NOTE: CONSIDERABLE COMMERCIAL-IN-CONFIDENCE INFORMATION HAS BEEN REMOVED FROM THIS VERSION OF THE REPORT

# Providing a circuit breaker to meet North West Queensland's future electricity needs

An independent review by Rod Sims

Public version of the Report
Commissioned by the Queensland Resources Council and the Queensland Government

May 2009

**Port Jackson Partners Limited**

Port Jackson Partners Limited (PJPL) is a specialist consulting firm which provides advice to CEOs, boards and senior managers to help them set corporate direction, define business strategies and develop their organisations.

Rod Sims is a Director of PJPL. In this work he was assisted by Grant Mitchell, a Senior Associate of PJPL, who led and coordinated the research and analysis for this report. Harry Cominos and William Sheane, Business Analysts at PJPL, undertook the detailed research and performed the analyses which underpin this Report.

**Acknowledgements**

This Report was made possible by the co-operation of the many organisations and companies listed in Attachment 2. Discussions with these organisations and companies assisted us to identify the issues of most importance. In addition, much of the analyses in this Report was based on data these organisations and companies agreed to share with us.

This Report benefited in particular from fortnightly discussions with members of the Review's Steering Committee.

## OVERVIEW

- North West Queensland (NWQ) is the dominant source of base metals in Queensland and an extremely prospective area
- Mount Isa is one of three economic centres which is the focus of a Queensland Government led initiative based on the Northern Economic Triangle (NET). Released in 2007, the NET Infrastructure Plan 2007-2012 seeks to foster the future prosperity of NWQ and North Queensland as a triangle of mining, mineral processing and industrial development. Critical to the NET Infrastructure Plan is the provision of secure and competitively-priced energy.
- The current source of local generation, the CS Energy owned Mica Creek power station, is approaching the limit of its ability to supply the NWQ load reliably and also needs to replace some units which are old and inefficient, particularly if, as expected, delivered gas prices rise significantly in the future
- There is a current "fork in the road" decision to be made in relation to NWQ energy supply: this will either see a local generation solution (likely to be Mica Creek upgraded) or a transmission line constructed to connect NWQ to the National Electricity Market (NEM). There are credible proponents of such a link who have invested time and money in the belief that a link is the best option
- Commercial negotiations to upgrade Mica Creek are facing difficulties due to the complex supply chain to supply Mount Isa users, and due to the difficulty of gaining attractive and long term gas prices to provide some assurance on the future cost of local generation
- In addition to needing to settle an agreement for energy supply to current customers, however, there are also other objectives to be met. It is important to make it easier for new loads to connect to the current NWQ distribution grid and to cater for the energy needs of mine expansions; given the prospectivity of the area it is necessary to achieve lowest cost energy for the region as a whole; and some account must be taken of the wider issues such as the possible eventual connection of renewable energy
- The Review finds that, based on the most likely assumptions, the economics of local generation and transmission are similar due, in particular, to rising delivered gas prices and the expected demand levels for electricity in NWQ. The Review also finds that a transmission line option is best placed to meet the other objectives just listed, but that it can only be preferred it if is also the most economic option for current NWQ customers once some regulatory and pricing adjustments are made
- A detailed examination found many credible supply options but there is insufficient information to determine now which is the lowest cost option for users. There is simply too much gas price, capital cost and regulatory uncertainty to recommend any one solution at this time; the above referred to "most likely" assumptions need to be tested in the marketplace

- The Review therefore recommends that the Government announce a 12 month competitive process to find a solution, and that the Government address the main barriers holding back some of the key proponents and place a deadline for a solution. Specifically the Government would:
  - assist with some feasibility study funding in specific circumstances
  - address some current regulatory and other hurdles, including through seeking National Electricity Market Rule derogations
  - work with transmission line proponents and the Australian Energy Regulator (AER) to ensure an appropriate discount on charges to connect to the existing Queensland grid in recognition of the wider benefits of a transmission solution
  - consider, upon application, that the Co-ordinator General make use of statutory instruments and powers contained within the *State Development and Public Works Organisation Act 1971* to assist the timely delivery of any infrastructure facility
  - work up a regulated shared transmission service option within six months as an alternative to be considered if other options are not available on reasonable terms
- There are reasons to prefer an unregulated solution, either one based on local generation or an unregulated transmission line. Such options can better adapt their pricing, timing and reliability to the needs of the current and future large NWQ customers. Such options, however, have long been under discussion and, along with the just mentioned Government actions, they also need a deadline to work towards. This will, for example, signal to potential gas suppliers that it is now timely to determine if gas can be provided to NWQ on terms acceptable to the customers
- While there are reasons to favour an unregulated option, a regulated transmission service option with prices determined without the "smearing" of asset specific costs across all Queensland transmission customers should also be developed and assessed. While it would not be explicitly part of the recommended competitive process, in particular ways such an option is well suited to the situation in NWQ. If, within 12 months, proponents and customers have not settled an agreement on energy supply, the Government should seriously consider whether such a regulated option is appropriate, in consultation with customers
- It is important to emphasise that the ultimate decision on the way forward for NWQ energy must lie with consumers. The Government's role is to assist with the key issues listed above and, at the end of 12 months, weigh the net benefits of offering customers a regulated solution if non regulated options have not in the meantime been found acceptable to customers. The Government should not impose a solution that customers believe will raise their cost of energy over other available options
- The Review is confident the most appropriate way forward will be found within the 12 month period. The Review's recommendations will remove the current bottlenecks, provide impetus and introduce alternatives such that all the relevant facts and focus are available for sensible decision making.

# CONTENTS

## Explaining some important terms

| | |
|---|---|
| AEMC | The Australian Energy Market Commission is responsible for rule making, market development and the provision of policy advice to the MCE concerning the NEM |
| AER | The Australian Energy Regulator, among other things, sets the allowable revenue for a shared transmission service and generally enforces the Natural Electricity Market rules |
| ALF | The Average Loss Factor is the average proportion of electricity lost during transmission |
| CCGT | Combined Cycle Gas Turbine |
| CGP | The Carpentaria Gas Pipeline running from South West Queensland to North West Queensland |
| Connection asset | Assets which allow the conveyance of electricity from a customer at its connection point, to the last connection which is unshared with another customer |
| Distribution network | A collection of network assets which distribute power to smaller end users; not to be confused with transmission assets, which transmits much larger volumes of power usually into distribution networks |
| SWQGP | South West Queensland Gas Pipeline |
| Derogation | Where a Government or a market participant applies for the National Electricity Rules to be varied, and this is granted by the AEMC, this is termed a derogation |
| Exempt service | A type of unregulated transmission service; see page 39 |
| Funded augmentation | A type of unregulated transmission service; see page 39 |
| Long-tail risk | Risk of price and volume changes post contract period; for instance, if a transmission provider fully contracts its line for 10 years, the transmission provider is assuming a usage and pricing risk on the remainder of the asset's life |
| MCE | The Ministerial Council on Energy which is responsible for policy setting in the NEM and comprises all of Commonwealth and State energy Ministers |
| MLF | The Marginal Loss Factor is the proportion of electricity lost in transmission at the margin |
| MNSP | A Market Network Service Provider provides a transmission service linking two NEM regions |

| | |
|---|---|
| Negotiated service | A type of unregulated transmission service, see page 39 |
| NEM | The National Electricity Market is an interconnected electricity market covering South Australia, Tasmania, Victoria, the ACT, NSW and Queensland |
| NEMMCO | The National Electricity Market Management Company Limited (NEMMCO) is the wholesale market and power system operator for the National Electricity Market |
| Non regulated transmission service (or unregulated transmission line) | These are largely transmission links other than those that are a Shared Network Asset |
| NWQ | North West Queensland |
| OCGT | Open Cycle Gas Turbine |
| 'Postage stamp' component of TUOS | The Common and General components of a transmission network service provider's TUOS charges which do not differ by location |
| Regulatory Test | The Regulatory Test is an economic cost-benefit test used by transmission businesses in the NEM to determine the least cost solution which meets the load, reliability and technical requirements for those who produce, consume and transport electricity in the market |
| Shared network asset (or regulated transmission line) | A transmission link that allows automatic access to all users in the NEM and is priced such that the link owner earns revenues set by the Australian Energy Regulator |
| Smearing | The process whereby the prices charged to users of shared transmission service are based partly on the cost of the entire interconnected network, and only partly on the full cost of the line that immediately connects the user. This recognises the fact that the transmission network operates as an interdependent system and customers throughout the network receive benefits from the operator of the fully connected grid |
| Transmission network | A system of transmission lines and other works used to connect grid injection points and grid exit points to convey electricity throughout a region |
| TNSP | Transmission Network Service Provider; Powerlink, for example |
| TUOS charges | Transmission Use Of System charges; what is paid by users of a shared transmission service |

# CHAPTER 1

## EXECUTIVE SUMMARY AND APPROACH TAKEN

# 1. EXECUTIVE SUMMARY AND APPROACH TAKEN

The majority of power to the North West Queensland (NWQ) region is supplied by the Mica Creek power station at Mount Isa, first constructed by Mount Isa Mines Limited, but now owned and operated by CS Energy and serving the broader community via Ergon Energy's local distribution network. Mining and other projects not served by the network have installed or contracted for stand-alone electricity generation facilities.

A combination of upgrades at Mica Creek, and the use of on-site generation at particular mining developments, has supplied a regional demand that has grown to around 390MW in 2008 – a 100% increase in the last 10 years.

The approaching expiry of key contracts for gas and electricity supply, growth in demand towards the firm capacity of the existing assets and concerns over the reliability of some ageing generating plant has focussed the attention of NWQ users on the best energy delivery solution for the future of their region. Agreeing a way forward has, however, been complicated by uncertainties surrounding the cost of key inputs to Mica Creek – notably gas supply and transport – and the emergence of alternative transmission link solutions.

These competing solutions provide a clear "fork in the road" as electricity supply decisions made now will remain in place for many years. Securing a reliable and cost effective supply of energy is vital if NWQ is to achieve its potential economic development.

In recognition of the importance of this decision for the region and for Queensland as a whole, the Queensland Resources Council and the Queensland Government instituted an Independent Review to assist all interested parties to find a way forward.

The Terms of Reference, summarised in Exhibit 1.1 and included in detail as Attachment 1, sought a suitable delivery model taking into account commercial viability and risk mitigation. They required the Review to make an assessment of the various options to deliver energy to NWQ, taking into account the current status of each option.

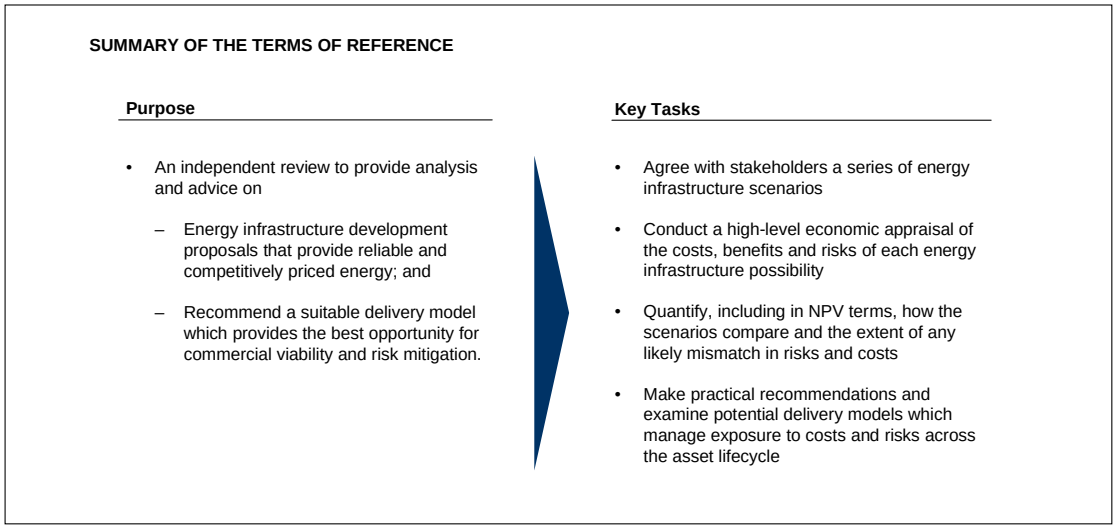
The Review team held many discussions with interested parties, including NWQ customers, suppliers of electricity and gas, proponents of various transmission link schemes, regulators, and representatives from local and state governments (Attachment 2).

Many of these parties agreed to share with the Review data previously provided only on a commercial-in-confidence basis. This information, along with publicly available data, provides the raw material for the analysis contained in this report. For this public version of the report, of course, all commercial-in-confidence information has been excluded. One transmission link proponent, IsaLink, prepared a public submission to assist the Review and this has been distributed to the Queensland Government and representatives of the Queensland Resources Council, as well as other interested parties (see Attachment 3).

Using this information, the Review has prepared its own analysis of the current situation regarding NWQ energy supply; the underlying economics of each of the proposed solutions; and an assessment of the regulatory and other issues relevant to each proposed solution.

These analyses, and the conclusions that arise from them, are summarised here and further in subsequent chapters. The coverage of the material in this public report is, of course, limited by the need to protect commercial-in-confidence information.

Exhibit 1.1




## 1.1 Current arrangements for NWQ electricity supply

For many years NWQ electricity users have been supplied through a combination of gas and diesel fired generation plants.

- Of a total regional demand of around 390MW:
  - Around 300MW is supplied through the local transmission and distribution network ("on grid"), operated by Ergon Energy
  - 90MW is "off grid" demand at more remote mines, supplied by on-site diesel or gas-fired generation plants
- "On grid" demand is supplied by two gas-fired power stations:
  - 30MW is supplied by the Xstrata Power Station (XPS) at Mount Isa
  - The remaining demand is supplied by Mica Creek, located at Mount Isa and owned by CS Energy
- The gas-fired power stations in the region are supplied with gas through the Carpentaria Gas Pipeline (CGP), operated as a regulated asset by the APA Group (APA). This pipeline also supplies the gas needed for processing needs, for example at Incitec Pivot's Phosphate Hill development

- Much of the gas has historically been supplied from the Cooper Basin but will increasingly be sourced from the Surat Basin as Cooper Basin reserves deplete
- These arrangements are secured by a complex series of purchase agreements, covering the supply of gas, gas transport, electricity generation and electricity distribution

The interrelated nature of the purchase agreements described above means many expire at similar times. The majority of purchase agreements by NWQ users expire on or before 2013, and are currently in the early stages of re-negotiation.

## 1.2 Negotiations are difficult to resolve

These negotiations are, however, being affected by a series of complications.

First, Mica Creek requires substantial investment if it is to continue to supply NWQ in an efficient and reliable way.

- The current Mica Creek power station is a combination of units, some dating from the 1960s. These older units, though used less often than they once were, still mean Mica Creek has relatively poor efficiency overall
- This low efficiency will impose a large cost penalty on users when, as seems likely, gas prices rise in the future
- These older units also have poor reliability and much higher maintenance costs than the more recent units, though customers' pricing arrangements may protect them from these impacts
- Current capacity at Mica Creek can meet current demand but is not sufficient to allow for mine expansions or for new mines to be connected to the grid

Second, securing long term gas contracts at known prices is currently difficult, making forecasts of the economics of future gas-based generation especially uncertain.

- LNG developers have secured and are continuing to secure gas reserves in anticipation of successful project developments
- The result is a complex market dynamic which exerts upward pressure on gas prices as suppliers attempt to extract the additional return available through exporting from LNG production
- That is, while Australia's east coast gas prices have hitherto been aligned with low cost domestic coal they will now be exposed to higher international prices
- The maturing Australian gas market, plus this pricing level uncertainty, mean that parties entering into long term electricity offtake obligations may be exposed to some level of gas price uncertainty whatever the initial contract price

Third, gas transport to NWQ is constrained and likely to increase in cost.

- Capacity on the CGP, the only means of transport of natural gas for generation, is fully contracted (there can be more capacity with investment in additional compression)
- Future gas is likely to be supplied by coal seam methane (CSM) reserves in the Surat Basin, and as such will be subject to additional transport costs along EPIC's South West Queensland gas pipeline (SWQGP), which is also fully contracted
- Compression infrastructure at two key points, Ballera and Wallumbilla, is owned by incumbent gas players and this can provide a further barrier to entry for NWQ supply

Finally, new energy options, based on construction of transmission links, are being developed by a range of proponents. Some of these projects are sufficiently advanced to have embarked on commercial negotiations with NWQ customers. These potential projects increase the choices faced by future NWQ users and also by the incumbent NWQ generator which could generate power for the National Electricity Market (NEM) if a line is built.

The factors above make reaching agreement on continuing energy supply more difficult today than previously.

### 1.3 The market will not solve all of the fundamental problems at hand

In the discussions leading up to this Review much was made of the difficulty facing Xstrata, Ergon Energy and CS Energy in settling commercial arrangements to supply the current needs of those relying on grid power. While a complex issue, it is not the only or even the dominant issue.

It is a complex issue because CS Energy requires long term gas supply and power purchase agreements with mainly Xstrata and Ergon Energy. The other major grid connected consumer, the Century mine, already has its electricity supply locked in for its remaining mine life. There are two problems: CS Energy has so far been unable to secure an acceptable long term gas supply agreement; and Xstrata has been unwilling to commit to take energy beyond its current mine plans (the so called "timing mismatch"). Xstrata is concerned to achieve the lowest possible electricity prices as these are fundamental to its future viability.

Left on their own, however, the Review believes that CS Energy and Xstrata would reach agreement or another way forward would be found. Since Ergon Energy's Mount Isa town load is much smaller than, and its continuing existence is dependent on, Xstrata's load, negotiations could essentially be between CS Energy and Xstrata. While Xstrata has established mine plans for only a limited time, its main Mount Isa mine has been operating for around 80 years and has reserves and resources that can underpin its future for many more years. The Review estimates this Xstrata load is sufficient to secure modest returns, and under many demand scenarios

underpin attractive returns from a future Mica Creek Power Station, even accounting for reinvestment costs.

It is true, however, that CS Energy may find it difficult to secure a gas contract of sufficient length at a suitable price. Nevertheless, absent an alternative, Xstrata will either negotiate arrangements acceptable to CS Energy and itself, or it will self supply. Xstrata already has the main contract for gas supply to Mica Creek, it previously owned and operated Mica Creek power station, and it recently installed 30MW of gas-fired power to meet its needs when it was unable to agree terms with CS Energy in an acceptable time frame.

In addition, however, the region as a whole must grapple with three other issues. These issues are broader than those typically encountered in one-to-one commercial negotiations. They are:

- First, new or incremental loads are difficult to cater for given the complex and long supply chain and, as a result, some mines are relying on very expensive diesel generation which limits regional growth
- Second, customers and proponents acting individually, through usual market mechanisms, may not secure the lowest cost solution for the region
- Third, there are wider issues to address outside the needs of customers in the NWQ region; for example, the potential to facilitate the development of renewable generation in or near NWQ, or the potential to connect additional loads outside NWQ itself

That these broader issues may not be settled in one-on-one negotiations between the players is explained by the following.

First, commercial negotiations can break down because the electricity supply chain to Mount Isa is complex. The future supply chain requires gaining access to limited compression at Wallumbilla, access to the SWQGP owned by EPIC and currently fully contracted, gaining access to compression at Ballera (and only the SWQ Gas Producers currently have such a facility), gaining access to the CGP, gaining access to gas and, of course, gaining access to generation capacity. It is difficult to "juggle" all of these arrangements and complete a deal.

Second, and reinforcing the first point, new demand comes along in unexpected "lumps" that are difficult to supply. Miners may need, for example, an extra 10, 20 or 40MW, while gas transport or generation capacity expansions are often in larger increments. If capacity expansions need to be fully underwritten, as is the case in NWQ, new load will often not be economically justified. In addition, many new loads may only last for a short time, less than would typically be required to underwrite investment in new capacity.

Third, there is a large risk of non-competitive outcomes. Existing and new miners must deal with monopoly generation and local transmission suppliers, monopoly pipelines, and a few gas suppliers at any point in time with available gas. Such situations inevitably affect market responsiveness.

Finally, and importantly, there has been imperfect information available to the key players. It is, for example, difficult to understand the true likely demand of the existing and likely future mines, and to compare the relative energy costs from the different supply options.

Evidence of the combination of the above four points is available. Companies on a number of occasions have found that the size of their needs do not justify increased capacity on a pipeline or at Mica Creek; miners cannot gain energy supply for a 3-4 year surge in activity; and prices recently quoted for additional gas supplies are multiples of past south east Queensland prices. Indeed, leaders in the Mount Isa area believe that the difficulty of connecting new load is the main energy issue facing NWQ.

This Review has been able to overcome these information gaps. It has also encouraged other options to surface, such as the potential for a regulated transmission line.

## 1.4 Create a "circuit breaker" to drive a solution

This Review has concluded that the preferred way forward is for the Government to announce a 12 month competitive process to determine the best solution for future NWQ energy supply. This process should empower customers, see the Government address the main barriers holding back proponents, and outline a timetable for all proponents so that a timely solution can be found.

