



Update on NQ energy infrastructure challenges – choosing the best way forward

Date: Thursday November 30 2006 Venue: TEL Energy Forum - Townsville

Introduction

- ROAM Consulting was recently commissioned to update a 2005 report to Townsville Enterprise.
- The purpose of the report was to assist in the development of appropriate policy solutions to address an energy price disadvantage for major industry in North Queensland.

Background

- NQ faces challenges in its bid to attract industrial development because of its high delivered energy price.
- This disadvantage occurs because of:
 - Regional isolation (large distance from regional node)
 - Weak transmission system between CQ and NQ
 - Relatively small load compared with the rest of the state

Background

- In our analysis, ROAM compared NQ (Ross 132kV) to CQ (Gladstone 132kV) to illustrate the energy price disadvantage.
- In order to attract development, and ensure the electricity supply to NQ in the future, the aim of policy makers should be to decrease the difference in price between CQ and NQ
 - Difference is currently about 0.8c/kWh

Changes since 2005

- Since the 2005 report the following major developments have occurred:
 - Powerlink announced the CQ to NQ double circuit transmission upgrade in three stages, with Stage 1 due for Summer 2007/08
 - AGL announced a 385MW CCGT for entry in 2008/09 for the Townsville area
 - The PNG gas pipeline has suffered setbacks which may delay entry of competitive gas supplies

Outline of Presentation

- This presentation will examine:
 - How the delivered price of energy is determined, and its components
 - The Supply Demand situation in QLD 2006
 - The combined development effects on delivered energy price for three alternate development paths for the NQ area
 - ROAM's recommendations to help equalize energy prices and promote development in the North

Energy Price

- The delivered price paid for electricity depends on the location of the connection to the grid and can vary for different locations throughout the QLD region quite markedly.
- The components of the price of energy:
 - Spot Price or Contract Price
 - Marginal Loss Factors (MLFs)
 - Transmission Use Of System (TUOS) Charges

Spot Price

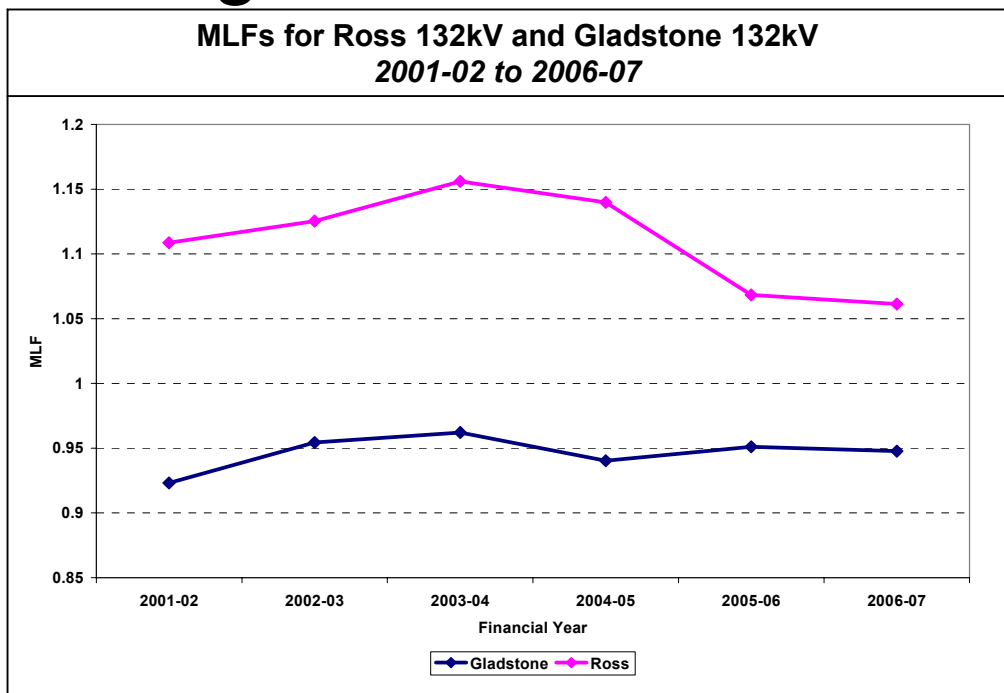
- All of QLD has a single spot price, as QLD is defined as one region in the market rules.
- The reference node in QLD is at South Pine near Brisbane
- The spot price is based on generator offers to supply energy into the market for each five minute interval throughout the day
- Alternatively, customers can elect to contract for a fixed price to purchase energy
 - Insulation from price spikes

Marginal Loss Factors

- MLFs are an adjustment to energy prices relative to the reference node and attempt to take account of how losses are distributed within the electricity grid.
- MLFs are calculated and updated each financial year according to rules developed by NEMMCO.
- MLFs can change markedly from year to year, especially in the area around Townsville, due to load growth and generation and transmission developments.

