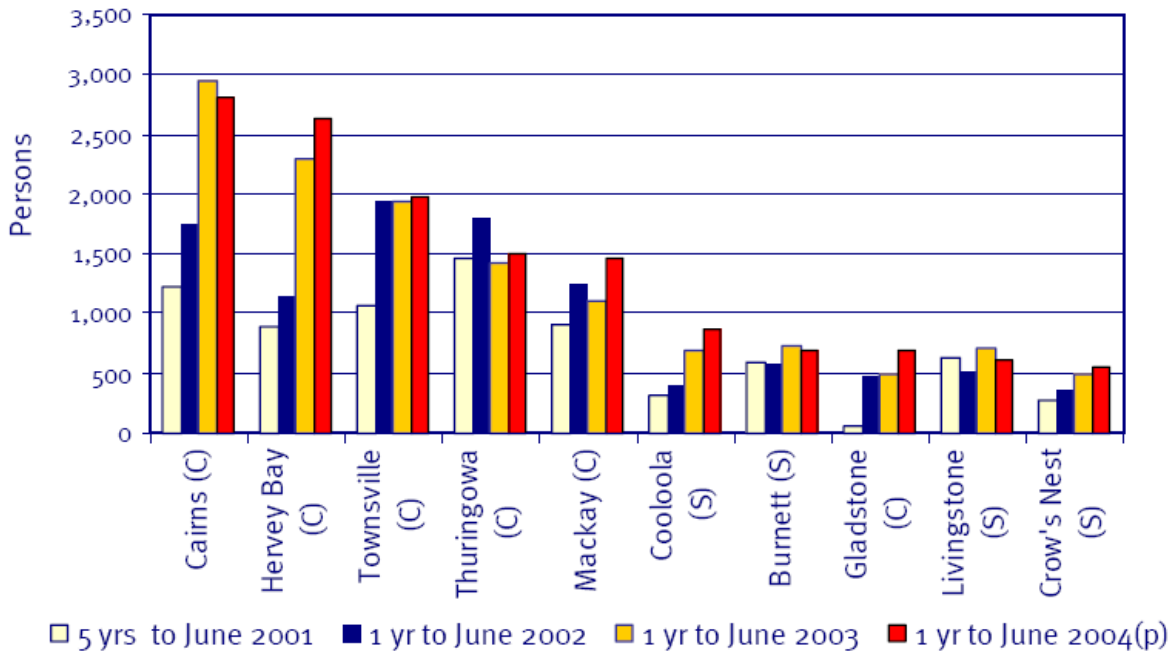


Figure 4.2 - Average Annual Population Change, Top Ten Largest Growth LGAs in Regional Queensland.

NB: Townsville/Thuringowa is a Twin City with two LGAs

Source: ABS 3218.0



These population growth statistics underpin Powerlink's projected growth rates for the future and the potential for higher growth rates if further industrial development is encouraged by competitive long term power prices. A strong increase in annual growth rate is observable in Figure 4.1 coinciding with the most recent period of major industrial expansion. Hence there appears be a strong possibility that the Powerlink medium growth forecasts will be exceeded in the mid to long term.

5) ADVERSE IMPACTS TO NORTH QUEENSLAND IF POWERLINK PROPOSAL NOT APPROVED

ROAM Consulting, on behalf of Townsville Enterprise, has identified a number of adverse impacts to electricity supply if the Powerlink proposal for a double circuit line from Strathmore to Ross is not approved. These are:

i. Inability to supply potential expanded industrial load development at market competitive prices due to transmission capacity limitations
ii. Higher transmission losses at all times but particularly peak times, even for medium growth conditions
iii. Adverse loss factors leading to higher energy prices for customers, even for medium growth conditions
iv. Reduced ability to attract major generators to North Queensland owing to lack of transmission capacity

These will be considered in turn, as in combination they represent a market failure in terms of electricity supply to North Queensland. These failures have a more serious impact on North Queensland than any potential cost reduction from deferment of the second circuit of the proposed Powerlink double circuit line from Strathmore to Ross.