This conclusion is based on the following logic:

- The situation at Mica Creek, the outlook for gas prices and likely future NWQ electricity demand, make a transmission link a potential option to be considered alongside local generation
  - Mica Creek units A1–4 are old, inefficient and are scheduled for replacement
  - Increased gas prices and transport costs will affect Mica Creek's economics significantly
  - The Review's demand outlook can support more load than can currently be supplied from existing Mica Creek infrastructure (though, of course, capacity could be added)
  - Given the above, local generation and transmission from the NEM can provide broadly similar costs of supply based on most likely assumptions
- A detailed examination of each available power supply option indicates that they are all credible, but there is insufficient information to determine now which is the lowest cost option for users
  - Delivered power costs depend heavily on gas prices, future demand and capital costs

  - There are wider benefits which, though difficult to quantify, favour a transmission link solution
  - Approval of an unregulated link would require an unusual application of the NEM Rules, and so a derogation from these Rules would likely be required
  - Other options considered were not credible. For example, selling Mica Creek to NWQ users to manage directly was judged too commercially complex, and new generation sources (e.g. geothermal) are not yet proven

- Instead, a well structured competitive process should begin immediately to:
  - Encourage proponents to put forward their best offer in a timely fashion
  - Address the issues outlined in Section 1.3 as much as possible
  - Allow users to manage uncertainties around gas price, NEM price, carbon price, as well as future demand
  - Provide time to address the current capital cost and funding uncertainty faced by proponents
  - Avoid a monopoly pricing outcome or nominating a winner without the support of users

It is proposed that the competitive process be structured as follows:

- All unregulated proponents should be invited by the Government to put forward their most competitive proposals to customers over the next 12 months based on, respectively, settling their source of gas or undertaking the required feasibility studies
- The Government announce how it will assist by removing particular barriers that are currently holding back proponents
- Customers choose the way forward; unregulated proponents have a maximum of 12 months to negotiate a bankable deal with both existing and potential customers, including those wishing to expand their production
- In the absence of such a bankable deal being negotiated, a regulated option will then be considered by the Government and discussed with customers to determine if it is an appropriate solution

The role of Government in this process is fundamental, but also necessarily limited. The Government's essential role is to remove some particular barriers, as follows:

- The unregulated transmission link proponents have to spend considerable amounts on their feasibility studies and it is appropriate for the Government to reimburse some of this money if these studies are

completed but then they are not the preferred option chosen by customers (see Chapter 4 for details)

- The unregulated transmission line proponents in particular face large regulatory hurdles as the NEM Rules do not cater for the unique circumstances in NWQ. It is appropriate for the Government to work with proponents, the AER and the AEMC to address these issues and to consider applying for any necessary derogations from the Rules
- To assist a local generation option to be developed over the next 12 months the Government should do what it can to facilitate access to the Ballera compression facility so that competing supplies of gas can be assessed
- In recognition of the wider potential benefits attaching to a transmission line solution, the Government should work with proponents and the AER to ensure an appropriate TUOS discount at the point of connection to the existing network such that the rest of Queensland consumers are not disadvantaged
- The Government should work up the economics and arrangements for a regulated shared transmission service option within 6 months, and then immediately share this information with customers
- Finally, if unregulated proponents and customers are unable to reach agreement on a way forward the Government should weigh up the benefits of a regulated line and discuss its economics and charging mechanism with customers

It is worth elaborating on this last point.

There are reasons for customers to prefer an unregulated solution, either one based on local generation or an unregulated transmission line. Proponents of such an option can adapt their pricing, reliability and timing explicitly to the needs of customers. A regulated shared transmission service is less flexible.

In order that all options are considered, however, a regulated option should be developed. While there is currently uncertainty as to its ultimate pricing for customers, and while customer charges will be at some risk because of uncertainty as to the ultimate level of load on the line, this option could be the most appropriate. First, if no bankable unregulated line option becomes possible,, then the Mica Creek expansion would be the only remaining option, which would place customers in a difficult negotiating position. Second, a regulated option naturally addresses issues of access for later customers, and its revenue stream will be based on a lower cost of capital.

To allow customers to make a valid comparison between regulated and unregulated line options the Review proposes that the regulated lines costs not be smeared in the usual way in determining regulated transmission prices. In the initial years, with such a long line, customers in the rest of Queensland would bear increased costs if the line charges were smeared. The Review proposes, therefore, that a levy be

imposed on NWQ grid customers that "unsmears" the charges so that NWQ customers are bearing the full costs of the line.

The Review believes, therefore, that if a regulated line option has similar economics and other outcomes for customers to an unregulated option then customers and the Government will prefer the unregulated option. If the regulated option has better economics for customers, however, particularly given that its charges are not smeared and so are not being supported by other Queensland transmission customers, then it should be preferred.

It is important to emphasise that the ultimate decision on the way forward for NWQ energy must lie with customers. The Government should assist in the ways listed above, and also weigh the net benefits of offering customers a regulated solution if required, but it should not impose a solution that customers believe will raise their cost of energy over other available options.

It is the Review's opinion that the competitive process just outlined and described fully in Section 4 will not cause a delay for unregulated proposals as, in any event, they require further feasibility studies before they make any decision to proceed.

The Review is aware that there are issues of asset stranding if a link is preferred. These risks are manageable, although unfortunate.

- CS Energy will see reduced local generation requirements from Mica Creek power station following any line construction but there are some offsetting benefits including, but not limited to, the opportunity to run the remaining gas turbines in open-cycle mode and operate Mica Creek as a peaking plant
- APA would see volumes and so revenues in the CGP fall, and so would be disadvantaged. There would, however, be continued requirements for gas for generation, for existing mineral processing operations and potentially to supply Mica Creek with gas for peaking operation (including linepack gas which could potentially be supplied by APA as a storage service)

That these disadvantages exist, of course, is a reason for local gas-fired generation proponents and their service providers to "sharpen their pencils", and for issues such as access to Ballera compression to be addressed.

The Review believes its preferred way forward is superior to the other alternatives considered which are summarised in the points below.

- For the reasons discussed above, there cannot be reliance simply on current negotiations to reach the best solution for NWQ
- A decision to favour either a transmission link or a gas-based local generation option at this time cannot be made:
  - Mica Creek has, for example, not yet achieved long term gas supply for Mount Isa and there are strong risks of unattractive and/or highly uncertain gas prices. Other alternatives, too, have specific risks. Unregulated line proposals, for example, face

regulatory and capital cost risks, and may not have secured funding. Customers may feel that a regulated proponent, to take another example, will be slow and unresponsive without some competitive pressure

- It is inappropriate for the Government to underwrite the "long-tail risks" of a particular solution, which the Review believes are manageable for both local generation and transmission link solutions. Unregulated options have limited downside if they lock in a modest return through contracting foundation customers. There is considerable upside if new customers are connected at a small price premium to these foundation customers
- A fully smeared regulated transmission link may not be appropriate given the size of the investment required and the nature of the load being supplied

* * *

The Review is confident the most appropriate way forward will be found within the 12 month period. The Review's recommendations will remove the current bottlenecks, provide impetus and introduce alternatives such that all the relevant facts and focus are available for sensible decision making.

While the current global financial crisis has severely affected mines in NWQ it may also provide a "window of opportunity". NWQ is at a crucial "fork in the road" in terms of its energy supply and it is important that the correct decisions are made. The global downturn can allow the time to do this before the economic cycle turns, as it inevitably will.

# CHAPTER 2

## THE SITUATION AT MICA CREEK, THE OUTLOOK FOR GAS PRICES AND LIKELY DEMAND MAKE A TRANSMISSION LINK A PRACTICAL OPTION

# 2. THE SITUATION AT MICA CREEK, THE OUTLOOK FOR GAS PRICES AND LIKELY DEMAND MAKE A TRANSMISSION LINK A POTENTIAL OPTION

The Mica Creek Power Station in Mount Isa currently supplies up to 270MW of power to Mount Isa and surrounding mines and communities.

Despite this existing plant, the Review believes that an option to construct a transmission link deserves consideration alongside an option of continued local generation. There are four reasons for this:

- Four of Mica Creek's current generation units are old, expensive to run, and will need to be replaced if Mica Creek is to continue to supply the NWQ grid load
- Gas prices will rise from current levels, and so will transport costs, leading to an increase in electricity prices from local generation
- Demand in NWQ is likely to increase, the global financial crisis notwithstanding
- As a result, local generation and transmission from the NEM are likely to provide similar costs to supply

The remainder of this section describes each of these points in turn. Commercial-in-confidence information is, of course, excluded from this public report.

## 2.1 The Mica Creek units are old, inefficient, and will be replaced

The current Mica Creek power station comprises of 10 units: four gas turbines; four gas-fired boilers; and two waste heat recovery units. Together, these units have an installed nameplate capacity of 325MW; at typical levels of utilisation, their average output is approximately 230MW. Though originally constructed by Mount Isa Mines Ltd (now Xstrata), Mica Creek is now owned and operated by CS Energy.

Gas to Mica Creek is supplied through the CGP. Exhibit 2.1 shows the CGP as well as other gas infrastructure in the region. This line also supplies gas required by NWQ users for other purposes. For example, there is isolated gas-fired generation at BHP Billiton's Cannington mine and Incitec Pivot's Phosphate Hill plant uses the CGP to supply gas for electricity generation and production needs.

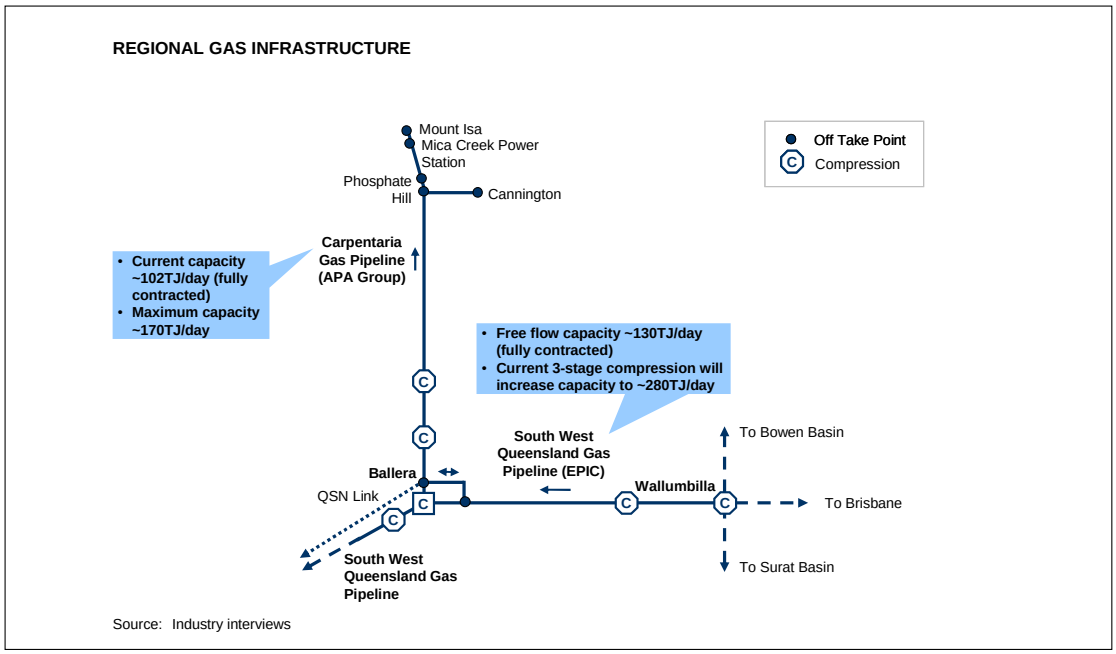
Though the exact supply arrangements are confidential, NWQ customers suggest gas has historically been sourced from conventional gas reserves in the Cooper Basin. Recent indications are that future gas is likely to be sourced from coal seam methane (CSM) gas deposits in the Surat Basin, and transported along the SWQGP and CGP.

Together with Xstrata's own 30MW power station, Mica Creek is just able to supply the total power demand of NWQ users connected to Ergon Energy's regional transmission and local distribution network in Mount Isa, Cloncurry and surrounding

areas. At times reserve margins are tight, the risk of which is carried by the miners who shed load in preference to Ergon Energy's urban and industrial load.

The age of the four old gas-fired boiler units at Mica Creek brings several disadvantages: the units have higher maintenance costs and, importantly, these units use much more gas per unit of electricity generated. These disadvantages mean that CS Energy intends to retire units A1 to A4 and reinvest in new combined cycle units.

Exhibit 2.1




One driver for this investment is that, compared with current estimated economics, increased gas prices and transport costs could add considerably to the cost of power delivered from Mica Creek, before distribution costs. Replacing A1-A4 generates substantial benefits, through savings in operating costs but, more importantly, through increased efficiency (less gas per unit of electricity produced).

## 2.2 Gas prices will rise from current levels, and so will transport costs

Any forecast of future gas prices for generation in NWQ must deal separately with its two components: the wellhead price of gas, and the cost of transporting gas from the wellhead to Mount Isa.

Transport costs will likely rise for three reasons:

- Previously, gas contracts were based on gas sourced from the Cooper Basin. Future gas contracts will likely reflect the additional cost of transporting gas along the SWQGP from the Surat Basin
- Incremental gas volumes supplied into the SWQGP, such as those required by NWQ users, will incur further transport costs to pay for enhanced pipeline capacity

- New players seeking to supply into either Ballera or Wallumbilla must pay for compression at either location, either by installing additional capacity or through purchasing compression from incumbent suppliers.

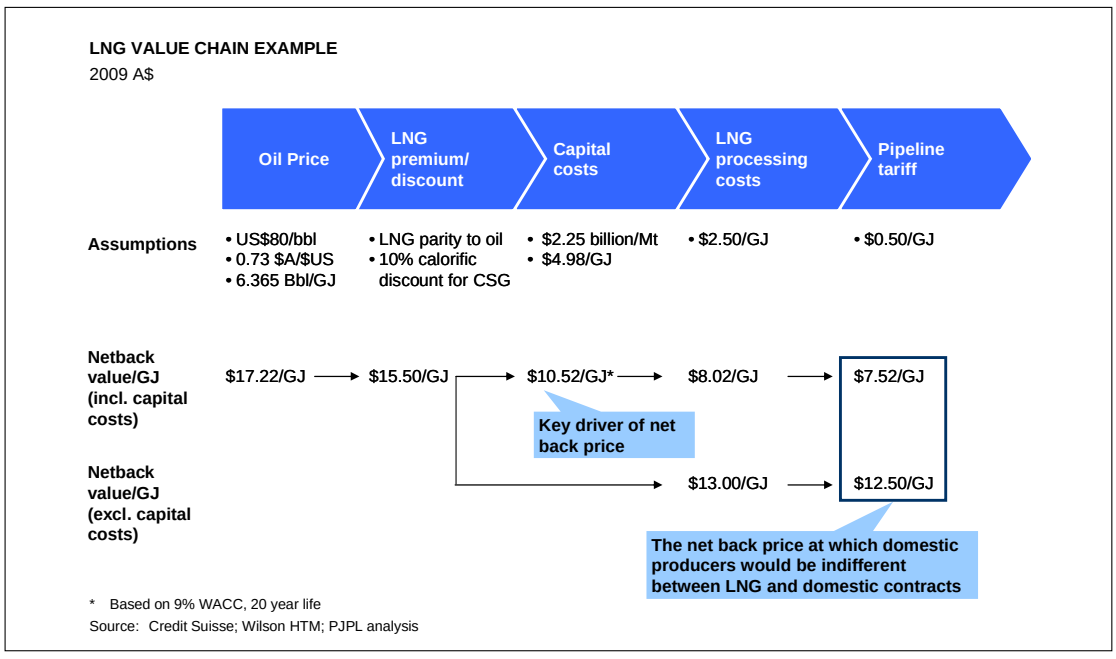
Of course, gas transport swaps or similar devices could be used to reduce the impact of these changes on NWQ users. The Review judges, however, that it is a commercial reality that NWQ users will pay for the majority of these components no matter where the gas is sourced from.

In addition to increases in transport costs, wellhead gas prices are also likely to rise, possibly significantly. The level of future gas prices is, however, unusually uncertain and the Review has in its analysis, therefore, considered a wide range of future gas prices. There are two material factors affecting the future gas market in particular.

First, LNG proponents are acquiring extensive reserves of coal seam methane (CSM) gas. Gas from current sources is largely already consumed by electricity and domestic use; that is, by existing demand. It is new sources of gas, therefore, that will supply new LNG projects as well as current customers who may be looking for new sources of supply.

Netback calculations, based on typical LNG economics, suggest that LNG proponents can afford to pay significantly more for CSM gas. Exhibit 2.2 demonstrates one such calculation. On the basis of the assumptions given, LNG proponents could afford to pay up to $7.50/GJ at the wellhead for CSM. This price is well above current Queensland wellhead prices which are estimated to be closer to $3.50/GJ. Note that the success of the LNG projects is uncertain at this stage, and the calculations shown depend crucially on the assumptions chosen, especially the long term oil price.

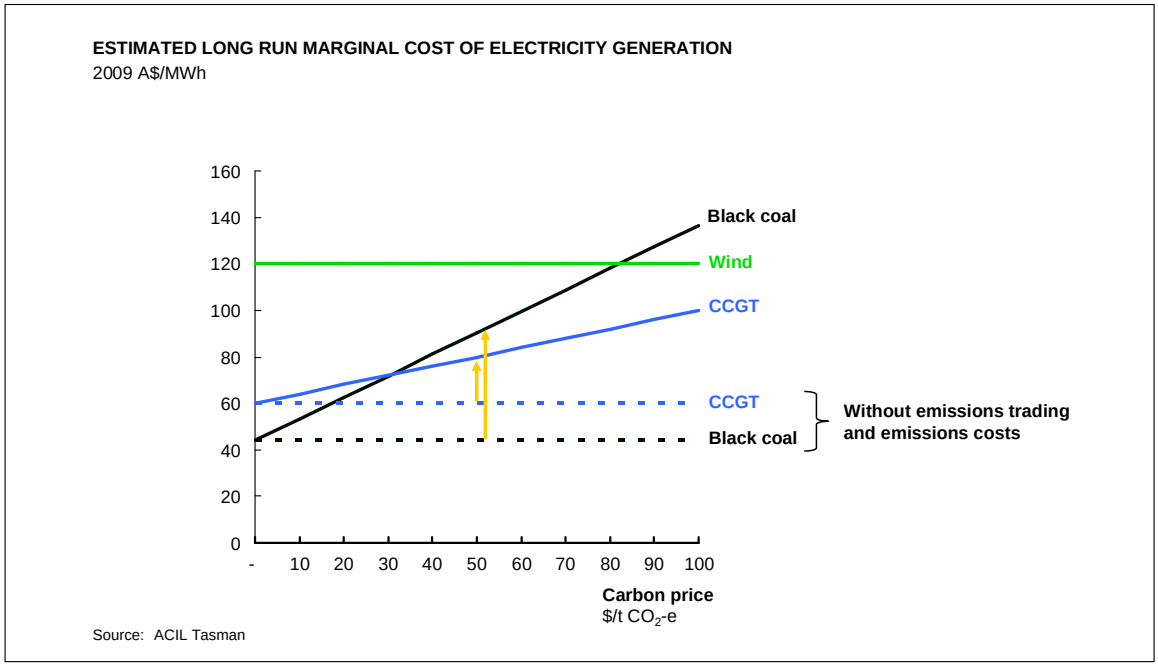
Exhibit 2.2



The extent to which these activities will increase domestic gas prices is by no means certain, and depends crucially on the number and size of successful LNG projects in Queensland. Complicating this picture is the likely availability of inexpensive "ramp up" gas for a time. What is clear, however, is that Australian east coast gas prices will rise noticeably with exposure to higher world energy prices.

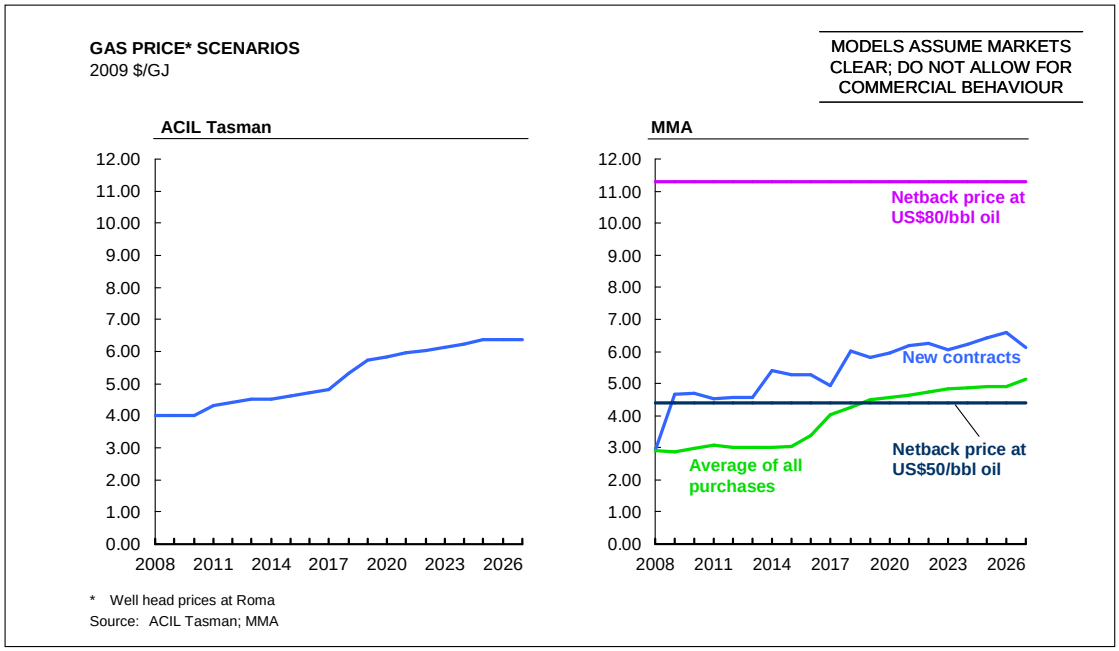
Second, the forthcoming emissions trading scheme (ETS) will increase demand for gas powered electricity generation. Exhibit 2.3 shows the estimated long run marginal costs of electricity generation capacity using different fuels. As the exhibit shows, at carbon prices above \$20/t $CO_2$-e, it can become more economic to install gas generation than coal. The introduction of the ETS will, therefore, introduce a significant additional source of new demand for gas resources.