Marginal Loss Factors

MLFs for Ross 132kV and Gladstone 132kV
2001-02 to 2006-07

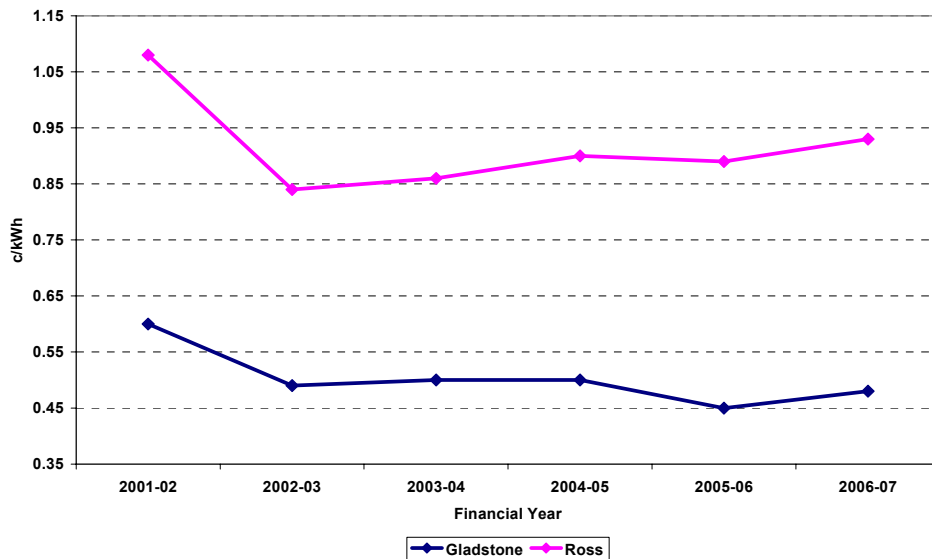


TUOS Charges

- TUOS charges are calculated and updated each financial year for the year ahead, based on NEM rules.
- TUOS charges are variable and depend on both the monthly peak demand and total energy usage for each connection point.

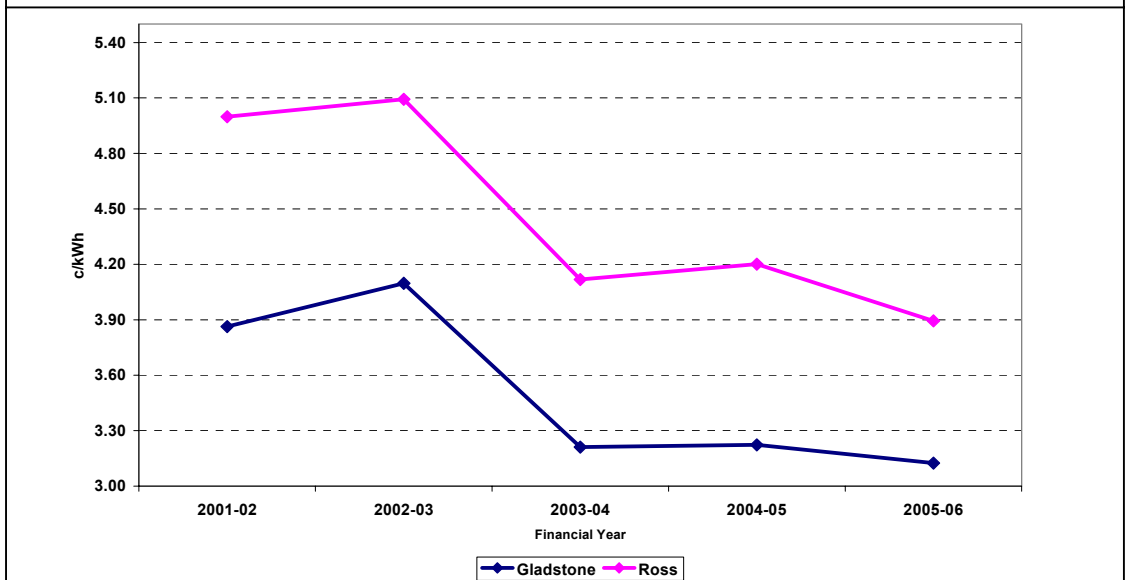
TUOS Charges (Industrial Load)