The situation in North Queensland is that new industrial load cannot be attracted to North Queensland owing to the delivered electricity price to major consumers being about 25% higher than that in Central Queensland. This 25% increase is solely due to transmission factors since the wholesale price of electricity, as generated, is the same throughout the state. The 25% increase is split approximately equally between higher TUOS charges and higher marginal loss factors.

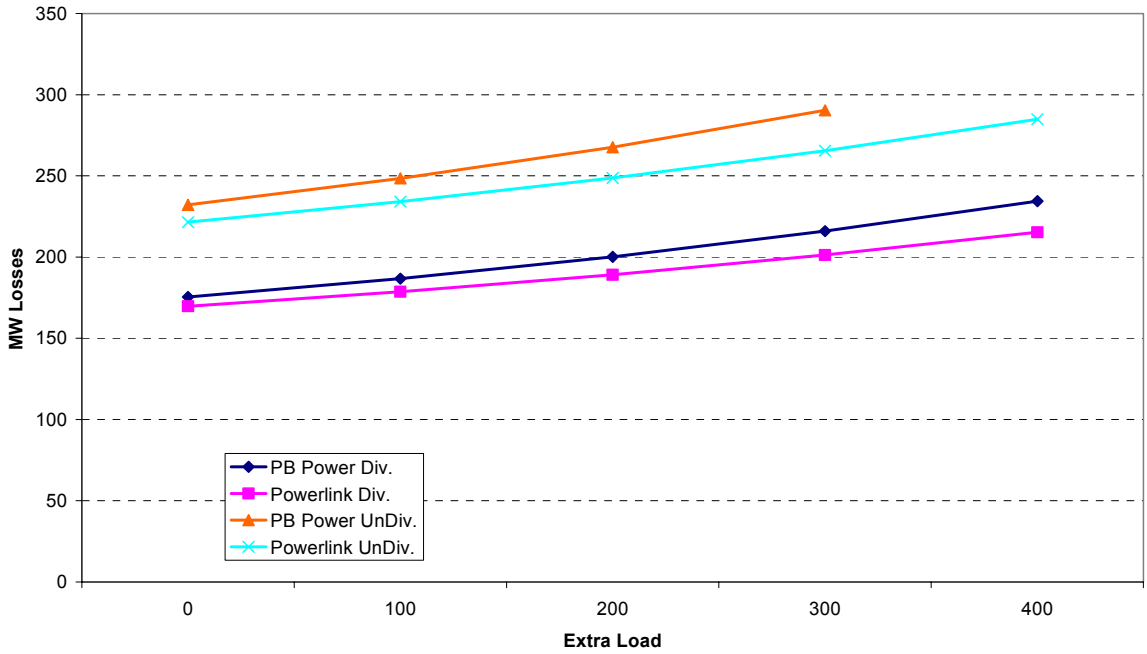
While consumers in North Queensland will have to pay additional TUOS for a larger line, this should be more than offset by reductions in costs due to marginal loss factors, as will be demonstrated.

The largest load in North Queensland, Sun Metals Corporation, is exposed to these higher marginal loss factors, and is therefore provided with a less competitive delivered energy price than if the Powerlink proposal is adopted. This is of significance to the region's ability to export value adding products.

The following chart shows forecast transmission losses on the Powerlink transmission system from Central Queensland north for several cases associated with system peak conditions in 2011/12 taken from load estimates developed in Section 3:

- Powerlink Div. refers to transmission losses at 2011/12 peak (diversified load at time of state peak) with the proposed Powerlink development from Strathmore to Ross
- Powerlink UnDiv. refers to transmission losses at 2011/12 peak (undiversified load, that is, not coincident with state peak)
- PB Power Div. refers to transmission losses at 2011/12 peak (diversified load at time of state peak) with the AER draft proposed development from Strathmore to Ross
- PB Power UnDiv. refers to transmission losses at 2011/12 peak (undiversified load, that is, not coincident with state peak) with the AER draft proposed development from Strathmore to Ross

Figure 5.1 – Summary of Total Transmission Losses with/without Extra Load (MW)



The charts also show the system losses with up to 400MW of additional load in 100MW increments, reflecting potential industrial load. However, part of the extra load shown could also occur as additional load growth through population growth, higher economic growth, or more extreme climatic effects.