Exhibit 2.3




Uncertainties surrounding both these issues make forecasts of future gas prices especially difficult. MMA and ACIL Tasman have, in recent months, published updated forecasts incorporating their views on the effects of both these issues. Both firms are acknowledged experts in the Australian gas market. Exhibit 2.4 displays these forecasts.

Exhibit 2.4




Both MMA and ACIL Tasman forecast a rise in gas prices, though neither anticipates prices will rise to levels they calculate as equivalent to LNG "netback" levels associated with typical long term oil price forecasts of around $80/bbl.

Both firm's forecasts rely on detailed models of gas supply and demand in the Australian marketplace. Both are based on assumptions regarding the development of LNG projects and the introduction of the ETS. Both models, however, cannot incorporate the type of commercial negotiations that, in the Review's experience, can arise from strategic considerations.

The review has also had discussions with many gas suppliers and consumers about the length of future gas supply contracts. Many feel past 15 year contracts reflect a less mature market than currently exists, and are also not possible given the current price uncertainty. While gas contracts could appear to be long term, they may have price reset mechanisms that mean there is effectively only up to five years of gas price certainty. In this case the gas price risk beyond five years would lie with customers, which is a risk they may not wish to take.

## 2.3 Demand is likely to grow beyond what can currently be supplied

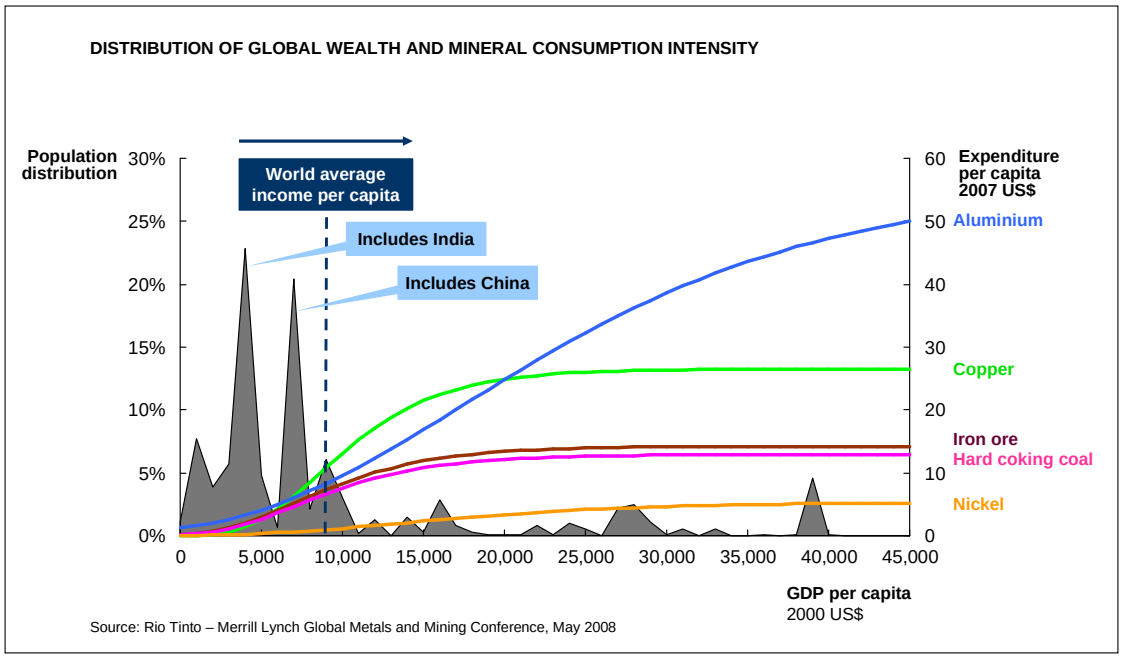
Issues of likely demand in the NWQ region are key to understanding the economics of potential energy solutions. The Review has consulted extensively with the then Queensland Department of Mines and Energy, and the many miners and geologists working in the area.

The global financial crisis has led to rapid falls in commodity prices, reducing levels of production and investment in new resource sector capacity. Existing and

potential mines in NWQ have had their production reduced and development curtailed as a result.

The nature of the problem at hand means the Review must, however, attempt to "look through" the current crisis. In the longer term, the underlying economic drivers that underpin commodity demand are unlikely to be derailed. Exhibit 2.5 shows the most powerful of these trends. As per capita GDP increases, along the bottom axis, usage of commodities per person, as shown on the right axis, increases. Most of the world's population is about to enter a stage of economic development where metals consumption grows most rapidly. Long term commodity demand, therefore, is likely to be strong.

Exhibit 2.5




That is not to say, however, that likely demand level and timing adjustments have not been made. Our approach to estimating demand is summarised in Exhibit 2.6. The approach had four steps.

First, estimates of local mineralization were used to forecast the likely demand from existing "on-grid" facilities. Local mineralization rather than current mine plans, which are typically limited to 5-10 years, provides a more realistic view of future production and hence power demand.

Second, the prospects for new loads to connect to the NWQ grid were assessed. These loads included existing and potential projects. Connection was considered likely if supply from Mount Isa appeared more economic than local independent generation after taking into account the cost of connection to the grid and, where applicable, the cost of the gas pipeline and generation units required for independent generation. Exhibit 2.7 summarises the Review's estimate of new loads likely to connect. Note that these are the Reviews own estimates, and not those of any particular mine.

Third, the likelihood of new projects becoming operating mines was assessed. Discussions with project owners, together with experts at the then Department of Mines and Energy (DME), were used to assess the likelihood of projects entering production at all, and whether their development was likely to be delayed from previous plans. Delays could be due either to current market conditions or the usual difficulties in bringing a complex project to fruition.

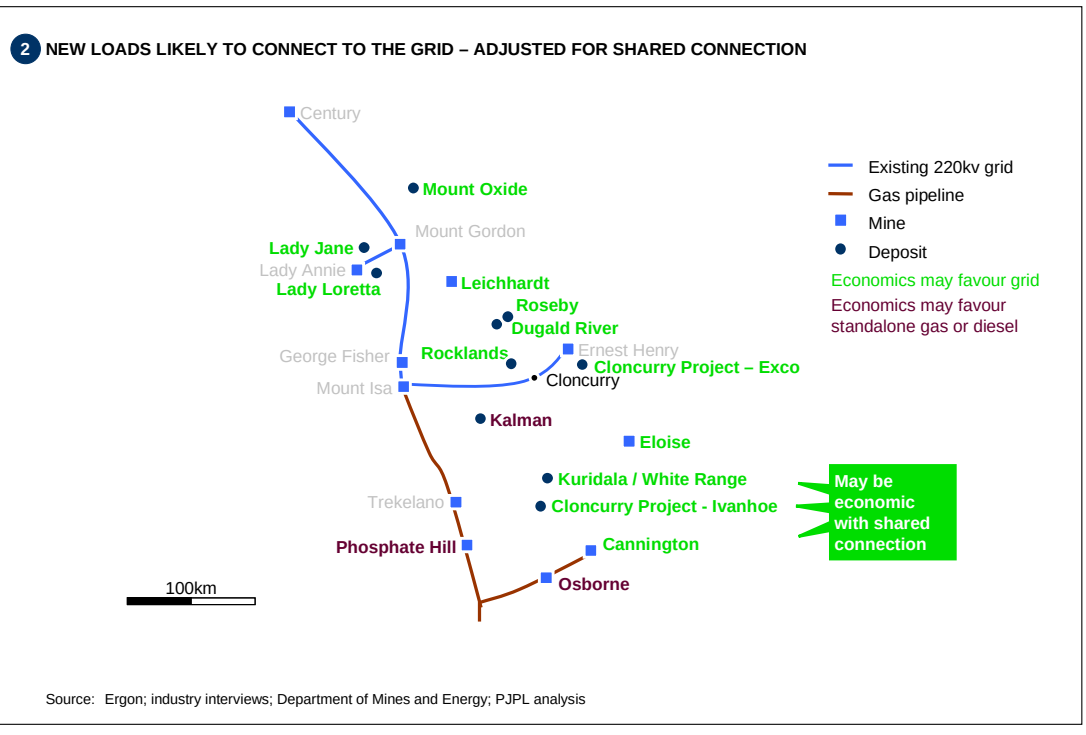
Exhibit 2.6

**APPROACH TAKEN TO FORECAST ELECTRICITY DEMAND**

| 1 Forecast future demand from existing mines on grid | 2 Identify new loads | 3 Assess likelihood of potential mines starting operations | 4 Create load scenarios |
|---|---|---|---|
| • Estimate current loads<br>• Develop load forecasts based on current mine plans<br>• Construct longer term estimates based on local mineralisation<br>– Published resource data<br>– Conversation with Department of Mines and Energy and others | • Repeat (1) for existing mines not connected to grid<br>• Interview proponents of prospective projects and estimate likely power demand<br>• Estimate the economics of connecting each load to the local grid<br>– Standalone and shared connections<br>– Relative to gas/diesel generation<br>• Develop the forecast contribution to grid load | • Summarise status of prospective projects, including<br>– Resource base<br>– Economics<br>– History<br>– Current status<br>• Rank and assign probabilities to each project<br>– Successful start up<br>– Start date | • Develop a range of possible demand forecasts, based on analysis in steps 1 to 3 |

Source: PJPL analysis

Exhibit 2.7



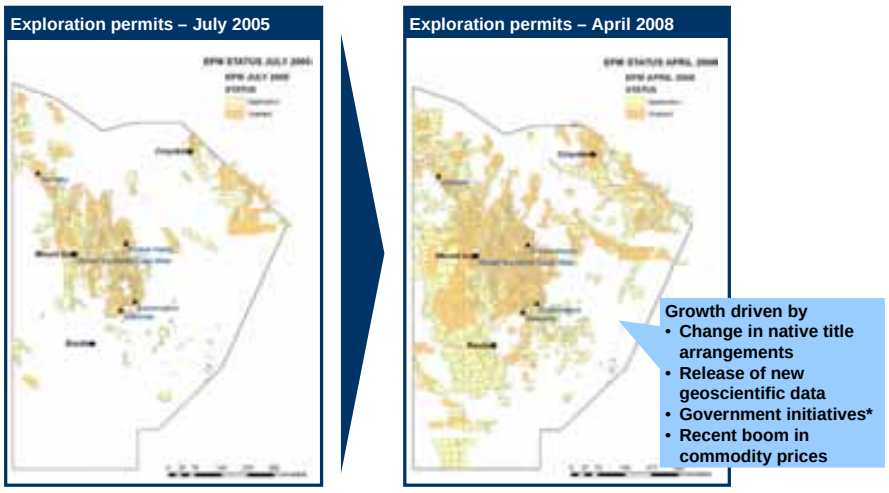

Source: Ergon; industry interviews; Department of Mines and Energy; PJPL analysis

In making these assessments, the Review was guided by the increase in exploration activity in NWQ. Exhibit 2.8 shows the recent increase in granted

exploration permits and applications in the region between 2005 and 2008. To the extent new projects have resulted from increased knowledge of the area, rather than simply recent high commodity prices, currently planned projects appear more likely to enter production. While recent high commodity prices have clearly been an important driver of activity, so has new exploration post the native title concerns and improved exploration technology.

Exhibit 2.8

**3 PROSPECTIVITY IN THE NORTH WEST QUEENSLAND MINERAL PROVINCE**




* For example, the Smart Exploration programme, the Smart Mining – Future Prosperity programme, the Collaborative Drilling program, the Cluster Formation initiative and the Industry Network Initiative

Source: Department of Mines and Energy

Fourth, the steps above were used to create demand scenarios. Exhibit 2.9 shows the base case or medium demand scenario developed in this way. This scenario shows the electricity grid at Mount Isa is likely to have a peak demand of around 350-400MW for much of the next 20 years.

While this base case estimate is considerably more than current demand, it has been developed with what appear to be conservative assumptions. It is not difficult, for example, as our high scenario shows in Exhibit 2.10, to construct a less cautious outlook for the region with demand approaching or exceeding 500MW. Indeed, 500MW was originally discussed with the Steering Committee for this Review as the minimum required capacity for any energy solution. Note also that our calculations take no account of the likely uranium mines in the area if government policy were to change.

There may be potential for this load to increase further if more mines can move away from on-site diesel generation. Previous studies, such as the North West Minerals Province Electricity Supply and Demand Study by Coffey Mining Pty Ltd in February 2007, suggest an improvement in cut-off grade is likely when energy costs fall. This potential is, however, difficult to assess precisely given the many factors that affect mine economics.

The Review, therefore, acknowledges the potential for lower cost energy to increase load or prolong mine life, but does not explicitly build this into its load forecasts.

Exhibit 2.9

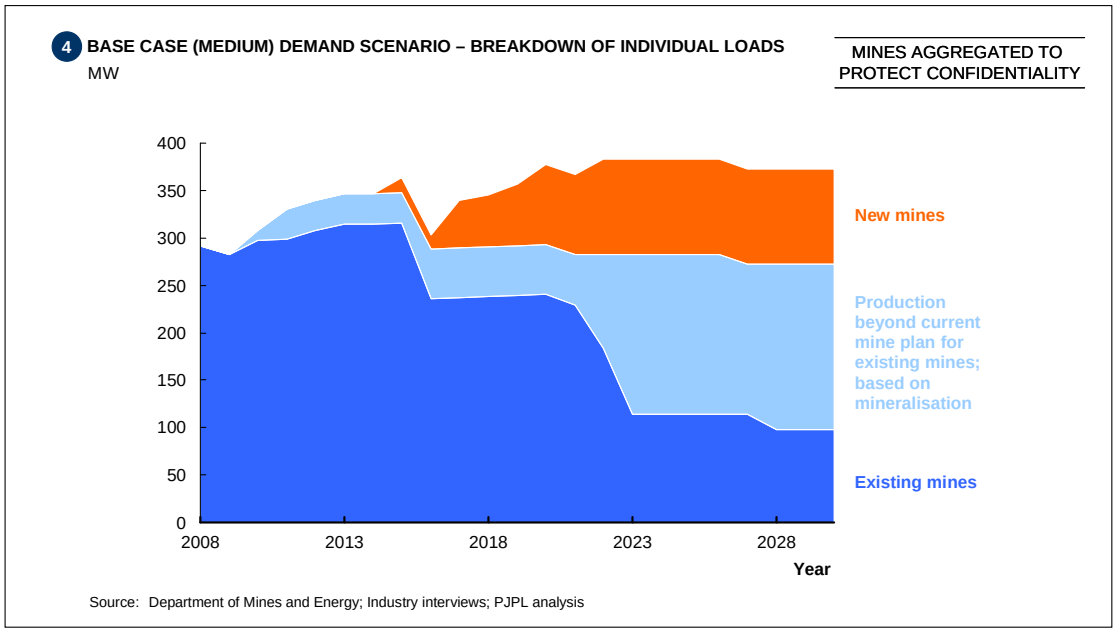
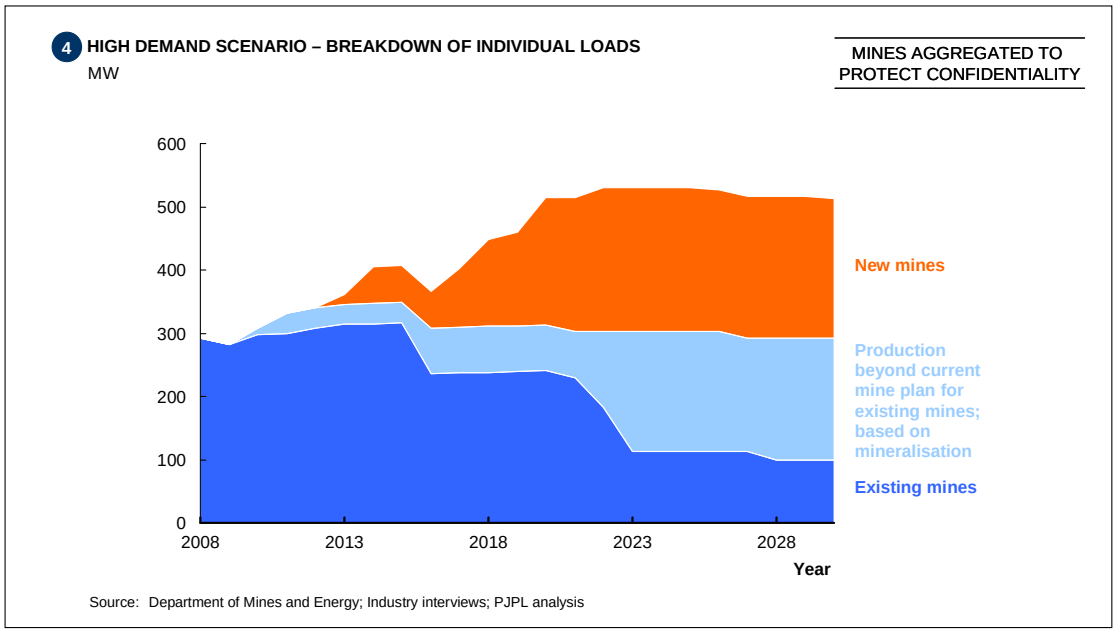



Exhibit 2.10




## 2.4 Local generation and transmission provide similar costs to supply

The factors described above will all act to increase both the capital base and operating costs of local generation at Mica Creek. The sums involved, however, appear modest when compared with the sizeable capital cost of a transmission link from the current Queensland transmission grid. How is it that a link can be competitive with local gas generation?

Exhibit 2.11 shows, at a high level, how both options can result in similar delivered energy costs. It does this by comparing the extra costs – relative to the NEM – incurred under both options.

Exhibit 2.11

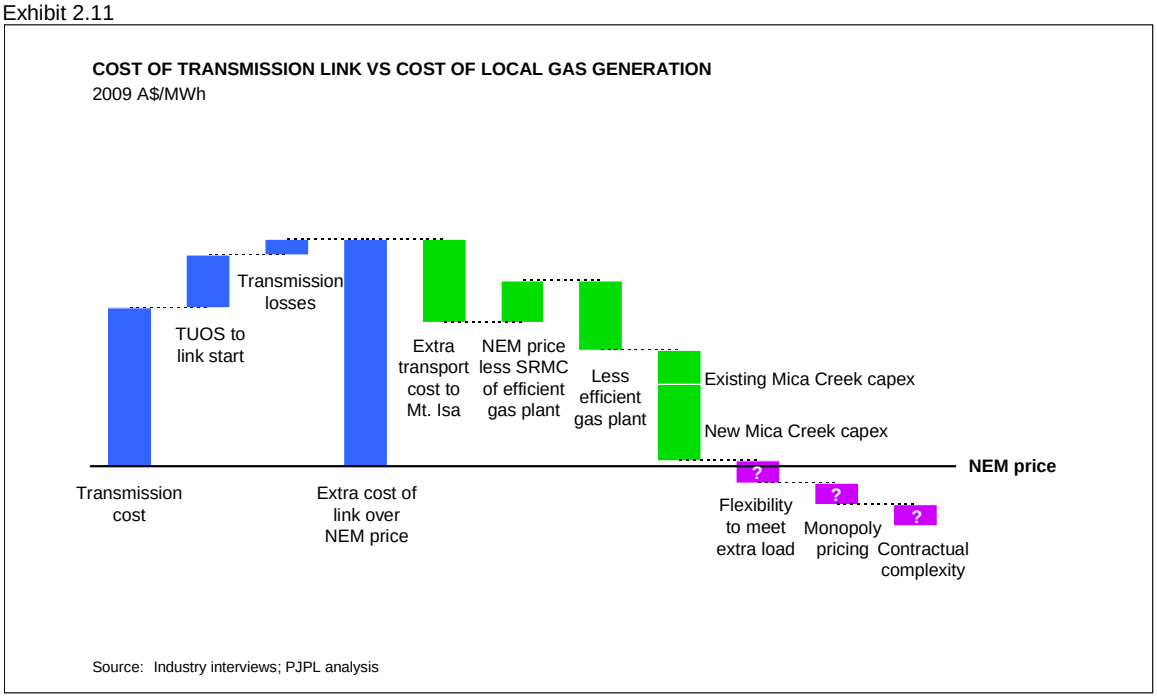



Exhibit 2.11 shows as a baseline the Queensland NEM price, then adds (in blue) the additional cost of constructing and operating a transmission link to NWQ. These extra costs are compared with the additional cost, again relative to the NEM, of running gas generation at Mica Creek, shown in green on the chart. Users of Mica Creek pay additional costs to transport gas to Mount Isa. They also are relying on gas generation rather than the mixture of generation technologies in the NEM. As shown in the exhibit, an efficient gas plant will have a short run marginal cost less than the NEM price. Mica Creek will not, however, be as efficient as a large-scale plant in the NEM, such as Swanbank-E, as in particular it is a collection of smaller units. In addition, reinvestment in Mica Creek will incur additional capital charges. In this example, these costs are similar in total to the additional cost of the link over the 2015 NEM price.