TUOS Charges for Ross 132kV and Gladstone 132kV Connection Points
2001-02 to 2006-07



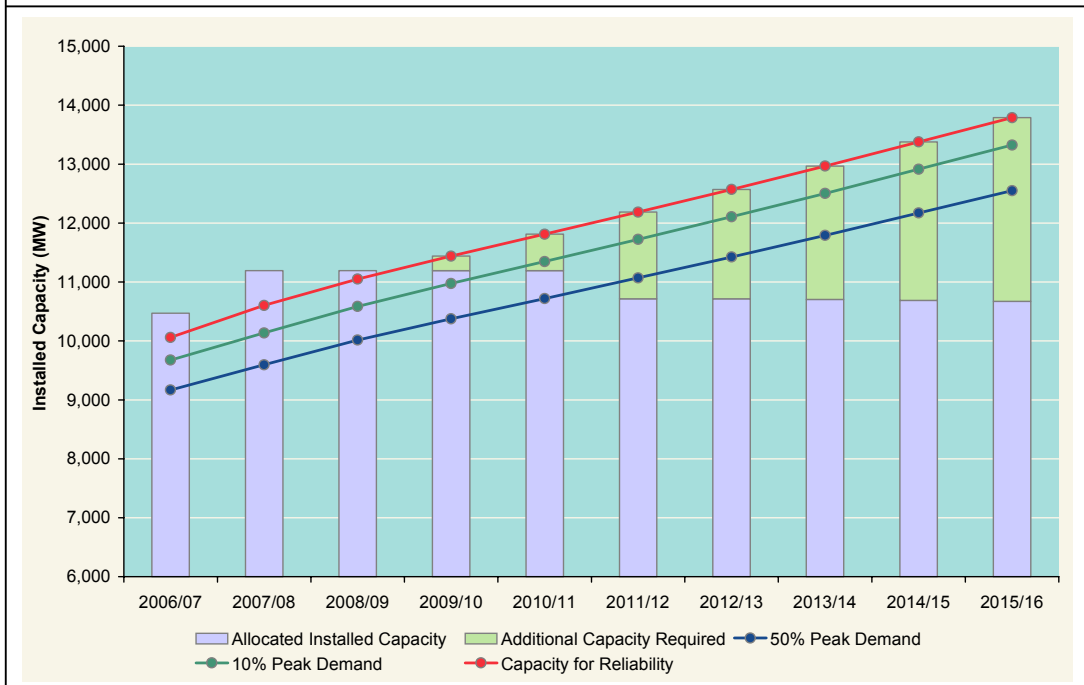
Combined Energy and Transmission Charges (Spot Price Customer)

Combined Energy and Transmission Charges for Ross 132kV and Gladstone 132kV Connection Points, 2001-02 to 2005-06



Supply Demand in QLD

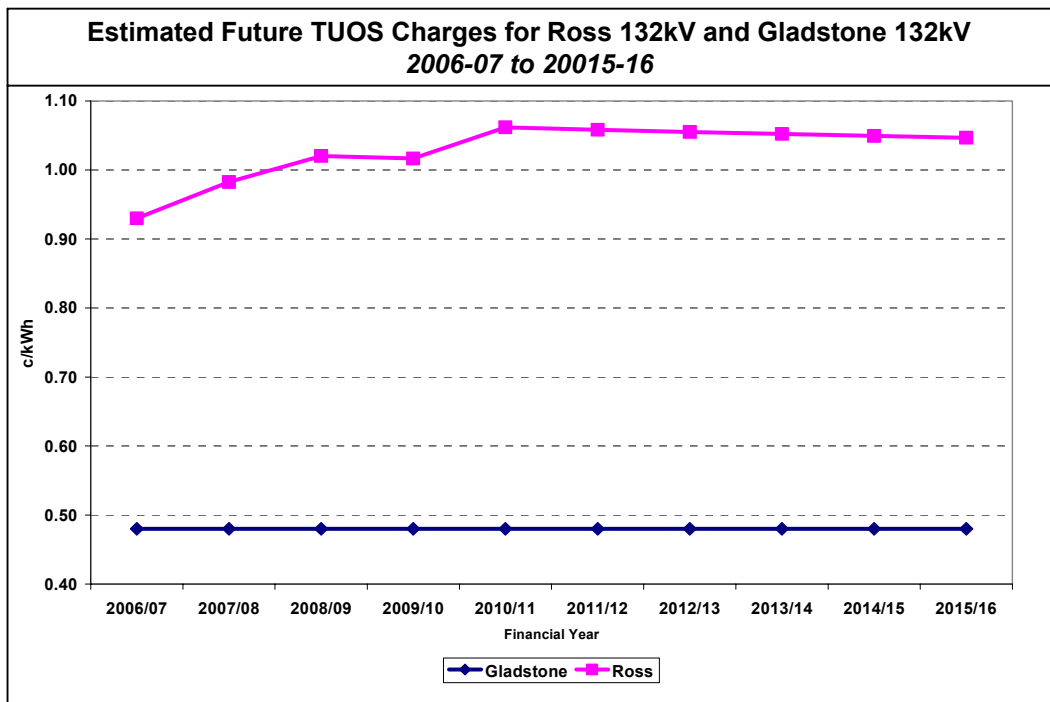
Supply Demand Balance for Queensland for 2006 forecast