For all case studies, North Queensland generation is the same, consisting of 78MW at Kareeya/Barron Gorge and 211MW at Yabulu Townsville, coinciding with Powerlink's dispatch in the APR 2006 Figures A.15 to A.19. These may be considered as typical dispatch at peak load times under market dispatch conditions.

Losses in these cases are also shown below:

Table 5.1 – Summary of Total Transmission Losses with/without Extra Load (MW)

Diversified	**0**	**100**	**200**	**300**	**400**
PB Power	175.5	186.8	200.2	216	234.5
Powerlink	169.8	178.7	189.2	201.4	215.4

Undiversified	**0**	**100**	**200**	**300**	**400**
PB Power	232.2	248.5	267.7	290.4	N/A[6]
Powerlink	221.5	234.2	248.7	265.5	284.9

The loss difference between the Powerlink proposal and the PB proposal with no extra load varies from 5.7MW in the diversified load case to 10.7MW in the undiversified load case. The difference in losses of 10.7MW can be expected to be exceeded every second year. Hence the generation capacity on the grid would in principle need to be increased by 10.7MW to provide the same reliability of supply.

Annual costs of 10.7MW would be in the vicinity of $142/kW/a[7], being the cost of the gas turbine capacity, requiring an additional cost of $1.52million per annum owing to these higher losses.

As shown in the chart and table, with additional load growth above the medium, the difference in peak load losses increases to 24.9MW with 300MW of additional load. Thus, with extra load, the difference in costs of losses between the two proposals multiplies.

Unless Powerlink enters into agreements with Network Service Providers, such as local generators, to operate at these peak load times, the annual cost of peaking capacity due to the higher losses in the PB proposal is estimated at approximately $1.52million per annum under conditions of normal load growth by 2011/12. It will be less in earlier years and greater in later years. It will also be higher in the event of higher than medium load growth.

As well as the peak generation costs there is the cost of additional energy required to meet transmission losses, which is in the vicinity of $20/MWh, being approximately the short run marginal cost of grid supplied power[8]. The additional losses for the PB proposal

[6] N/A means that the PB Power proposal could not support this load level without additional support, the nature of which has not been assessed.

[7] The Western Australia Economic Regulation Authority has approved a value of $142.2/kW/a for 2009 (Decision on the Maximum Reserve Capacity Price Proposal for 2009/10, http://www.era.wa.gov.au/maximumReserveCapacityPrice.cfm).

[8] From Table 39 - SRMC of new entrant base/intermediate load CCGT's and coal-fired plant in the 17zones (nominal $/MWh), calculated as an average of CCGT and coal fired generation in Queensland, ACIL Tasman, 'Report on NEM generator costs (Part 2), prepared for IRPC and NEMMCO, February 2005.

will average 2MW continuously based on an average import to Ross of about 400MW[9], with the following attributable annual costs:

$$2.0\text{MW} \times 8760\text{hrs} \times \$20/\text{MWh} = \$350{,}000$$

The combined value of reduced losses associated with the Powerlink proposal is therefore about $1.87million per annum. This difference can be compared with the difference in annualised capital costs of the Powerlink and PB proposals. At a discount rate of 9%, the annual costs of the additional $38million in capital would be approximately $3.4million.

Hence, adjusting for transmission losses, the real gap in annual costs between the two schemes is $3.4m-$1.87m = $1.53m.