Finally, shown in pink, additional commercial considerations, difficult to quantify but nonetheless valuable to customers, may act to push the balance from one option to the other.

While these calculations depend totally on the assumptions used, they show that transmission links cannot be discounted as a potential solution. Neither, of course, can local gas-fired generation.

# CHAPTER 3

## A DETAILED EXAMINATION OF EACH OPTION INDICATES THAT THEY ARE ALL SERIOUS OPTIONS, BUT THERE IS INSUFFICIENT INFORMATION TO DETERMINE NOW WHICH IS THE LOWEST COST OPTION FOR USERS

# 3. A DETAILED EXAMINATION OF EACH OPTION INDICATES THAT THEY ARE ALL SERIOUS OPTIONS, BUT THERE IS INSUFFICIENT INFORMATION TO DETERMINE NOW WHICH IS THE LOWEST COST OPTION FOR USERS

The high level analysis presented in Chapter 2 makes clear that neither a transmission link nor local generation at Mica Creek can immediately be discounted as potential solutions for NWQ energy supply.

Though the analysis presented above is the Review's own, other parties have made similar calculations and reached similar conclusions regarding the competitiveness of both link and local generation options. The Review is aware of at least four distinct options, possibly among others, to supply the energy needs of NWQ. They are:

- Investment in local gas-fired generation, of which there are a number of potential scenarios. For example, Xstrata could expand its own capacity or a new player could compete to provide supply. However, the most likely scenario, and the one analysed by this Review, is the proposal by CS Energy to reinvest in and expand Mica Creek
- Construction of an unregulated DC line, proposed by IsaLink
- Construction of an unregulated AC line, proposed by CuString
- Construction of a regulated AC line

The Review finds that all of these are serious options which must be considered by NWQ energy users. Detailed analysis suggests, however, that none can currently be declared the lowest cost practical option.

Each of these options will be summarised in the remainder of this chapter, albeit with most of the detail removed to protect commercial-in-confidence information. This chapter will then compare each option, again also only at a high level, including the relative economics, regulatory considerations, and other issues inherent in each proposal. This chapter concludes with a brief comment on another transmission link proposal, put forward by a group called Northern Territory Queensland Energy (NTQE).

Economic analysis presented in this section uses some base case assumptions, which are summarised in Exhibit 3.1. The following are particularly important:

- The Review has utilised a wide range of gas price forecasts given future gas price uncertainty
- Carbon price forecasts are those developed by the Australian Treasury for the recent emissions trading scheme White Paper (prior to the recent announcement of the scheme deferral)

- NEM price forecasts for Queensland are based on industry expert price forecasts which contain consistent assumptions of gas and carbon price
- The Review's own modelling has been used to estimate the impact of changing gas and carbon costs on NEM electricity prices
- Capital and operating costs have been developed through frequent discussions with the proponents of each solution and industry experts
- We have taken proponents' advice on the length of time over which their capital investment must be recovered. We have incorporated the recovery of capital (debt and equity) over their specified time periods into the assessment of the costs of each option.
- Electricity demand volumes are those of our medium scenario described in Chapter 2
- We have assumed all unregulated assets have "private sector" capital structures and rates of return, based on discussions with scheme proponents and other industry experts. Scheme proponents may, of course, eventually choose different capital structures. Regulated assets have a capital structure and rate of return as specified in the most recent determination by the Queensland Competition Authority (QCA). The AER will, of course, be the future regulator of line costs, and it has very recently proposed a new, lower cost of capital. This new lower cost of capital will improve the relative economics of the regulated line over what is shown in this report.

Exhibit 3.1

**MODELLING ASSUMPTIONS**

| Topic | | Assumption |
|---|---|---|
| **Inputs assumptions** | **Well-head gas price** | • Wide range of prices used |
| | **Gas transport** | • Consistent with estimates provided by NWQ users |
| | **Carbon price** | • Treasury modelling (Note: before recent scheme delay) |
| | **Queensland pool price** | • Based on industry expert price forecasts, consistent with gas price and carbon price assumptions |
| | **Demand** | • Long term demand assumed to follow the report's base case assumption as defined in Appendix 3 |
| | **Load factor** | • 0.83 (mining load, 0.85; non-mining load, 0.65) |
| **Financing assumptions** | **Capital and operating costs** | • Developed through interviews with industry experts and infrastructure proponents |
| | **Capital recovery** | • Recovered over a time period that is consistent to business model advised by infrastructure proponents |
| | **Capital structure and rates of return** | • Unregulated assets assumed to be consistent with scheme proponents<br>• Regulated assets as per latest QCA determination |

Source: PJPL analysis

## 3.1 Reinvestment and expansion at Mica Creek

CS Energy has proposed a two stage reinvestment at Mica Creek. When both phases are complete, the aging A1-A4 units will be retired and replaced by modern combined cycle gas turbine units which will increase installed capacity significantly.

These upgrades could be completed by the time existing power purchase agreements expire in 2013. The capital requirements, and the relatively standard nature of the generation units, mean that the upgrades can proceed at a relatively rapid pace. Discussions with CS Energy indicate that the upgrades themselves will take around 2 years from the beginning of the tender process. This process is, however, contingent on securing the required commercial arrangements for gas supply and power sales.

Future capacity needs will be satisfied through the installation of additional 115MW generation units. However, smaller combined cycle units with approximately 60MW capacity may be installed to meet incremental load if practical.

The cost of any upgrade to Mica Creek will have to be recovered by fixed term power purchase agreements and based on firm gas purchase agreements. Based on historic agreements, these could be around 15 years in length although, as discussed in Chapter 2, there may not be 15 year gas price certainty. Customers may need to bear a significant future gas price risk..

## 3.2 IsaLink

IsaLink is supported by Cheung Kong Infrastructure Ltd (CKI) and Hongkong Electric Holdings Ltd (HEH), majority shareholders in Powercor Australia, CitiPower and ETSA Utilities.

Many of the details of the proposal are contained in IsaLink's submission to the Review, reproduced here as Attachment 3. In summary, IsaLink propose to build an unregulated DC transmission link, with a capacity of 500MW, from Stanwell to Mount Isa, a distance of approximately 1,200km.

The proposed link is a 'bipolar' circuit, and would share many similarities with those used for long distance power transmission in other countries. IsaLink is also considering the application of 'next generation' DC technology, thought to be more suitable for transmitting electricity to a location where the existence of local generation cannot be guaranteed.

DC technology is most commonly applied to long distance transmission links. DC conductors and towers are less expensive relative to conventional AC structures, offsetting the cost of the converter stations required at each end. The result is that, compared with AC, DC becomes more economic at long distances. Estimates of this distance vary, but a range of 800km and 1,200km is commonly used.

The total capital investment required is estimated to be approximately $1b, with maintenance and capital costs of around $10m per annum. In addition to the cost of this capital investment, users of the link would pay for several other costs, over and above the NEM price at the Queensland reference node. Users would, for example, pay for:

- A TUOS charge to connect the link to the main Queensland transmission network

- An adjustment to the Queensland regional NEM price, represented by the marginal loss factor (MLF) at the point of connection
- Losses incurred through the transmission of electricity from the connection point to Mount Isa

IsaLink plans to install transmission capacity of 500MW. This capacity is sufficient for NWQ demand under both the medium and high demand scenarios described above. Furthermore, the proposed design can cater for 600MW of capacity at the expense of higher losses. Beyond 600MW, the line would most likely require duplication.

As proposed, the link will be unregulated. IsaLink will be free to set prices and other commercial arrangements as it negotiates with initial users, and subject to access provisions consistent with competition regulations for later users. More importantly, the link must be consistent with the arrangements for unregulated assets within the NEM. This issue will be discussed in more detail in Section 3.6 below.

IsaLink estimates that, assuming a feasibility study begins in 2009, the link could be complete by the middle of 2013. This timetable is accelerated by the significant amount of 'desktop' preparatory work already completed. For example, IsaLink have already invested significant effort in engineering estimates, and in the assessment of environmental and heritage issues concerning their proposed route.

### 3.3 CuString

The current CuString proposal is for an unregulated AC line from Townsville to NWQ. The proposed line is a 300MW, dual circuit AC link.

The AC technology proposed is similar to that used in the existing Queensland transmission network. As with the IsaLink proposal, users of the link pay for this capital cost as well as the TUOS charge, MLFs and losses associated with transmission, and the NEM price for the electricity transmitted along the link.

CuString plans to install capacity of 300MW, but the proposed link could run at volumes of up to 500MW at the expense of higher transmission losses, and a small cost for additional intermediate substations.

Like IsaLink, CuString also propose their line be an unregulated one.

CuString has advised the Review that their link could be operating by the beginning of 2013. This time incorporates a full feasibility study, an approvals process and a 2 year construction period. Construction is accelerated due to the reduced transmission link distance.

## 3.4 A regulated link

This option is for a 930km regulated AC transmission link from Strathmore to Mount Isa, with a firm capacity of 400MW and constructed to the same standards as the existing network in Queensland.

As a regulated link, users would pay a charge to recover a regulated return on capital, along with depreciation and operating costs, in common with the usual practice for regulated electricity assets. As a general rule, transmission asset costs are allocated partially to the users of the particular asset and partially to all customers of the whole transmission network, a process known as smearing. Typically around half of the cost of a new asset is borne by users, half by other customers. This arrangement recognises the fact that the transmission network operates as an interdependent system and customers throughout the network receive benefits from the operation of the fully connected grid.

Should such smearing occur, the regulated link option would clearly be cheaper than all other options.

If the link was treated as a shared network asset and costs were smeared in setting transmission charges, NWQ users would benefit from having broadly half the line costs met by the rest of Queensland. Offsetting this, however, is the fact that Mount Isa users would also pay their share of the rest of the network's smeared charges. As illustrated in Exhibit 3.2, based on high level and therefore approximate calculations, the net effect may be to increase transmission costs to the rest of Queensland electricity consumers by around 5% for larger users, or 0.5 – 1% in terms of their total cost of electricity. The effect on households or small users in the rest of Queensland would be negligible.

Exhibit 3.2

**APPROXIMATE IMPACT ON QLD DELIVERED ENERGY PRICE OF A SHARED REGULATED TRANMISSION LINK**

| NWQ transmission link revenue per annum | |
|---|---|
| WACC | 9.6% |
| Depreciation | 2.0% |
| O&M | 1.0% |
| Tax | 0.4% |
| **Return** | **13%** |
| X | |
| **Approx. link capital** | $1,000m |
| = | |
| **Total revenue** | $130m |
| ***% smeared*** | ***50%*** |
| **Revenue smeared** | $65m |

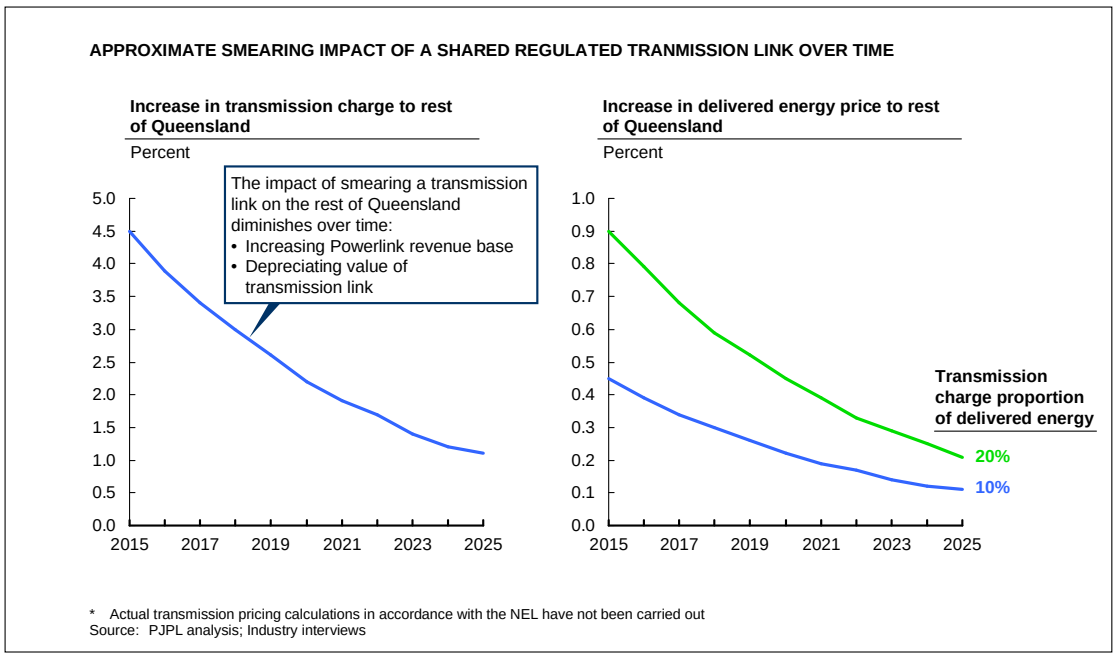
| Smearing impact on QLD electricity price | |
|---|---|
| Revenue smeared across Qld | $65m |
| - | |
| Less contributions from NWQ towards TUOS across Qld | $15m |
| ÷ | |
| 2015 Total transmission revenue from Rest of Qld | ~$1,000m |
| = | |
| **Increase to Rest of Qld transmission charges due to net smearing from NWQ** | **$50m (~5% increase)** |
| Transmission charge proportion of delivered energy price | Average = 10% High = 20% |
| **Increase in delivered price of energy** | **~0.5-1.0%** |

* Actual transmission pricing calculations in accordance with the NEL have not been carried out

Source: PJPL analysis; Industry interviews

There is a reduction in capital charge over time, however, which means that the value of the smearing and so the impact on the rest of Queensland would reduce over time, as illustrated in Exhibit 3.3, to low levels.

Exhibit 3.3




The Review considers this smearing is inappropriate for a long line extension to the NEM, especially a radial one which services a relatively small load. The implications of this will be discussed in more detail in Chapter 4.

The true basis for cost comparison with other options should be the full cost of the line, including losses over the line, plus the cost of any upgrade required to the rest of the Queensland grid to support the connection of this new line. This cost would reduce over time, however, as the capital invested in the link is depreciated.

Similar to the CuString link, the capacity of the proposed regulated line could be expanded from 400MW to 600MW by adding additional equipment, with large economies of scale.

Any regulated proponent would need to undertake a Regulatory Test which must be passed in accordance with the NEM Rules in order to commence construction. The Regulatory Test is required under the NEM Rules to assess the efficiency of large network investments. There are two tests which can be applied:

- The “market benefits” test identifies projects that maximise the net economic benefit to all those who produce, consume and transport electricity in the market by conducting a cost-benefit analysis; or
- The “reliability” test identifies projects that minimise the present value of the costs to meet the service standards linked to the technical requirements of the NER

In the situation at Mount Isa, any Regulatory Test would be conducted under the reliability limb.

## 3.5 A detailed comparison raises many issues

The Review has conducted a detailed comparison of these options. Using its own modelling, and based on the assumptions summarised above, the Review assessed the likely economics of each option under a variety of scenarios, including gas prices and levels of demand. The Review also assessed the relative merits of AC vs DC technologies, again using discussions with scheme proponents and other industry experts. Finally, the Review considered potential wider benefits of each proposal, for example the potential to facilitate the development of alternative sources of generation in NWQ.

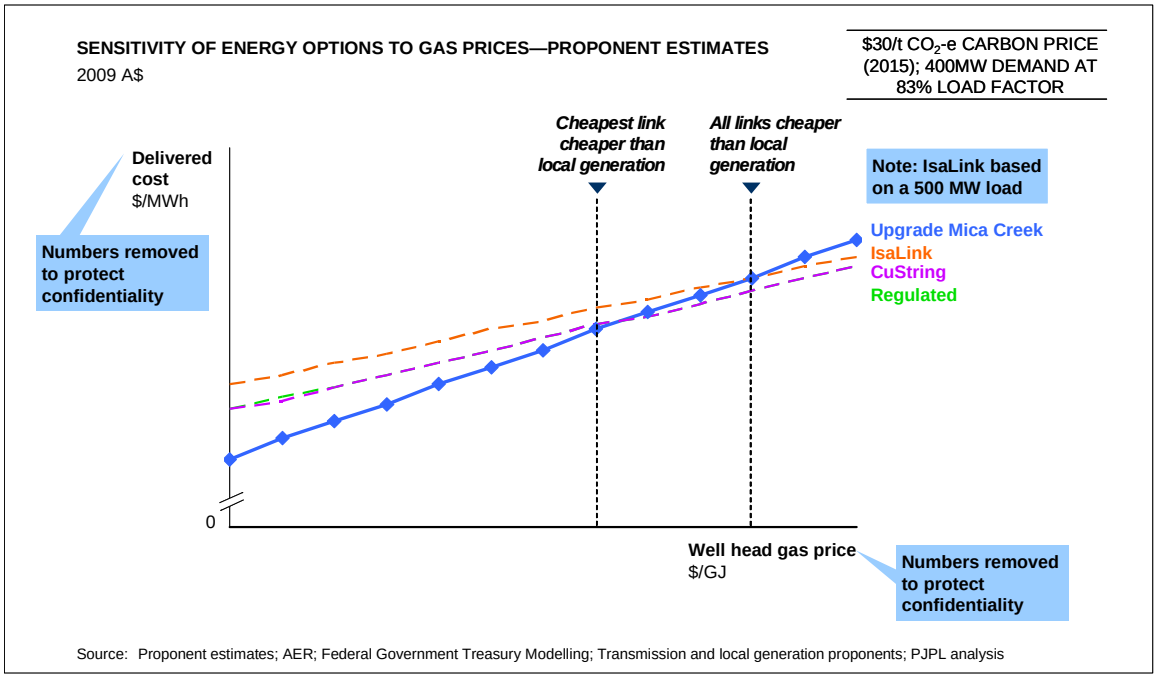
These analyses are summarised here, again at a very high level.

### *3.5.1 Costs of each option at various gas prices*

Customers' preference for different solutions will depend strongly on their expectations of gas prices over the life of each option.

Exhibit 3.4 shows the delivered power cost under each option at various gas prices. It has been necessary, however, to remove the gas and power prices to protect each proponent's commercial-in-confidence information.

Exhibit 3.4




This exhibit shows the different relative sensitivities of Mica Creek and transmission link options to gas prices. Mica Creek is directly exposed to changes in

well head gas prices. Link options are indirectly exposed through the effect of gas prices on the average NEM price, which we have modelled.

The result is that, in 2015 and at relatively low gas prices, Mica Creek generation is lower cost than all link options. At higher gas prices, the situation is reversed and link options become lower cost. As their exposure to the NEM price is similar, different gas prices do not change the relative order of each link option.

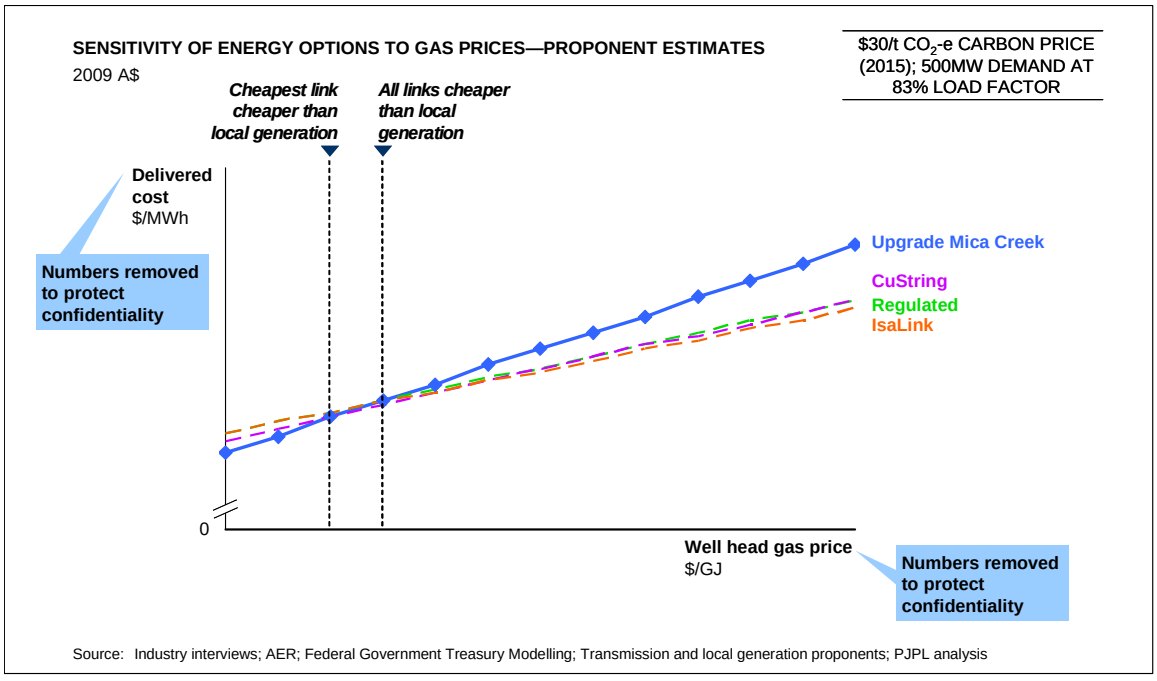
This important dynamic complicates comparisons between the options at a time when, as discussed in Section 2.2, forecasting gas prices is extremely difficult.

### *3.5.2 Costs of each option at various levels of demand*

Customers' assessments of different solutions will also depend on expectations of demand.

Exhibit 3.5 shows the same analysis as in Exhibit 3.4, performed using the Review's high demand scenario instead of the base case, which coincides with the required 500MW of supply discussed in the lead up to this Review. At this higher level of demand, transmission link solutions are estimated to be lower cost than Mica Creek generation at all but very low gas prices. This is because transmission link solutions require lower levels of capital investment to increase their capacity (up to the point where line duplication is required).

Exhibit 3.5




Source: Industry interviews; AER; Federal Government Treasury Modelling; Transmission and local generation proponents; PJPL analysis

### *3.5.3 AC vs DC technology*

The choice of AC vs DC technology for transmission links is an important one. Each of the transmission proponents has invested considerable time and expertise in coming to an informed view on the relative merits of each.

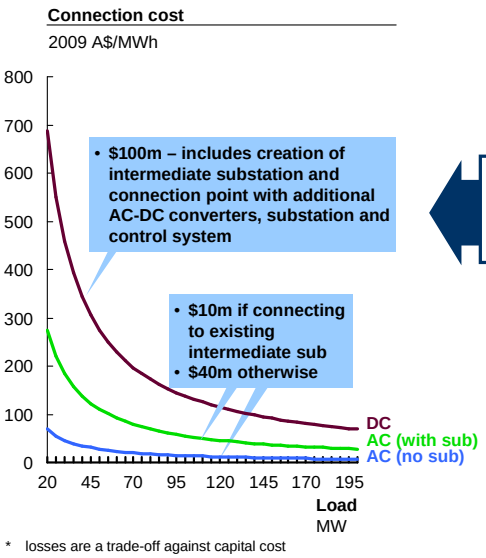
The assessment of the relative merits of each is complicated by a number of factors:

- Views on each technology are generally in agreement, but vary considerably over important details
- DC technology in particular is undergoing a period of change, with relatively untested "next generation" technology being introduced
- Most proponents acknowledge the merits of each technology for specific applications – and some appear undecided about which technology could be best used in this application
- A DC transmission link to Mount Isa, being a long link to an isolated load potentially without any local generation, poses technical challenges

The Review's own assessment of DC and AC technology is summarised in Exhibit 3.6. A key difference in AC technology is the cost at which new users can connect along the line.

Exhibit 3.6

**POTENTIAL TO CONNECT TO TRANSMISSION LINE—COMPARISON OF AC AND DC TECHNOLOGY**




| | AC | DC |
|---|---|---|
| **Technology** | • Proven technology<br>• Easily extended | • Conventional DC requires local generation<br>• Next generation DC unproven |
| **Connection** | • Cheaper<br>• Initial design has intermediate subs | • Extra converter stations<br>• No provision in initial design |
| **Losses* and stability** | • Higher line losses<br>• Stability issues need investigation and management | • Lower line losses<br>• Additional losses from converters<br>• Stability issues unlikely |
| **Substation / converter maintenance** | • Spares and skills readily available | • Specialised spares and skills may be required |
| **Local Generation** | • Not required | • Retain for conventional DC<br>• Not needed for new generation DC |

* losses are a trade-off against capital cost

Source: Industry interviews

### *3.5.4 Wider benefits*

Consistent with its Terms of Reference, the Review has held many discussions regarding the potential for particular electricity solutions to offer additional benefits beyond the supply of electricity to NWQ.

These wider benefits rely on bringing new connections to areas currently not served by the Queensland electricity network. As a result they are most relevant when assessing transmission link proposals. Redevelopment of Mica Creek alone creates no wider benefits in this broader sense, although extra capacity will, of course, enable new users to connect to the Mount Isa based grid.

Three areas are typically identified as benefiting from a link connection:

- Small loads near the transmission link. The Review has been told nearby towns and mining developments could benefit from a cheaper, more reliable electricity supply
- Large new loads, such as mining developments, along the link route
- New generation in NWQ or along the link route, especially renewable energy developments consistent with current Government policy

In consideration of these benefits, the Review has addressed two issues: the likely benefit of each, and whether different proposed solutions are more or less likely to capture each benefit. These considerations have the potential to influence the choice of solution.

The economics of new connections differ between link technologies. For example, DC connections are typically more expensive for smaller loads and would therefore count as a disadvantage when wider benefits are being considered. Low cost methods to connect small loads to DC links have been proposed but are untested.

Capturing wider benefits from an unregulated link would be more complex than from a regulated one, all else being equal. A regulated transmission link would have well-established access regimes including, for example, the exemption from TUOS for generators using the link. Unregulated links are able to create their own access and pricing regimes, which may not be as favourable as those applying to a regulated link.

Furthermore, a regulated transmission line would ensure that NWQ is reclassified as part of the NEM. In this case, Ergon Energy's existing 220kv network would automatically become regulated. Although not typically thought of as a wider benefit, this would help facilitate the connection of new loads and reduce existing charges paid by NWQ users.

The Review has not attempted to quantify each wider benefit suggested above. A number of comments can, nevertheless, be made.

The benefits from new small load connections are unlikely to be material. In addition, many communities along potential routes are already connected to the Queensland grid through lower voltage connections. The benefits to these communities of connection to a higher voltage line appear marginal, when allowance is made for the additional capital investment that would be required, but they would gain improved realiability.

The potential to connect large new loads is an important wider benefit. Their size may, however, mean they may find the cost of connection to both AC and DC

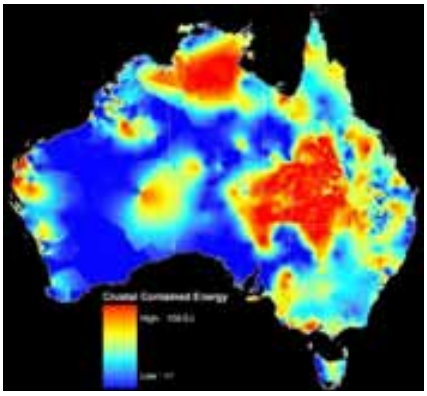
acceptable. Of course, very large new loads may be able to underpin their own connection to the NEM.

With Queensland Government policy in mind, the Review has had many discussions with proponents of renewable energy generation developments encompassing wind, solar and geothermal. The potential of NWQ for all of these developments is clear; Exhibits 3.7 and 3.8 provide an example of this.

Exhibit 3.7

**GEOTHERMAL ENERGY**

**Geothermal potential**



**Summary**

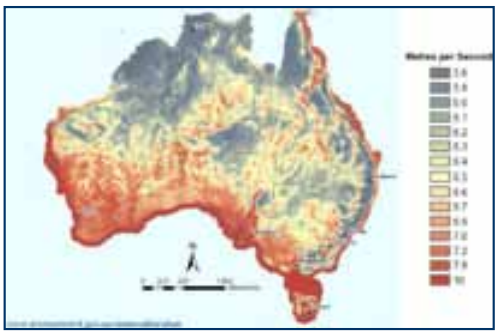
- Economics of geothermal are potentially attractive
  - proponents suggest power can be supplied to region between ~$90-110/MWh
    - Minimal ongoing fuel cost
    - No waste disposal or carbon cost
    - …but high initial capital costs ($10m/MW) and moderate maintenance costs (1-2% of capex)
- Technology is unproven and remains the dominant challenge for geothermal players
  - Can the reservoir be 'cracked' effectively and without disruption?
  - Is the technology scalable?
- Proponents are currently attempting to conduct pilot schemes in the region, but nonetheless, geothermal power is unlikely to be a power source in the short term

Source: Clean Energy Australia; ROAM Consulting – Energy development opportunities in North Queensland

Exhibit 3.8

**WIND POWER**

**Wind potential**



**Summary**

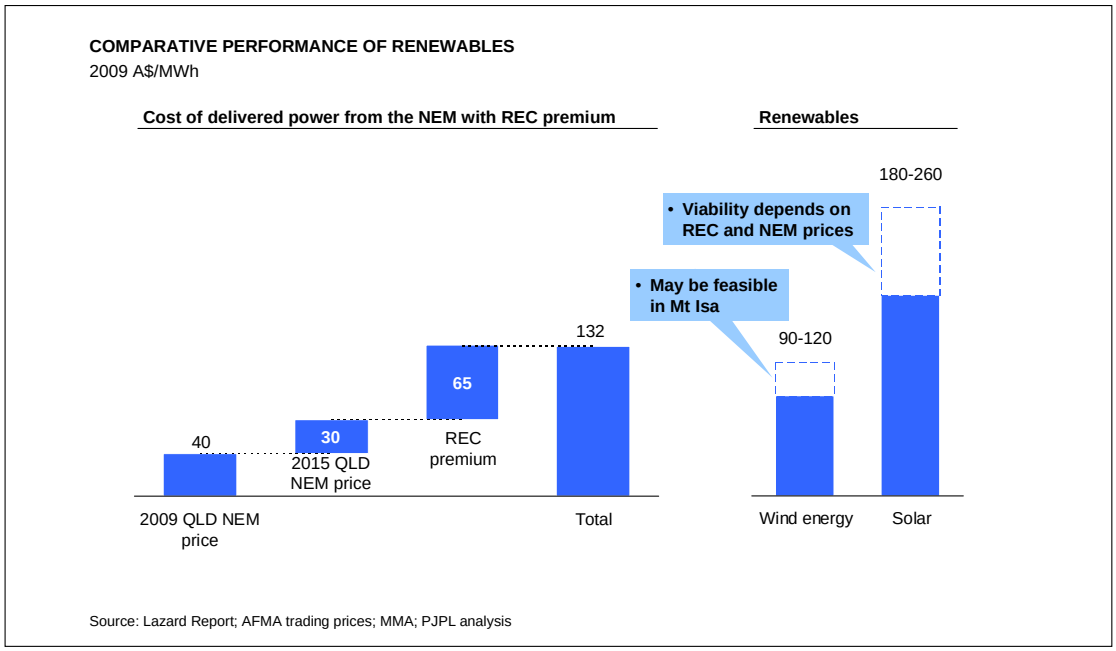
- Wind power is the cheapest source of renewable energy
- The technology is proven at scale both globally and in Australia
- Coastal regions in South Australia and Western Australia are typically the best locations for wind farms, but North West Queensland has a number of prospective sites under investigation
- Given the variability of delivered power, wind generation will not occur at any significant scale without a transmission link to the NEM
- A link increases the potential scale of a wind farm, but also opens the region up to alternative power sources – as such, the benefits are hard to quantify

Source: Clean Energy Australia; ROAM Consulting – Energy development opportunities in North Queensland

The prospectivity of these developments is less clear cut. As shown in Exhibit 3.9, while wind generation already appears economic, other forms of renewable

energy do not, even after credits from federal and state government schemes are included.

Exhibit 3.9




The Review recognises that a link facilitates all of these wider benefits in a way local generation cannot. These wider benefits, therefore, need to be considered when determining the way forward by this Review.

## 3.6 Regulatory issues

Regulatory issues have the potential to constrain significantly the options open to NWQ if a transmission link solution is chosen.

The Review has held a number of discussions on regulatory issues with the AER, scheme proponents, industry experts and the National Electricity Market Management Company (NEMMCO).

Regulatory issues surrounding Mica Creek are straightforward, as Mica Creek is currently an unregulated asset, and a Mica Creek solution would leave NWQ separate from the NEM.

These discussions focussed, therefore, on how potential regulated and unregulated links would work under existing arrangements. The Review's understanding of these issues is described below.

### *3.6.1 The approach to a regulated link is straightforward*

Typical regulated transmission links are built under well established regulatory protocols. A regulated transmission link to NWQ, however, differs in several respects:

- Typical regulated links are within the licence area of a regulated transmission entity; NWQ is not within any licence area
- Typical regulated links join to points within a NEM region; NWQ is not currently part of the NEM
- Typical regulated links are constructed after a Regulatory Test that determines that the link is the lowest cost solution to address particular reliability issues; reliability standards for NWQ need to be established

If a regulated transmission link was used to supply electricity to NWQ, these issues would likely be dealt with in the following way:

- The Queensland Government would include NWQ in the licence area of an appropriate service provider and set appropriate reliability standards for NWQ
- The regulated service provider would proceed to do a Regulatory Test in accordance with NEM rules, even though NWQ would still be outside the NEM
- The Regulatory Test would be triggered because of the need to replace the A1-A4 units at Mica Creek and because of the need to supply increased load at a given level of reliability
- The regulated proponent builds the line if it passes the Regulatory Test and the NEM boundary automatically extends to include the Mount Isa region

The Review's discussions lead it to believe that these issues are straightforward.

The key issue is passing the Regulatory Test. In order for a solution to pass the Regulatory Test it would need to be the lowest cost solution under the majority of demand scenarios. The transmission network service provider (TNSP) would estimate reasonable demand scenarios for the NWQ region in order to choose the optimal capacity of a link solution. That said, the AER is able to rule on the process followed to determine the ultimate solution and the capacity of any transmission link solution.

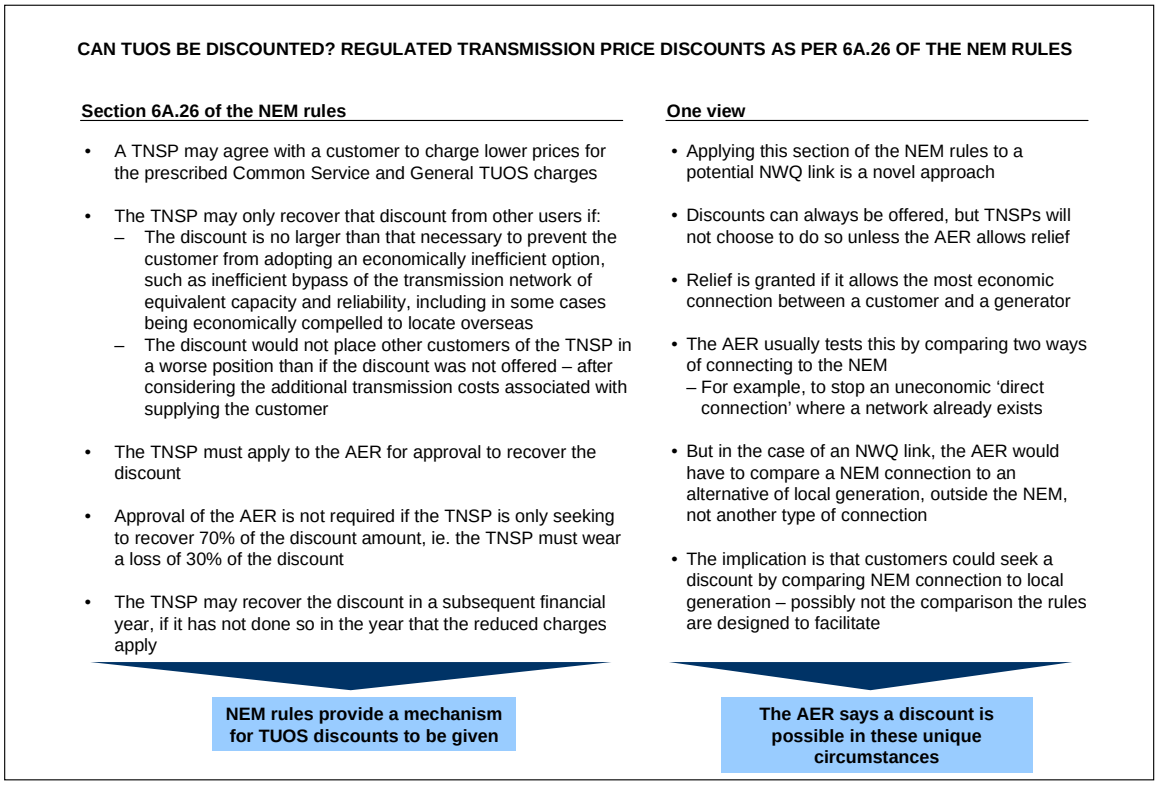
A Regulatory test usually solves for the lowest cost solution over a 15 year timeframe. Given the magnitude of the investment involved here, however, it is likely that the Regulatory Test would solve for a 20 – 25 year period.

Pricing in the region would be determined on completion of the Regulatory Test. Of particular relevance is whether NWQ customers are eligible for discounted TUOS charges. Clause 6A.26 of the Rules allows for common and general TUOS components to be discounted when the user would choose an uneconomic solution otherwise. The TNSP would need to apply to the AER for full recovery of this discount.

While an unusual application of the TUOS discount provisions, the Review understands that such a discount is clearly possible in this instance (see Exhibit 3.10).

The discount envisaged is one such that charges to customers in the rest of Queensland would be no higher than if the link was not built.

Exhibit 3.10




Clearly a discount would greatly improve the competitiveness of a regulated (and also an unregulated) link relative to other solutions and, given the many benefits of a transmission link, should be able to be justified for both a regulated and an unregulated link.

### *3.6.2 Constructing an unregulated link would be uncharted regulatory territory*

The construction of an unregulated link would, however, represent an unusual application of the NEM Rules (described as a non-regulated transmission service in the Rules). The regulatory challenges faced by an unregulated link can, however, be readily overcome with a derogation which seems justified in these particular circumstances.

There are a limited number of categories under which an unregulated link can operate within the NEM.

The most obvious category is for any such link to be a market network service provider (MNSP) which links two regions of the NEM. These links benefit from the anticipated price difference between the two regions. That is, the link would be justified by its expectation of higher prices in NWQ relative to those in the rest of Queensland. In reality, the line owners would only build the line against hedge contracts with NWQ customers who were seeking to gain access to electricity prices in the NEM.

There are at least two issues:

- First, the link ownership and control must be separate from Mica Creek to ensure there is competitive bidding in the NWQ region of the NEM
- Second, the Queensland Government must be prepared to allow NWQ as a separate region within its borders. The Queensland Government has, in past NEM policy discussions, so far refused to consider more than one region in Queensland to avoid separate pricing within its borders. It may be, however, that the NWQ region could be seen as an exception given its unique circumstances

The Review judges that having any unregulated link proceed as an MNSP is highly unlikely. It is not clear if the unregulated line proponents would wish to follow this route and, if they did, competition issues would quickly arise in this new region with very few sources of generation.

Unregulated links can also be appropriate if they are a "connection asset" or an "exempt service". Discussions with the AER lead the Review to believe that these options are very likely not available for an unregulated link to NWQ. To take each case in turn:

- To be classified as a connection asset the link would have to be a connection from the NEM to a single facility. A link to NWQ would be clearly serving many different customers even if, in the first instance, the link was held only to be a link to the Ergon Energy network
- To be classified as an exempt service, the link would have to be incidental to the business of its owner (e.g. a network within a caravan park). This is clearly not the case for the envisaged link to NWQ

Discussions with the regulators identified another two options that could be considered.

- The first is to classify the link as a "negotiated service". This section of the NEM rules has, however, never been used before. Such a classification was meant to address a situation different to that at Mount Isa, and it is unclear if this approach could be allowed
- The second is to classify the link as a "funded augmentation". This option was established to allow generators facing constraints on dispatch to pay for an unregulated addition to the network. One potential problem is that the NEM rules make no provision for charging others for access to such a funded augmentation. The Review believes that this approach would be a contentious one under the rules.

The essential problem is that a major link that connects the NEM to multiple users, and many potential new users, has all the characteristics associated with a prescribed shared network service and would likely be seen as such by the AER. Even if the AER did not express such an initial view, current or new users could appeal to the AER for such a ruling which would likely succeed.

An unregulated link that is not an MNSP would, therefore, likely require the Queensland Government to seek a derogation from the NEM rules to be sure of its status. The Review believes that this would be an appropriate step given, for example, the length of the line and the nature of the customer base in NWQ. There would also need to be rules for future access to the link to be settled either through National Competition Council (NCC) approval of a Queensland Government legislated regime, or through the Australian Competition and Consumer Commission (ACCC) accepting undertakings by the unregulated link proponents.

### 3.7 NTQE unregulated DC link to the Northern Territory

There are other solution proponents in addition to those discussed above. For example, the Review had several discussions with representatives of NTQE who are proposing the construction of a DC link from Stanwell in Central Queensland to Mount Isa and then beyond to the Northern Territory.

Such a proposal is similar to the IsaLink proposal in its first phase. It envisages additional equipment and capacity so that the link can be later extended to the Northern Territory. Much would, of course, depend on the extent of load in the Territory and the benefit seen by users, and also the benefit seen by the Commonwealth Government in terms of reductions in the subsidies it already pays to users in the Territory. Reviewing such issues was beyond the time and scope of this Review and, consistent with the recommendations of this Review, could be addressed by the Commonwealth or large Territory users over coming months if they wish to do so.