5.1) DIFFERENCE IN MARGINAL LOSS FACTORS

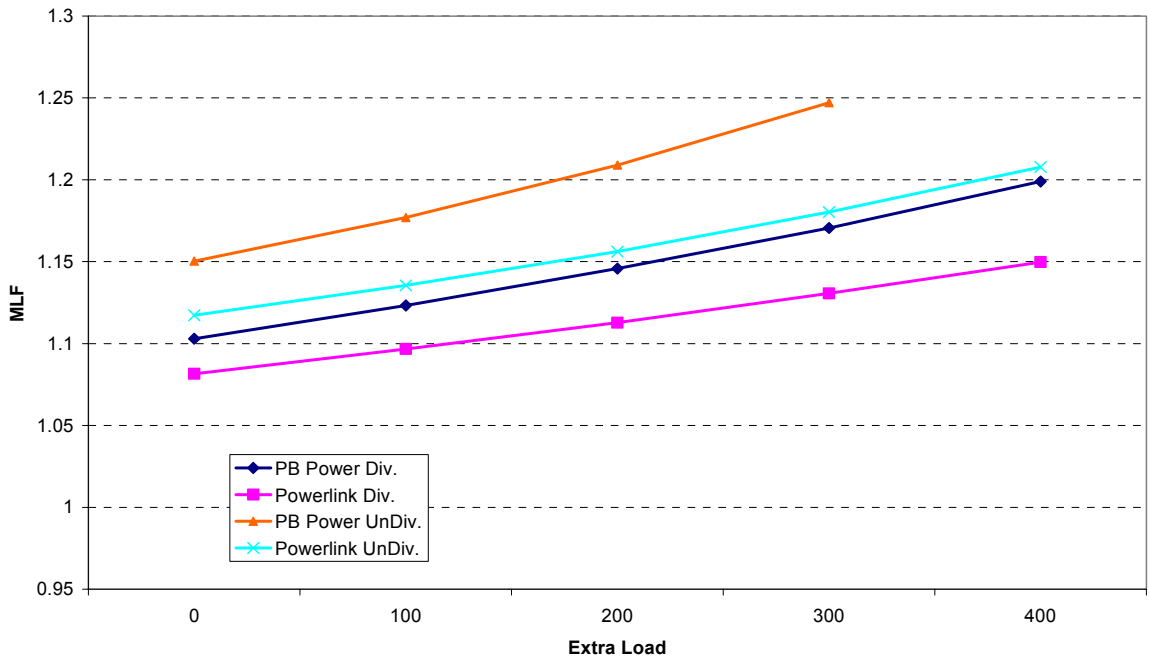
In the electricity pool, and for all contracts, energy prices are multiplied by MLFs at each load offtake point to determine the delivered energy price.

North Queensland has consistently had the highest marginal loss factors in the NEM. The MLF for Townsville South (KZ) in financial year 2006/07 is 1.1180 (Cairns has an even higher MLF of 1.1604). Competing regions such as Gladstone have an MLF of 0.9504, or 15% lower. Albury, a comparable load centre in NSW, has a loss factor of 1.0368. Tomago, an industrial centre, has a loss factor of 0.9864.

The following chart shows forecast MLFs in 2011/12 for the same conditions as for the previous chart, Figure 5.1, which showed MW losses:

[9] The average import is calculated as the difference between forecast annual energy demand and forecast annual energy supply for the year 2011/12. The losses have been estimated based on average import conditions being maintained throughout the year, which provides an underestimate of the actual losses.

Figure 5.2 – Forecast Peak Period Marginal Loss Factors for Ross in 2011/12 (MW)



The forecast difference in MLF at Ross between the Powerlink and PB Power proposed developments is 1.0817 vs 1.1030 for the diversified peak load case with no extra load, a difference of 0.0213, or 2%. While this value represents a single point of time in 2011/12 it is representative of the overall outcome in that year in terms of MLF difference[10].

Hence, all loads in North Queensland can expect to pay around 2% more, whether on contract or exposed to pool price. An individual 100MW base load such as Sun Metals can expect to pay approximately $500,000 per annum more.

The forecast energy for Ross and Far North zones in 2011/12, from the Powerlink APR, Table 3.14, is:

	GWh/a
Far North	2174
Ross	3365
Total	**5539**

[10] A reliable forecast of absolute MLF for 2011/12 would require 17,520 separate power flow studies of the NEM to be undertaken for each development option which is beyond the scope of this submission.