# CHAPTER 4

---

## A WELL STRUCTURED COMPETITIVE PROCESS SHOULD BEGIN IMMEDIATELY

# 4. A WELL STRUCTURED COMPETITIVE PROCESS SHOULD BEGIN IMMEDIATELY

The Review's analysis of the options available to supply electricity to NWQ illustrates many of the complexities and uncertainties that have prevented any individual solution gaining the support required to date through negotiations. The key issues of gas price and future demand are difficult.

In addition, any negotiated solution may not solve the three additional energy supply issues introduced in Section 1.3: that new loads are having difficulty connecting to the grid; that individual commercial negotiations may not secure the lowest cost solution for the region as a whole; and that wider issues should be considered.

To deal with these uncertainties and difficulties, the Review recommends the Queensland Government facilitate a customer driven and competitive process to determine future NWQ energy supply. Such a competitive process is required for at least four reasons:

- To encourage the many parties to put forward their best offers in a timely way
- To maximise the chances of addressing the three additional issues mentioned above
- To allow customers, who are best placed to judge their appetite for risk, to manage uncertainties regarding gas prices and demand, and to negotiate the level of reliability they are willing to accept for a given price
- To avoid creating a monopoly, or nominating a preferred proponent without the support of NWQ customers

The design of the process is important. It must:

- Create as level a playing field as possible between options
- Give customers, not government, the power to choose the way forward
- Maximise the chances of a way forward at the end of a set period of time

The Review proposes the process would last for a maximum of 12 months. If any unregulated solution, that is, either local generation or a transmission link, secures sufficient customer support, it will be able to proceed. The level of customer support required will be dependent on the proponent's appetite for risk and the economics of the solution. In tandem with the competitive process, the regulated option will need to provide estimates of the delivered price of power it can supply the region and provide a preliminary basis of comparison. It is important to note that the estimates would be preliminary and subject to change with further work by the regulated proponent. If no unregulated proposal is accepted within the allotted time, or if customers decide they prefer a regulated solution, then negotiations with the Government over such a solution can begin within the parameters described in this report.

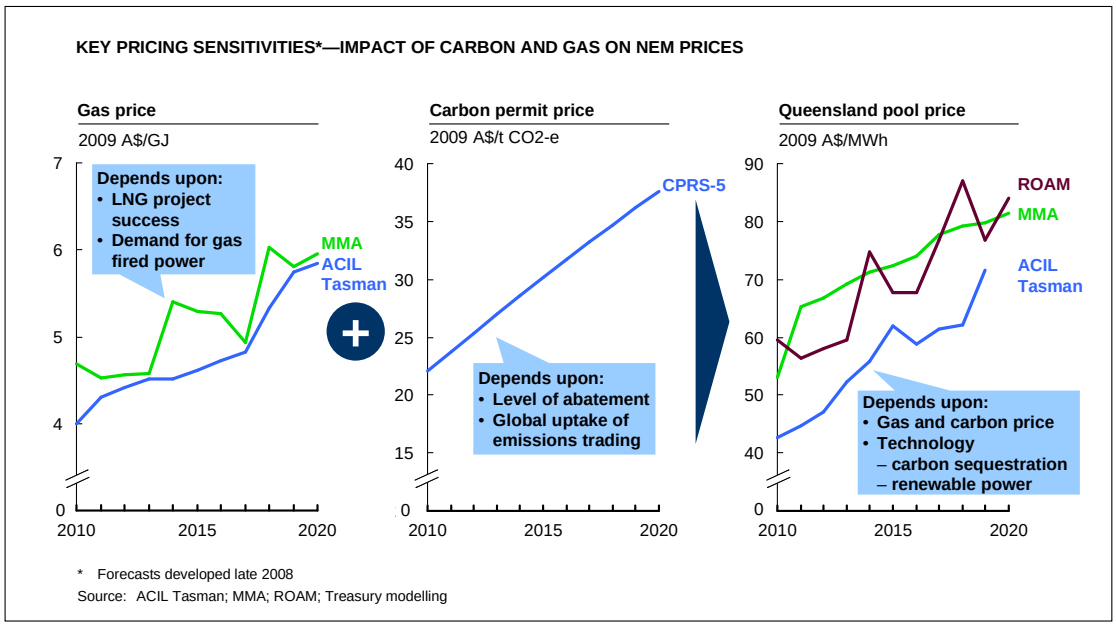
Though at first glance this process may involve delay, it is important that the most appropriate long term energy supply option is chosen. In the Review's judgement, the proposed process is superior to all other alternatives.

## 4.1 There is too much uncertainty to recommend any one solution at this time

Uncertainties concerning key inputs mean that this Review cannot determine a preference for one solution to meet the energy needs of NWQ at this time.

The uncertainties surrounding gas prices, carbon prices and their impact on the relative costs of each electricity supply option create difficult judgements that should be left to the customers. Exhibit 4.1 illustrates some of the uncertainties associated with this issue by showing gas, carbon and NEM price forecasts prepared by MMA, ACIL Tasman, and ROAM, acknowledged experts in these areas. There are three factors that make comparing NEM and local generation electricity costs particularly difficult. First, the uncertainty in gas prices already discussed. Second, future carbon prices depend on judgements concerning the design of the forthcoming ETS. Finally, the introduction of the ETS establishes a new, complex interaction between carbon prices, gas prices and the NEM prices.

Exhibit 4.1



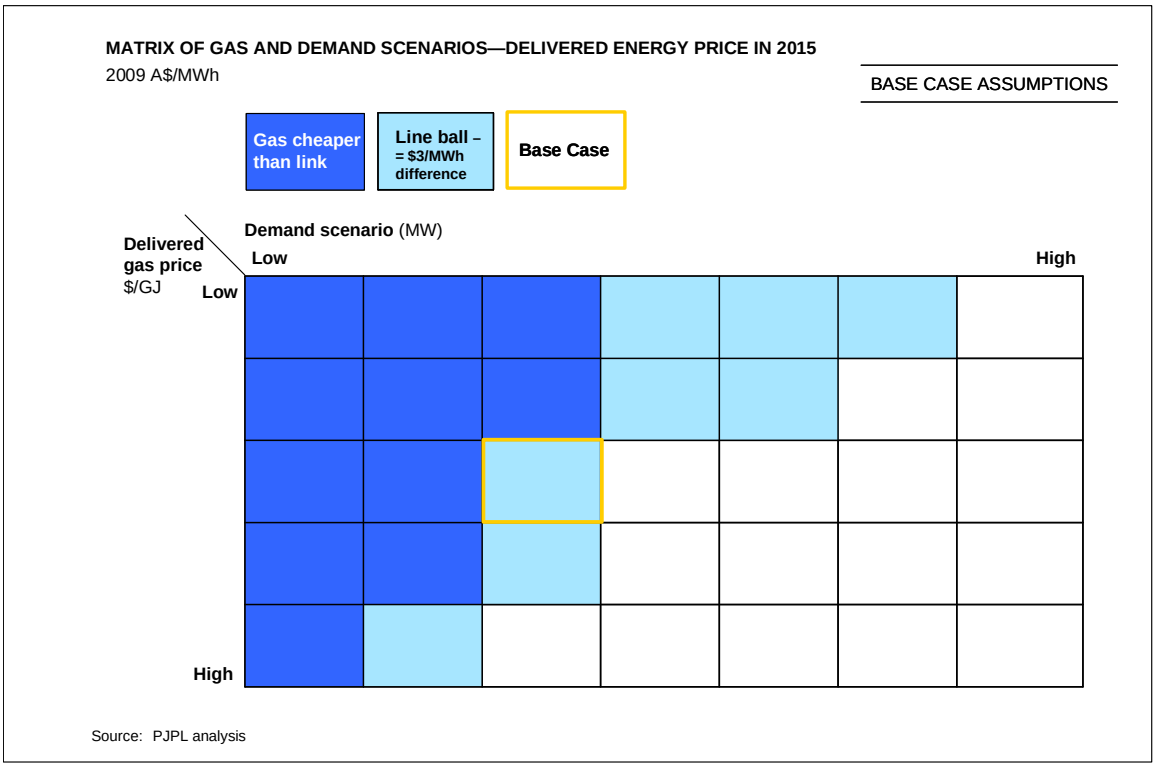

There is also considerable uncertainty around the gas price that Mica Creek will be able to secure and for how long it will be able to secure it. Through discussions with market participants, the Review understands that long term fixed price gas contracts are difficult to achieve in the market. Instead, customers of Mica Creek will likely bear the risk of future gas price increases.

These uncertainties cannot be resolved through more detailed modelling. Customers evaluating potential solutions must weigh the uncertain gas price obtained at Mica Creek against uncertain NEM prices. This must be their judgement.

There is also uncertainty associated with capital costs, particularly for the transmission link options. Despite the best efforts of proponents to provide robust estimates to the Review, the desktop nature of the studies creates uncertainty as to the eventual capital costs. In comparison, and at this time, the cost estimates for a Mica Creek upgrade will be more robust. Exhibits 4.2 to 4.5 provide an illustration of these uncertainties. Note that the numbers on each axis have been removed for this public version of the report.

In each case, the exhibits compare the delivered cost for the Mica Creek upgrade and the regulated AC line at a range of gas prices and demand. Where Mica Creek has the lowest price, the cell is shaded in dark blue. If the options are too close to call, the cell is shaded in light blue. Exhibit 4.2 demonstrates that at high gas prices, and high demand, the transmission link option is lower cost than generation at Mica Creek, and vice versa.

Exhibit 4.2




Changing capital costs can, however, change this picture significantly. Should the capital cost for the link be, for example, 10% greater than the estimate, Mica Creek becomes competitive over a wider range of assumptions. Note that the capital costs used are generally in a $\pm$ 15% range so the reverse picture could apply if further work established that a line could be built 10% below the expected cost. During the current downturn construction costs may be lower than expected. These points are shown in Exhibits 4.3 and 4.4.

Making a decision between these options today, therefore, is not possible without firm gas prices and capital cost estimates.

Exhibit 4.3

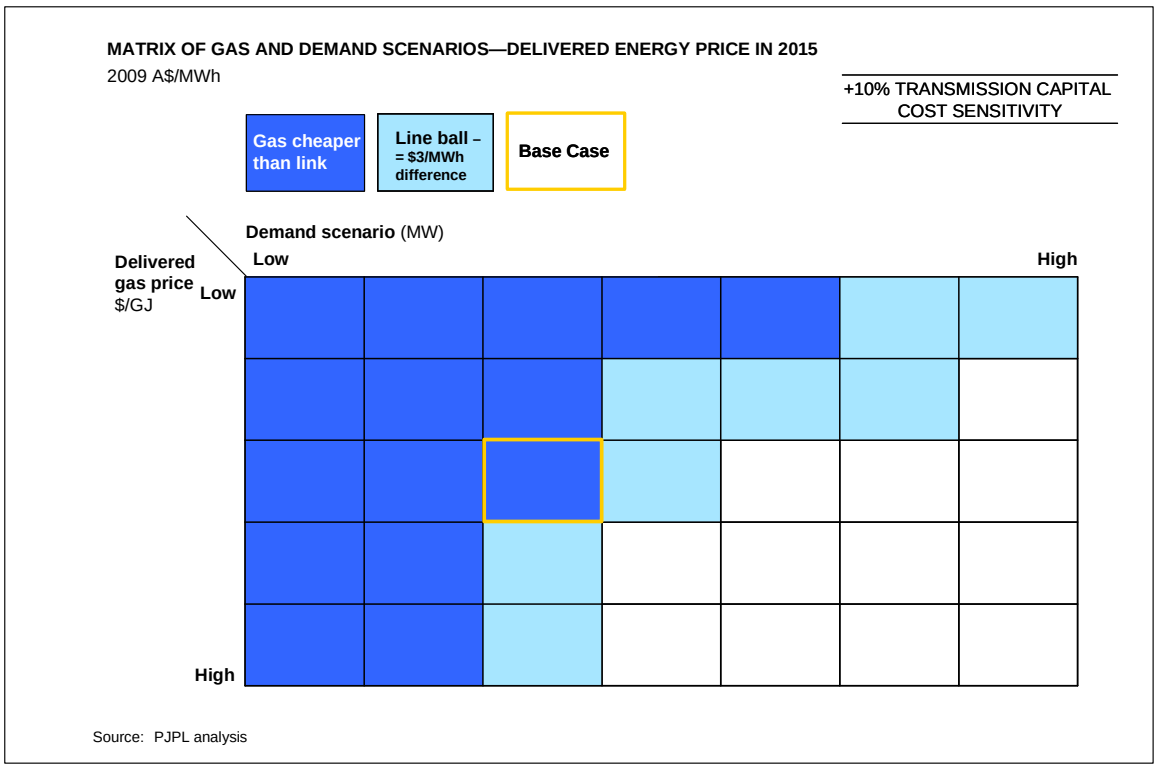
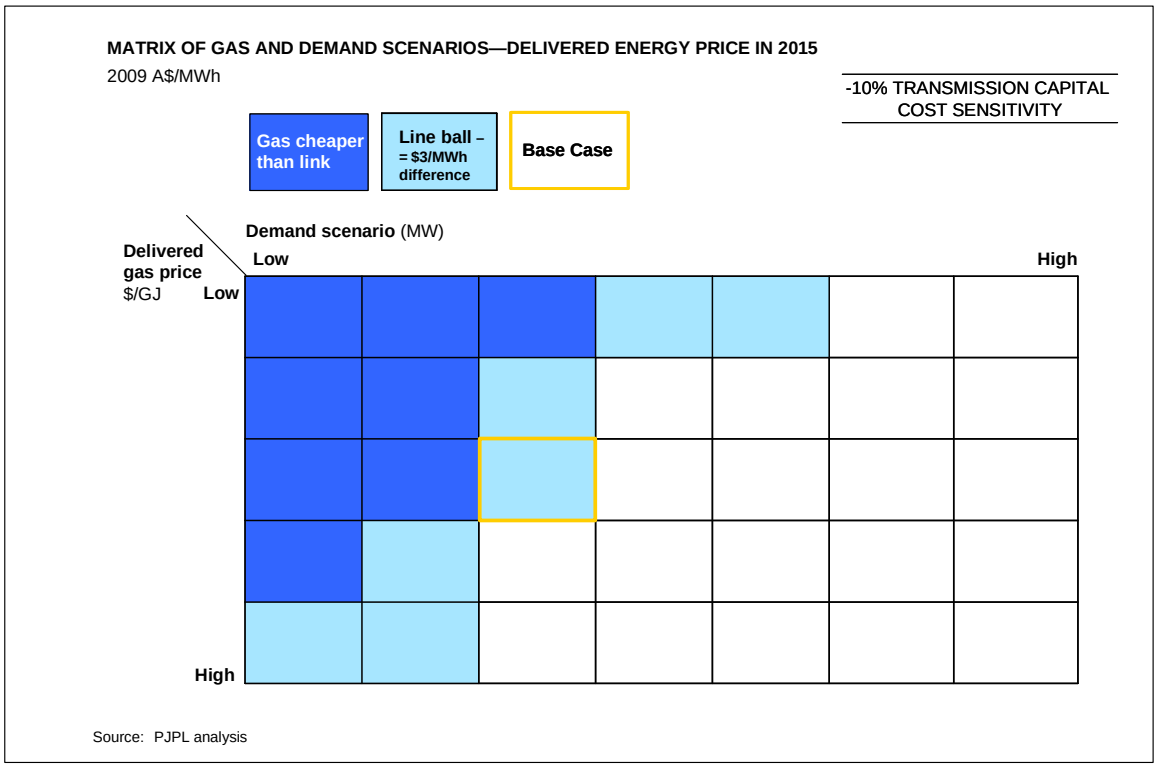


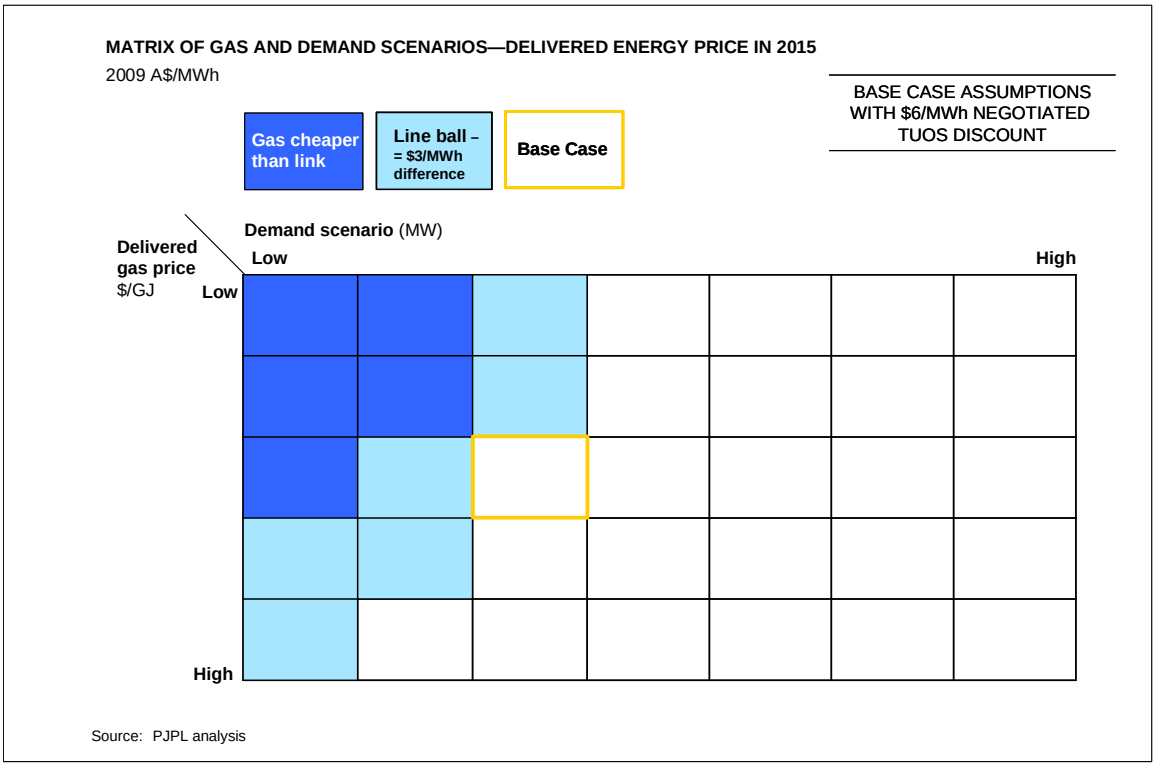

Exhibit 4.4




It is also recommended that for any transmission line option (unregulated or regulated) there be a negotiated TUOS discount applied to the regulated TUOS

charge. This is discussed later in terms of a discount based on ensuring that rest of Queensland customers are no worse off. If in 2015 this discount was to be $6/MWh, then the transmission link becomes more economic across a wider range of scenarios, as shown in Exhibit 4.5..

Exhibit 4.5




## 4.2 We must avoid a monopoly – or nominating a winner without support

A specific recommendation by this Review favouring one proponent would count against proponents of other schemes. There is a material risk that these proponents would see continued work on a solution for NWQ as a waste of resources. NWQ customers could then find themselves negotiating with an electricity supplier in a powerful bargaining position.

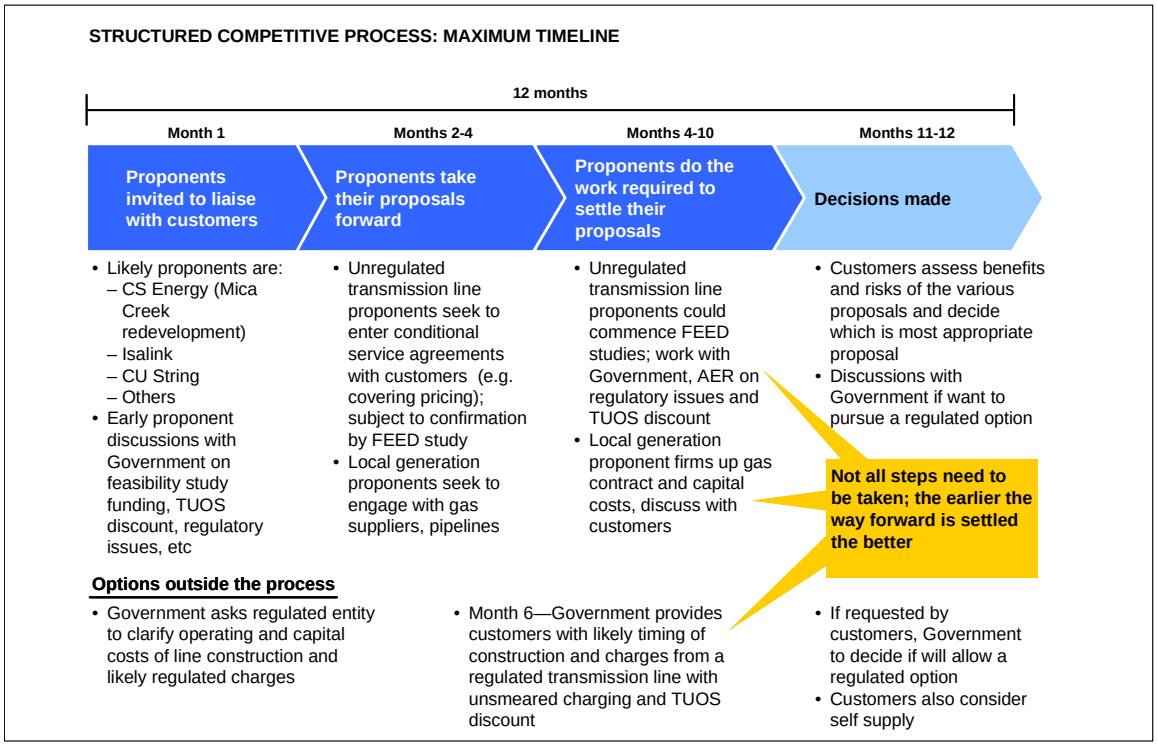
Alternatively, a premature recommendation favouring one proponent by this Review may have little, if any, support amongst key NWQ customers. In this circumstance, this Review would have done little to develop an appropriate solution for NWQ electricity supply.

## 4.3 A well structured competitive process

The review, therefore, recommends a well structured competitive process to determine the most appropriate solution to meet the energy needs of NWQ. The question becomes what rules and arrangements will govern the process, and how can the chances of a way forward be maximised?

Exhibit 4.6 summarisesthe proposed process which the following sections shall describe in detail.

Exhibit 4.6



### *4.3.1 Conditions to be met*

The Review proposes that any unregulated proponent be able to liaise with customers to reach a bankable outcome for delivering power to NWQ.

This is not to say that each solution will not have to meet certain conditions. Each solution must still demonstrate to customers, for example, that it can be financed, meet the technical and commercial requirements of customers, be developed and delivered in an appropriate timeframe and that there are no major remaining hurdles in achieving necessary approvals from the AER and NEMMCO. In addition, transmission line proponents will have to devise and have approved an acceptable access regime, consistent with regulations governing significant infrastructure assets.

Customers will need to give balanced consideration to all unregulated proposals before declining an unregulated solution. They will need to understand that a decision by the Queensland Government to support a regulated transmission proposal is at the Government's discretion and not a foregone conclusion.

### *4.3.2 Entry is open to all, but some proponents may quickly fall away*

Entry should, of course, be open to all. There are, however, some constraints on the number of proponents that will emerge.

CS Energy will find it straightforward to participate. As an active proponent, it can firm up its offer with little additional work, other than the difficult task of settling its gas supply and transport costs. Other generation proponents may also emerge, and some may wish to work with CS Energy.

The Review judges that, while all unregulated link proponents should be encouraged to engage in the competitive process, at most there may only be one practical contender that can secure conditional terms sheets with the major customers. Due to the high cost of conducting the FEED studies required to be able to offer firm prices to customers, unregulated link proponents may not be willing to commence such studies without gaining some level of financial commitment from customers. Customers are only likely to make such a commitment to one unregulated link proponent; others will likely fall away.

### *4.3.3 Customers choose the way forward*

This process is specified such that the customers will determine the most suitable unregulated solution for long-term energy delivery in North West Queensland. An unregulated local generation or transmission link proponent will only proceed if it can reach an agreement to the satisfaction of sufficient customers. This will, in practice, mean that future electricity or transmission prices have been agreed subject only to finalising necessary approvals and financial close. Customers will, of course, want to be convinced that financing arrangements are in place and that the necessary approvals are achievable prior to entering a long-term commitment.

The main customers that will determine the results are, of course, Xstrata and Ergon Energy, as they constitute the bulk of the current load. OzMinerals (Century mine) has its energy requirements already locked in until the end of its published mine

life, and the other current connected miners are small users. It is quite possible, however, that potential customers will also engage in the process, either existing mines not currently on the grid, or new mines that are close to a start-up decision.

## 4.4 The role of Government

The Government's role involves three fundamental responsibilities that should all be announced up front.

- First, invite solution providers to work with NWQ customers to meet NWQ energy needs. This invitation would acknowledge that the Government anticipates that both generation and transmission link proponents would be talking to customers
- Second, the Government would commit to working with all proponents, through the course of the 12-month period, to remove particular barriers where possible and acceptable to Government
- Third, the Government would initiate work on a regulated option, which should be completed in six months. If there is no timely agreement between customers and proponents within 12 months, subject only to finalising necessary approvals and financial close, then the Government would weigh up the benefits of a regulated line and discuss its economics and charging mechanisms with customers

It is worthwhile elaborating on the last two points.

### *4.4.1 Removing particular barriers*

The Government's essential role is to remove some particular barriers under five headings.

First, the Government should offer to assist unregulated link providers with their feasibility studies in well defined circumstances.

Some Government assistance is appropriate because, firstly, the announcement of this competitive process will increase the chances of (but by no means guarantee) having more active proponents at this key "fork-in-the-road" decision point; and secondly, there is a difficult to quantify risk to unregulated option proponents that the regulated option is seen to be superior, and that the Government may trigger it

It is proposed that the Government contribution be structured as follows:

- The Government would make no up-front financial assistance
- If, however, the proponent and the customers agree to proceed with a study based on customer commitments to fund at least one third of the feasibility study (either up front or only if the proposal does not proceed) then the Government could commit to refund one third of that study if the proposal does not proceed

Imposing a requirement for a customer commitment may mean the Government is only exposed to funding the study of one proponent. In any event the Government could cap its total commitment..

Second, the Government should stand ready to assist with regulatory approvals, including seeking derogations from the Rules where necessary. This is a major issue.

The unregulated transmission line proponents in particular face large regulatory hurdles, as discussed in Chapter 3. The NEM Rules do not cater for the unique circumstances of NWQ, and this is widely recognised in conversations with a range of individuals, including those at the AER. In these circumstances if customers and an unregulated line proponent can agree to terms that can underpin line construction, and if the access regime that is put forward is acceptable, then the Government could ensure there are no other regulatory hurdles due to the nature of the NEM Rules.

Of course, derogations may also be needed for quite specific issues, as occurred when Tasmania joined the NEM. For example, if NWQ were in the NEM then Mica Creek or the Xstrata Power Station (XPS) could need a derogation to deal with technical connection issues if it continues to operate.

Third, to assist a local generation option to be developed over the next 12 months, the Government should do what it can to facilitate access to the Ballera compression facility. This is because only the SWQ Gas Producers have such a facility, and access to this is required to send gas up the CGP. If access is not available to all potential gas suppliers than only one source of gas supply is available to Mica Creek which would limit the competitiveness of this option. The Review understands that past negotiations for access to this facility have not been successful.

Fourth, the *State Development and Public Works Organisation Act 1971* provides the person holding the office of the Coordinator-General with significant powers to manage major projects on a whole-of-government basis. This Act provides for planning and development through a system of public works, mechanisms to ensure the timely completion of environmental assessments, the acquisition of land for persons other than the state, and other things to secure the proper planning, , execution, coordination, and enforcement of a program of works.

To ensure that the delivery of an unregulated transmission option is progressed, the Coordinator-General, at his discretion, may approve the use of various mechanisms and statutory powers to assist the proper coordination of the project.

Finally, the Review believes that the Government should work with all transmission line proponents (regulated and unregulated) and with the AER to ensure an appropriate discount to the TUOS charges at the point of connection for any new line to the extent that the rest of Queensland consumers are not disadvantaged. There are two justifications for such a discount.

The main justification is that a transmission line brings the wider benefits discussed in Section 1.3 above. Current customers cannot be expected to pay more to secure these wider benefits; another modest form of support is justified in recognition

of these benefits. The effect could then be that the provision of the discount results in the correct cost option for NWQ customers and delivery of the wider benefits, while leaving all other Queensland customers no worse off.

The other justification is that, whether it is an unregulated line, or a regulated line with "unsmeared" charges (as already discussed and which is discussed further below), customers will already be paying fully for the line. This is unusual with new lines as they are usually shared services and the rest of Queensland makes some contribution to the charges for the new line through the smearing mechanism.

The size of the discount could be the common and general charges component of the TUOS charges to the point of connection of the new line. In a broad sense the locational element of the TUOS charges already allows for the cost of the system to the point of connection; any payment of the common and general charges by a new NWQ line may provide a reduction in charges over the levels they would otherwise be at for customers in the rest of Queensland.

This is, therefore, a "marginal cost" versus "average cost" approach, which while unusual, is allowed for under the Rules as discussed in Chapter 3. Regardless of the connection point, this discount may be up to $6/MWh.

### *4.4.2 The regulated line alternative option*

There are reasons for customers to prefer an unregulated solution, either one based on local generation or an unregulated transmission line. Such options can adapt their pricing, reliability and timing explicitly to the needs of customers. A regulated shared transmission service is less flexible and may have associated pricing risk going forward with demand fluctuations.

The regulated option would not be part of the competitive process. The process would only be between proponents of unregulated options as only they are able to reach agreements with customers.

The regulated transmission link would, however, be an alternative option that could be considered. Customers would need some information on what it would offer to make decisions in the competitive process.

For customers to be able to compare power prices, reliability and timing, therefore, work would need to begin immediately and be completed within 6 months, which the Review understands is achievable, to:

- Assess the line route in detail and take other steps to provide indicative line capital and operating cost estimates
- Determine the level of indicative customer charges that would apply. This requires running a detailed pricing model which takes considerable time
- Settle the timing for potential construction

Some may argue that having a regulated transmission link as an alternative option is unfair to the unregulated proponents:

- First, it "requires" a lower return, and does not need to achieve a given return as quickly as unregulated proponents
  - This is true but the choice of return is up to the proponents. To justify their return the onus is on them to provide better value for customers in other ways
- Second, the regulated link does not require customer commitments, and it faces no stranding risk, as this is ultimately borne by all Queensland customers. There are a number of responses to this important issue
  - Customers face considerable demand risk as their charges are linked to the value of the regulated asset under an unsmeared pricing arrangement. If the demand is low, charges will necessarily be higher. Customers will need to understand the relationship between demand and price, in order to quantify this risk. This is further discussed in the next section
  - Unregulated proponents can assess demand in the area and compensate through their charging arrangements for later additional load

The Review believes that if an unregulated line option has similar economics and other outcomes for customers to a regulated option then customers and the Government will prefer the unregulated option. If the regulated line has better economics for customers then it should be preferred.

While customers will determine what is in their best interests, customers will need to weigh up the risks of foregoing an available unregulated option for a regulated option. Only the Government can weigh the wider costs and benefits of a regulated option when all the facts are known. With increased pressure on state borrowings, and a need to prioritise available Government borrowings given the State's reduced credit rating, Government involvement in a regulated option, potentially through Powerlink, is not certain. Customers will need to weigh the risk of it not proceeding or not proceeding at a time preferred by the customers.

If a regulated link were ultimately chosen, the Review believes that a transmission link would emerge from any then required Regulatory Test as the least cost option. It is important to note, however, that in this case the Regulatory Test will need to compare a transmission link to other options, including local generation. Under a Regulatory Test, local generation would find it difficult to guarantee supply to current and future loads at assured prices and likely required reliability levels.

### *4.4.3 The regulated solution will require particular arrangements*

As already indicated the Review proposes that the asset charges on a regulated shared network not be smeared in the usual way so that customers can make a fair comparison with unregulated options, and so the rest of Queensland customers are not paying more for their electricity as a result of constructing the new and very costly line. It is proposed therefore that, if a regulated line were to proceed, the Government impose an appropriate charge, through for example a contract with users, which could be paid to Powerlink to reduce the charges to the rest of Queensland customers.

It is important to understand that unregulated proponents are likely to make fixed price offers or, at a minimum, offers with well defined escalation mechanisms. In addition, unregulated proponents are likely to offer discounted prices to foundation customers, such as Xstrata and Ergon Energy, who can sign up early and represent large loads. This ability represents a fundamental and appropriate advantage to proponents of unregulated solutions.

Customers considering the regulated option cannot receive a similar offer as the regulated pricing mechanism does not allow it. This mechanism operates so that:

- The total revenue earned by the regulated proponent is proportional to the value of the asset base
- The price customers would receive, therefore, depends crucially on the total volume flowing along the link
- All customers receive the same price
- Transmission charges reduce over time as the value of the regulated link reduces through depreciation

Exhibit 4.7 illustrates how this methodology would work on a regulated link to NWQ. The left hand side shows the estimated link cost in 2015 to customers for various levels of capacity utilisation; the right hand side the differential between the price at these utilisation levels and that of a fully utilised line. It can be seen that if all 400MW of the regulated transmission line is fully utilised at 83% load factor, then the price to customers is at a given level. If, in 2015, only 250MW is utilised, i.e. the likely amount of capacity then required by current large customers combined, the price paid by customers will be significantly higher.

Clearly, under this mechanism initial customers are exposed to substantial immediate volume risk.

In addition, as all customers must pay the same TUOS charge, foundation customers such as Xstrata and Ergon would underwrite the entire link capital in a way other loads which might later connect would not. Later customers would receive lower prices as the regulated price diminishes over time. The regulated allowable return to the TNSP decreases with the depreciating asset base. This is illustrated in Exhibit 4.8, which also shows the price outcomes for different load levels.

Exhibit 4.7

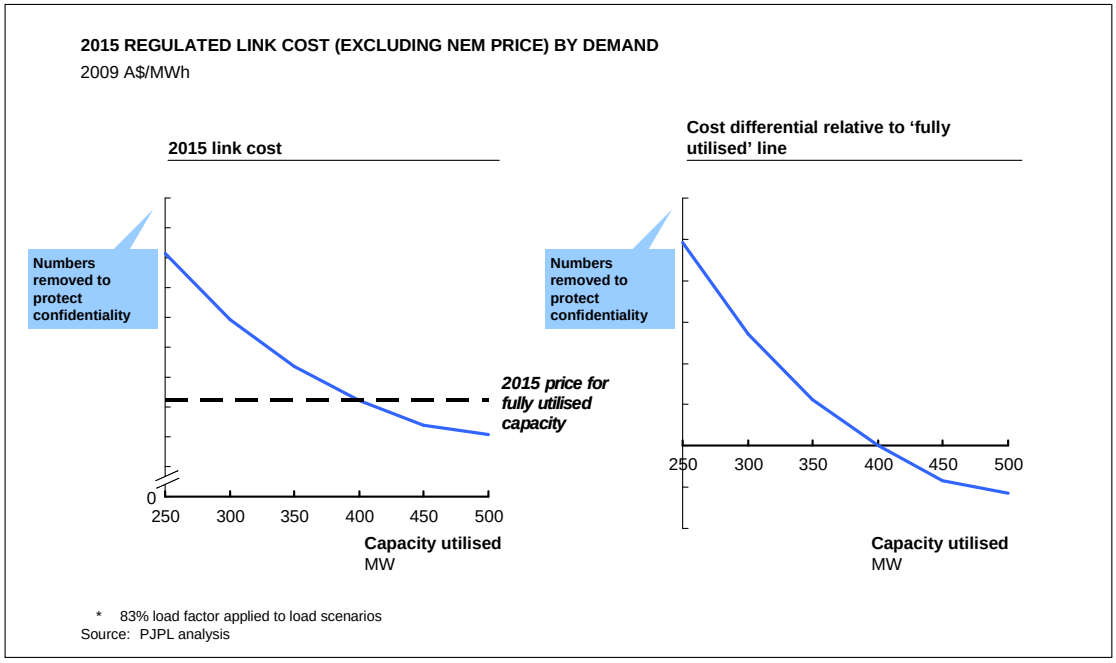
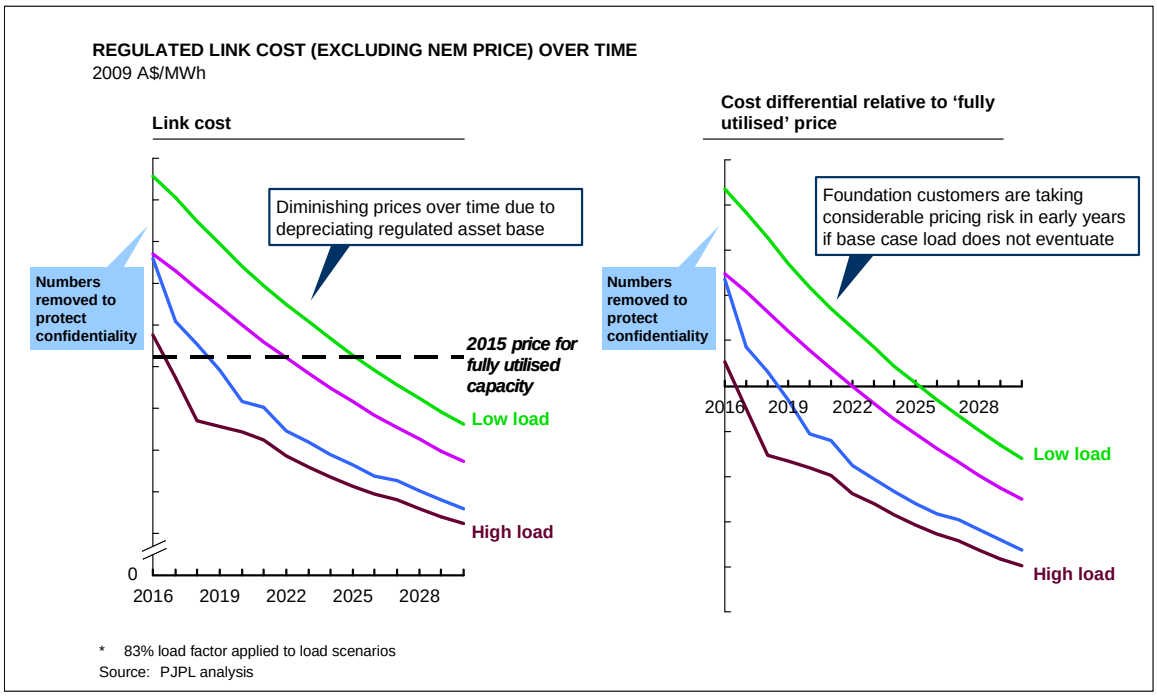



Exhibit 4.8




Even with diminishing prices over time, there is still considerable load and therefore pricing risk for foundation customers in the early years. This risk is largely unavoidable and, indeed, these customers will need to assess their relative position under different load growth scenarios.

The Review's proposed TUOS discount of around $6/MWh can ease this burden on foundation customers (as it will for customers of an unregulated line). Exhibits 4.9 and 4.10 illustrate the effect of the $6 discount.

Exhibit 4.9

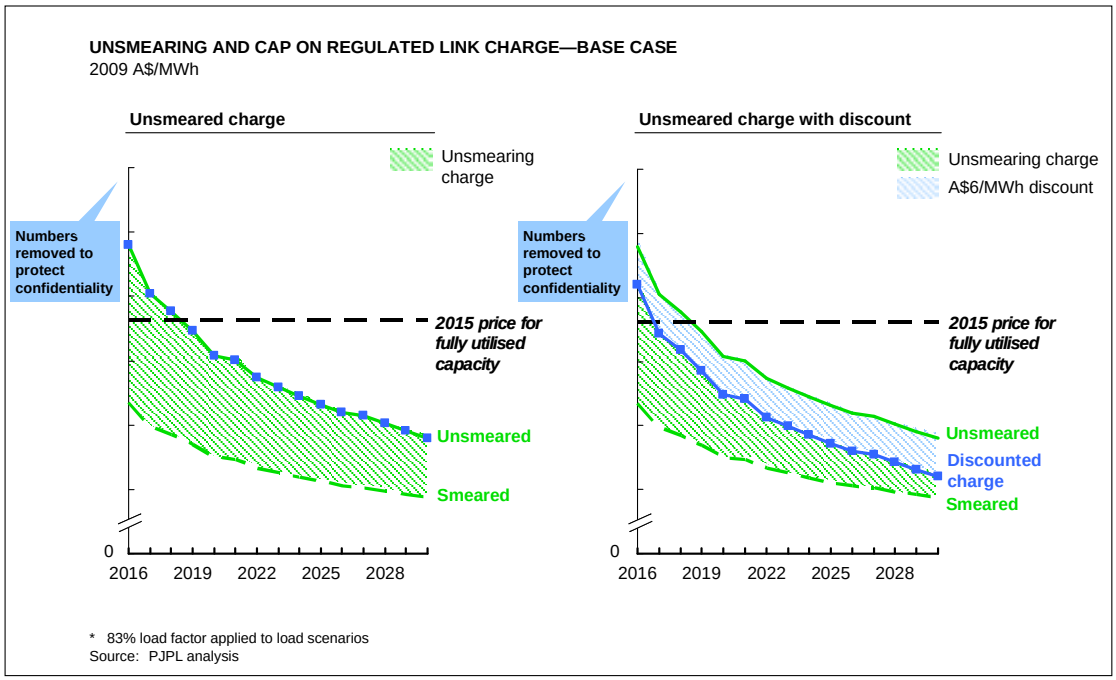
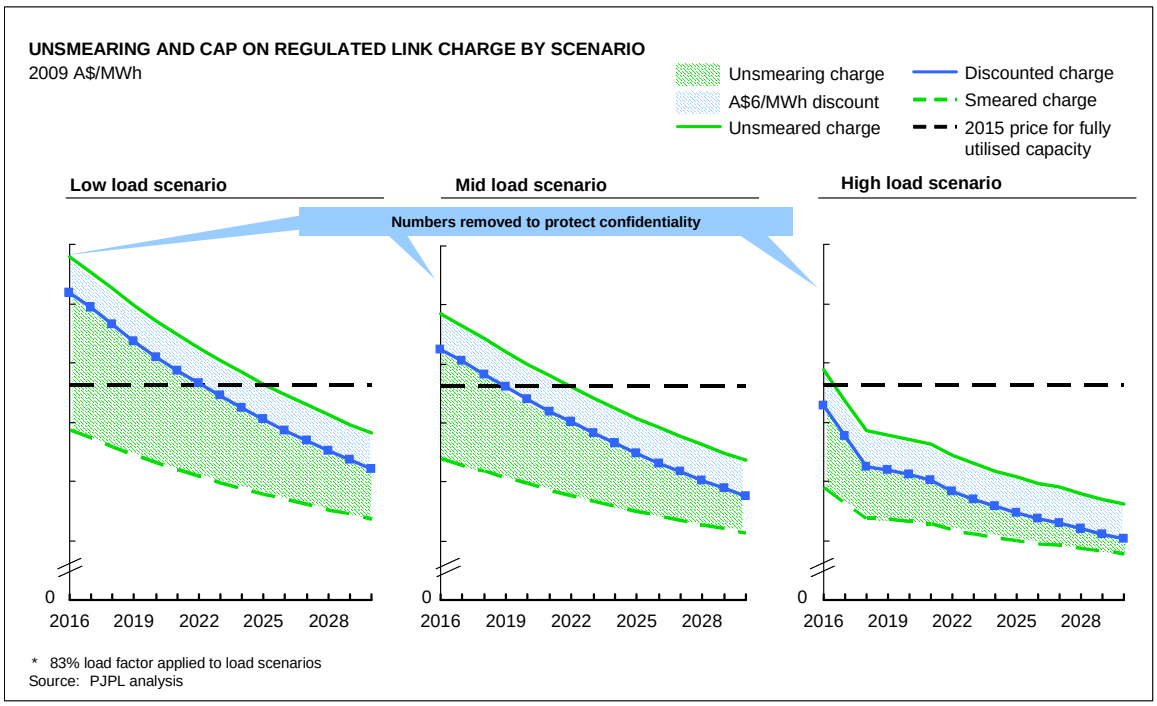



Exhibit 4.10




The right hand side of Exhibit 4.8 shows the benefit of the discount. The left hand side of Exhibit 4.9 shows the regulated link charge paid if only large current customers connect compared to the price for a fully utilised line in 2015. The charge assuming full smearing is shown in dashed green; the charge without smearing in solid green. Of course if demand is higher.they will pay less, and they should not for long pay more than for a fully utilised line in 2015. This may be a small "bet" for them to make. The high demand case, of course, shows the considerable upside for

proponents and customers if demand from NWQ is high. This upside is available to unregulated and regulated line proponents.