At a typical energy market spot or contract price of $35/MWh, the 2% additional cost represents $3.88million in increased charges. On the other hand, generators in North Queensland will receive 2% loss on total production volume of about 2000GWh, or a reduction of $1.4m/a. The nett market benefit to North Queensland (Far North plus Ross zones) is therefore $2.48million. This factor combined with the reduction in losses of $1.87million exceeds the annual costs of the $38million extra capital associated with the Powerlink proposal.

5.2) ADDITIONAL COST OF DEFERRING SECOND CIRCUIT

Powerlink has advised that the deferment would not be indefinite and would be needed within 6 years. Powerlink has also advised that deferment of the second circuit as proposed by PB would also introduce additional capital and other operating costs which would narrow the gap between the capital costs of the two options and further improve the case for Powerlink's proposal.

In contrast, ROAM's assessment has been based on comparing two alternatives on the differences in annual cost to North Queensland customers on a year by year basis, and does not attempt to provide a whole of life economic analysis as Powerlink has done.

The annualized cost method and the whole of life economic analysis both demonstrate the benefits of completing the double circuit line as a single project, rather than deferring the second circuit.

6) EFFECT OF ADDITIONAL GENERATION IN NORTH QUEENSLAND

AER/PB Power have suggested that the justification for the Powerlink proposal will be negated by the development of new generation in North Queensland under some scenarios.

However, such new generation development is less likely to occur under the PB Power plan than the Powerlink plan.

Marginal loss factors are a key concern of generators when deciding where to locate. Generators consider not only the present loss factors but also the loss factors following development of their plant.

A baseload generator of the size needed to be competitive in the NEM will need to be of several hundred MW capacity. A generator of this size, locating at Townsville, is likely to

receive an MLF of less than 1.0, which will negatively impact its return on investment compared with a higher MLF[11].

The effect of adding additional transmission conductors in the Powerlink proposal will keep MLFs closer to 1.0 (i.e. loss factors above 1.0 will move down and loss factors below 1.0 will move up). Hence a large generator locating in North Queensland will receive higher MLFs as a result of the Powerlink proposal than would apply with the PB Power proposal. An added benefit of additional transmission capacity is that loss factors will be more stable from year to year and less affected by the influences of new load and new generation.

The effect of the PB Power proposed development is therefore to reduce the potential for a new market generator to develop in North Queensland.

Hence MLFs throughout North Queensland are likely to remain high, precluding the opportunity for industrial development that would otherwise be more likely to eventuate if power prices came more closely into line with other competing regions such as Central Queensland and industrial locations in NSW, Victoria, South Australia and Tasmania.

7) CONCLUSIONS

Anticipated benefits from choosing the Powerlink proposal over the PB Power proposal have been estimated to include:

Loss reduction benefits	$1.87m/a
MLF benefits to NQ consumers	$3.88m/a
MLF costs to NQ generators	($1.4m/a)
Total	**$4.35m/a**

The only offsetting costs are the annual costs of building the Powerlink proposal compared with the PB proposal. The estimated annual costs of this difference are approximately 9% of $38million, or $3.42million per annum. The resulting nett benefit to North Queensland is in the vicinity of $1.0million per annum. This would be larger for higher loads, which may result from a combination of higher economic growth, new industrial loads, increased population growth or more extreme weather conditions.

The analysis conducted demonstrates that, on an annual basis, the benefits of the Powerlink proposal to North Queensland exceed its costs and therefore deferment of the second line is not justified.

[11] The reason that a generator locating in North Queensland would cause the loss factor to drop by around 10% is because the resulting change in network losses will apply back to the reference node in Brisbane, approximately 1200km away.

Importantly, Powerlink advises that the deferment proposed by PB would not be indefinite and would be needed within 6 years. Deferment of the second circuit would also introduce additional capital and other operating costs which would narrow the gap between the capital costs of the two options and further improve the case for Powerlink's proposal, on a whole of life economic basis.