## 4.5 Timing issues

The Review is conscious that as most current power purchase agreements in NWQ expire in or around 2013, the time remaining to choose and construct a solution is limited.

To this extent, the proposed process could be seen as causing delay. For customers whose power purchase agreements are expiring this concern is real. There are, however, at least two points to be made.

First, if an unregulated link or the Mica Creek upgrade is preferred by customers, the process will not have caused delay. None of the unregulated link proponents have completed feasibility studies, and so this work must be completed whether part of this competitive process or not. Absent the proposed process, Mica Creek would not have needed to begin work for some time so the process could accelerate the work of CS Energy.

Second, it is possible that the competitive process may not take 12 months. The hurdles facing unregulated proponents are significant, which may lead customers to discuss the regulated option with Government within the 12 month period. If this were to occur this should not be seen as a failure of the process; on the contrary, an early move to any option should be seen as gaining earlier clarity on the way forward.

## 4.6 Potential choices of proponents and customers

The process described above deliberately places the control firmly in the hands of the proponents when formulating their proposals, and the customers through their responses to each.

The Review cannot say with any certainty how this interaction might play out. It is possible, however, to put forward a view on how the process could unfold. Exhibit 4.11 summarises this.

To take each class of proponent in turn:

- Proponents of unregulated transmission links will immediately begin to seek backing from target customers, both to fund their feasibility study and, later, to bank their project. The Review believes the process will allow these proponents to decide quickly whether their proposals will be competitive with other offers; in a short amount of time they will either proceed to a feasibility study or fall away
- Local generation proponents, including but not necessarily limited to CS Energy, will also begin to seek backing from customers. These proponents are likely to use the process to gain leverage with gas sellers and gas transport providers; without the fixed timeframe and alternative regulated

transmission option from the proposed process, local generation proponents may have difficulty gaining competitive tension. These proponents will proceed if they can sign up sufficient customers

- Potential regulated link providers can indicate an interest to work with the Government to address the issues raised above
- Finally, customers (most likely Xstrata) must themselves be considered proponents, as they always retain the option to self supply and so withdraw demand from Mica Creek. This ensures all options are put on the table, including the regulated option, and a sensible commercial choice can be made. The Review notes that if, for example, Xstrata self supplies, considerable capacity will be freed at Mica Creek, allowing new loads to be served

Exhibit 4.11

**COMPETITIVE PROCESS—HOW IT COULD UNFOLD**

| Solution | Approach | Benefit from the process | Possible end point |
|---|---|---|---|
| **Unregulated link** | • Seek backing from whichever customers they want (or CS)<br>• Seek Government help<br>– Study funding<br>– Help with AER, ACCC | • Way forward which clearly identifies where others sit, role of Government<br>• Study funding | • Should know <3 months if these will proceed with feasibility studies<br>• Need to sign up sufficient customers to proceed |
| **Local generation** | • Seek backing from whichever customers they want | • Leverage with gas sellers and gas transport providers | • Need to sign up sufficient customers to proceed |
| **Regulated link** | • Conduct studies outlined above, including pricing<br>• Government says must be an unsmeared outcome | • Clarity around pricing for a regulated link | • Consider if needed |
| **Self supply** | • Customers always have this option (its true default option)<br>• If, say, Xstrata chooses to self supply, Mica Creek can supply other mines | • Customers can see all above options and decide which is preferred | • Depends on attractiveness of other options to customers |

## 4.7 There are manageable issues of asset stranding if a link is preferred

If customers choose a transmission link its construction could create stranded assets. Mica Creek would no longer be needed for baseload generation. Volumes in the CGP would also fall, as demand at Mica Creek is reduced and additional mines are connected to the local grid.

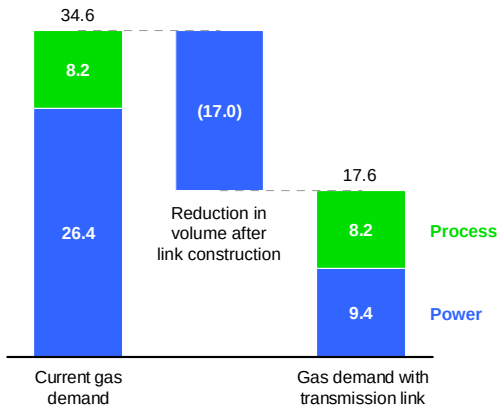
The Review finds these outcomes unavoidable, although unfortunate. There is, however, some upside potential to offset part of the value loss:

- CS Energy could benefit in several ways from the construction of a transmission link. As an illustration, Mica Creek could operate as a peaking plant. In addition, its remaining plants in the NEM will supply some of the NWQ load

- APA will see reduced volumes on the CGP. Exhibit 4.12 shows this reduction but notes that volumes will be greater than shown if Mica Creek can operate with line-pack gas. Over time some new operations may also need gas for their production process

Exhibit 4.12

**VOLUME IMPACT ON CARPENTARIA GAS PIPELINE IF A TRANSMISSION LINK IS CONSTRUCTED**
PJ per annum




Source: Industry interviews

## 4.8 The preferred option is superior to others

In coming to its recommendation, the Review considered a number of other options.

Four options were available at the outset: leaving the decision to the market; choosing a preferred option today and trying to broker a solution; asking the Queensland Government to underwrite the "long-tail risk" of a particular solution; and immediately deciding upon a "smeared" regulated link.

A further option arose in the consideration of the proposed competitive process: a process without inclusion of a regulated solution.

The Review feels its proposal is superior to all these alternatives.

### *4.8.1 Leaving the decision to the market*

This risks a suboptimal solution that does not address the three important issues identified in Section 1.3, and does not achieve the best gas price for a local generation option.

### *4.8.2 Choosing a preferred option today*

The problems with choosing a preferred option today have been discussed in Sections 4.1 and 4.2. Such an action also risks creating a "monopoly by appointment" or, alternatively, a recommendation without credibility with customers.

Picking a preferred option today also risks locking customers into specific risks which they may not wish to bear. The gas price risk of choosing Mica Creek today has already been discussed. Other alternatives, too, have specific risks that customers may prefer to avoid. Unregulated line proposals, for example, are still at an early stage, and face regulatory risks and do not yet have secured funding. Customers may feel that a regulated proponent, to take another example, will be too slow and unresponsive to their needs to develop a truly cost effective solution.

Only a process where customers choose the way forward can avoid these problems.

### *4.8.3 Underwriting the 'long-tail risk' of a particular solution*

The Review could recommend that the Queensland Government underwrite the load for a supply proposal for the later years beyond which customers are willing to commit ("long-tail risks"). The Review sees two problems with this approach. The first is that offering to underwrite the long-tail risk for a preferred solution poses all of the problems associated with picking a preferred option today. The second is that there is little justification for using Government resources in this way. The long-tail risks associated with either Mica Creek or transmission link investments are manageable.

No action is needed to support Mica Creek investment in this way for three reasons:

- First, other generators routinely manage similar risks albeit in the NEM where a pool price buyer is always assured. Nonetheless, if CS Energy invests, it will preclude a transmission link investment for some time, and so could be confident shorter term contracts would be renewed
- Second, CS Energy's scaleable capital expenditure reduces the risk of demand uncertainty. Additional units can be installed as needed, unlike transmission links under which capital is committed up front
- Third, there are few wider benefits from Mica Creek generation and so no justification for additional Government support

An unregulated line's "long-tail risk" arises from the fact that only some of the loads can be relied on at the time of its investment. The proponent can manage this risk in a number of ways, including charging later customers a different price than those that can commit today, and by crystallising some residual value after the initial commercial life.

There are two points to be made.

First, unregulated line proponents may only need to charge modest price premiums to later customers to ensure target returns are met. This is illustrated on the left hand side of Exhibit 4.12, which shows the delivered price to each class of

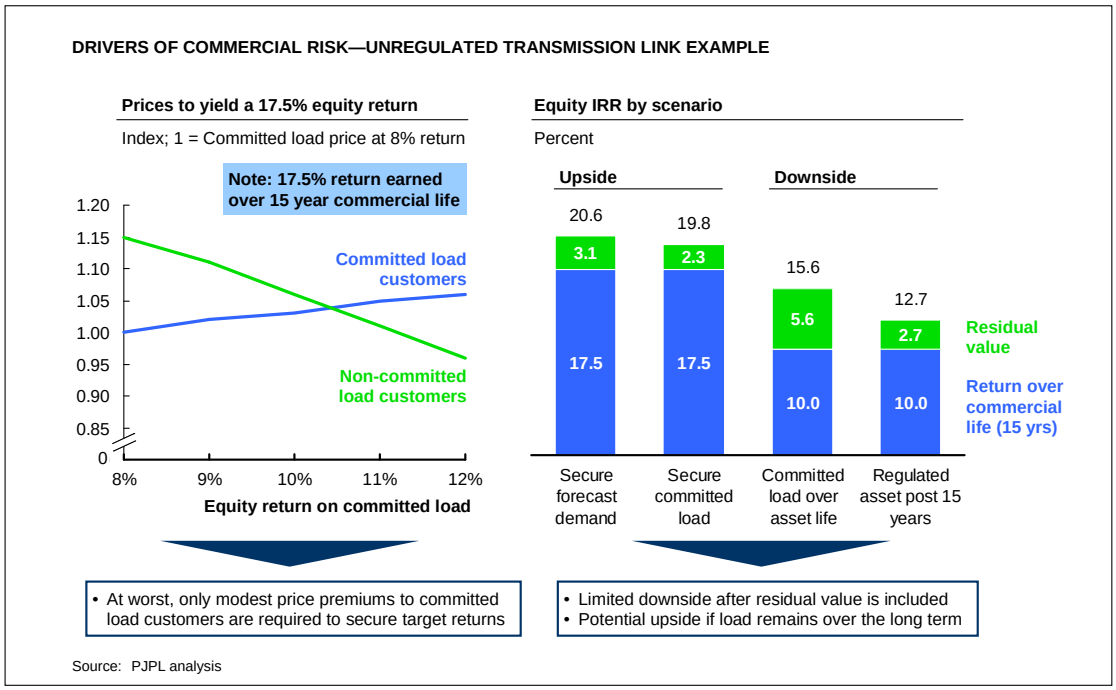
customer required to secure a, say,17.5% return to equity holders. The price differential between committed loads (namely, Xstrata and Ergon Energy load based on Xstrata's known mineral resource) and later customers depends on the return secured from committed loads. Even assuming committed loads provide only modest returns, say 10%, the unregulated line proponent must charge only a 3-4% premium on delivered price to other potential loads to hit their targets.

Second, including the residual value of an unregulated line after the initial commercial life suggests any expansion has limited downside and substantial upside.

The right hand side of Exhibit 4.13 illustrates this. Even if unregulated line proponents only ever serve committed loads, as in the "downside" scenario shown, the reasonable assumption that these loads will continue past the 15 year commercial life would allow investors to anticipate returns approaching their targets. In addition, unregulated proponents always have the option to become regulated, and secure a guaranteed though less attractive return, via the AER, at any point in the future. There would be no stranding risk on this line, just as there is no stranding risk on any other regulated line.

Unregulated proponents have told the Review they are comfortable earning only modest returns on committed load, and risking their desired return from new load. The Review judges that this is consistent with usual commercial practice.

Exhibit 4.13




### *4.8.4 Constructing a "smeared" regulated transmission link*

The Review could recommend to simply extend the current Queensland transmission network and construct a smeared transmission link to NWQ. Customers would, of course, welcome that.

As discussed in Section 3.4 however, the Review feels smearing a transmission link to NWQ would be inappropriate, given the size of the investment required, the radial nature of the extension and the nature of the load being supplied.

Absent "smearing", this option has all of the other problems associated with choosing a preferred option today.

#### *4.8.5 Have a competitive process, but without the potential for a regulated link solution*

It is possible to accept the logic underlying the recommended process is sound, but to argue that including the regulated option is unnecessary.

There are four reasons why such an option should be included:

- The possibility of the regulated option gives meaning to the proposed 12 month deadline
- It helps puts pressure on gas suppliers to engage with potential generators if they are interested in accessing the NWQ market
- An unsmeared regulated link may be preferred by customers over all other alternatives, in which case it should be favourably considered by Government
- Most important, an unregulated transmission link may strike particular roadblocks. Maintaining a regulated option ensures customers can always compare a link with local generation

### 4.9 The preferred approach has one limitation

Having defined the three additional issues described in Section 1.3, the Review is conscious that the proposed competitive process could deliver an energy supply solution which does not address them.

This is because it allows customers to select a local generation option, and the Review believes a local generation option is less likely to address these issues. Specifically:

- Local generation cannot supply new loads as cheaply and easily as a transmission link. This is because local generation capacity expansions will occur as needed, and in discrete blocks. As discussed previously, this is a substantial advantage as it allows capital investment to grow with demand. The disadvantages are both the complexity of negotiating with each element of the supply chain, as previously discussed, and that when new capacity is needed the marginal cost to supply new loads can be high. In comparison, the large initial capacity and inexpensive expansion options make the marginal cost to connect new loads to a transmission link low

- Local generation cannot capture wider benefits in the same way a transmission link can. As discussed in Section 3.5.4, many wider benefits can only be captured through connection to a link

These comments should not be seen as a reflection on existing gas generation providers. These disadvantages remain whether generation is supplied from an expanded Mica Creek, or from Xstrata self supply, or even by a new generation entrant.

The Review identified a potential remedy for this problem. The competitive process could include entry conditions that would force customers to choose an option that guaranteed to supply a particular level of load at known or transparent prices.

The Review feels unable, however, to recommend that these conditions be set. The conditions would necessarily be complex and involve a substantial expansion of the Government's role in the process. They would also increase the cost of or exclude local generation from the competitive process. This would deny current customers, who even in our high case demand scenario constitute a large portion of the load, the chance to choose an option which could potentially be lowest cost for them.

It would be inappropriate for the Review to take this step.

Instead, to take account of the wider benefits from a transmission line, the Review has recommended a TUOS discount be provided, as discussed above.

* * *

This is a critical point in the future power supply for NWQ and it is important to get the decision right. It is possible that the current global downturn provides a "window of opportunity" to do this before the economic cycle changes, as it inevitably will.

# ATTACHMENT 1: TERMS OF REFERENCE

## NORTH WEST QUEENSLAND ENERGY DELIVERY REPORT
## NORTHERN ECONOMIC TRIANGLE

### PROJECT OUTLINE

**PURPOSE**
To undertake a high-level study to provide information and advice to Government and industry on:

- Strategic efficient energy infrastructure development proposals that provide reliable and competitively priced energy to the North West Minerals Province, which gives consideration to delivering maximum social, environmental and economic benefit to the Northern Economic Triangle (NET) region and the State; and
- Recommend a suitable delivery model which provides the best opportunity for commercial viability and risk mitigation.

**MECHANISM**
A jointly funded independent study by the Queensland Government and the resources industry, through Queensland Resources Council (QRC).

**TIMEFRAME**
To have an interim report by end of February 2009 and a final report by mid-March 2009.

Underlying Provisions
This study will be funded on an equal share basis between the Queensland Government and QRC.

**KEY TASKS**

1. Agree with stakeholders (including potential energy suppliers) a series of energy infrastructure scenarios for providing energy, which includes generation and transmission links, to the North West Minerals Province. All assumptions need to be explicitly stated, particularly regarding the level of accuracy of cost estimates.
2. Conduct a high-level economic appraisal of the costs, benefits and risks of each energy infrastructure possibility. Different configurations of ownership and risk should be assessed. Consideration should be given to the level of comparability of cost and revenue estimates from one energy infrastructure scenario to another.

3. Quantify in each scenario, the extent of any likely mismatch in risks and costs – what is the barrier to each solution proceeding?
4. Attempt to quantify (including in net present value terms) how the scenarios compare (recognising that this may require considering some subjective judgements).
5. Make practical recommendations, based on stages 1-4, which provide the most social, economic and environmentally advantageous solution to long-term development and growth of the NET region.
6. Identify and examine potential delivery models which manage exposure to costs and risks across the asset lifecycle.
7. Quantify in each delivery model the extent of any investment mismatch for an asset amortised over 20, 30 and 40 years scenarios.
8. Propose recommendations, which best advance the development of a solution determined in stage 5, by the deployment of a delivery model that presents the best opportunity for commercial success and least “back-end” risk exposure.

**MILESTONES**

1. Formation and endorsement of the Steering Committee and its membership
2. Finalisation the Terms of Reference by stakeholders, commitment of finance and endorsement of the proposed consultant by stakeholders (including shareholding Ministers)
3. Independent expert briefings with the Deputy Premier, the Minister for Mines and Energy and Shareholding Ministers of the relevant GOCs as required.
4. Commence key tasks 1-4 to determine the most strategic energy infrastructure development proposal that accounts for the long-term social, environmental and economic benefit to the NET region and the State and delivers reliable and competitively priced energy for the future sustainability of industry located in to the North West Minerals Province;
5. Report on mid term findings of the review to Steering Committee and provide briefings to Ministers;
6. Conduct workshops with a wider Stakeholders Group
7. Commence key steps 5-8 to determine the most viable delivery model
8. Assess recommendations including the identification of implementation steps and stakeholders for infrastructure development, as well as investment gaps
9. Review draft report
10. Deliver final report

# ATTACHMENT 2: INTERVIEWS CONDUCTED BY THE REVIEW

| | |
|---|---|
| **Users** | Aditya Birla<br>Barminco<br>Barrick-Osborne<br>BHPB<br>Copper Co<br>Ergon<br>Exco<br>Incitec Pivot<br>Ivanhoe<br>Legend Resources<br>Matrix Metals<br>Oz Minerals<br>Xstrata |
| **Infrastructure proponents** | CS Energy<br>HMA Consulting (CuString)<br>IsaLink<br>NTQ Energy |
| **Gas participants** | AGL<br>APA Group<br>EPIC Energy<br>Santos |
| **Clean energy proponents** | Ausra<br>Clean Energy Australia<br>Investec<br>Whittle Consulting Pty Ltd |
| **Government departments , regulators and industry bodies** | AER<br>Department of Clean Energy<br>Department of Infrastructure and Planning<br>Department of Mines and Energy<br>NEMMCO<br>Queensland Treasury<br>Powerlink |
| **Industry experts** | ACIL Tasman<br>MMA<br>ROAM Consulting<br>Worley Parson<br>Windlabs |
| **Industry bodies** | Queensland Resources Council |

# ATTACHMENT 3: ISALINK SUBMISSION