Forecast Outcomes – Impacts on North QLD

- The following analysis assumes that the reference base energy price will remain at 2009 price levels in real terms for the outlook period.
- The following chart illustrates future TUOS for Gladstone and Ross connection points for high load factor loads
 - Ross is expected to increase in response to the costs of the Powerlink transmission upgrades
 - Prices are in c/kWh and are stated in 2006 real prices (exclusive of inflation)

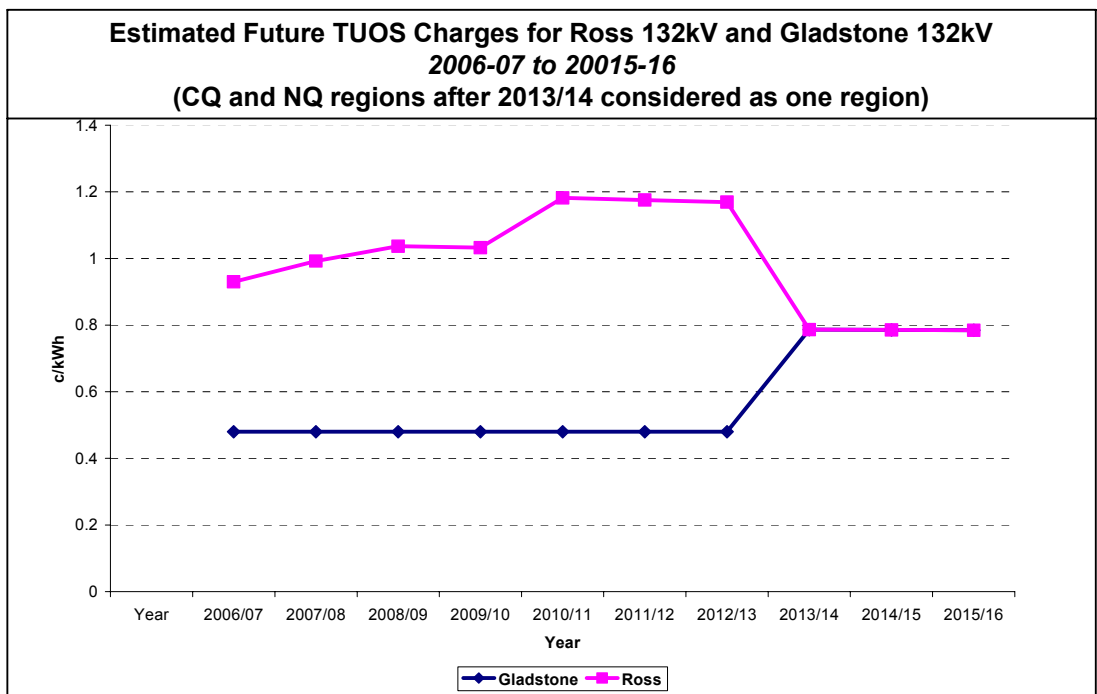
Impacts on TUOS Charges



Impacts on TUOS Charges

- The following chart assumes that in 2013/14 the CQ and NQ regions are considered as one due to transmission line upgrades.
- This situation is only likely to emerge if sufficient generation development occurs in NQ to neutralize reliance on import of power from CQ
 - Satisfied if approximately 1000MW base load generation capacity is developed in next 10 years

Impacts on TUOS Charges



Impacts on MLFs

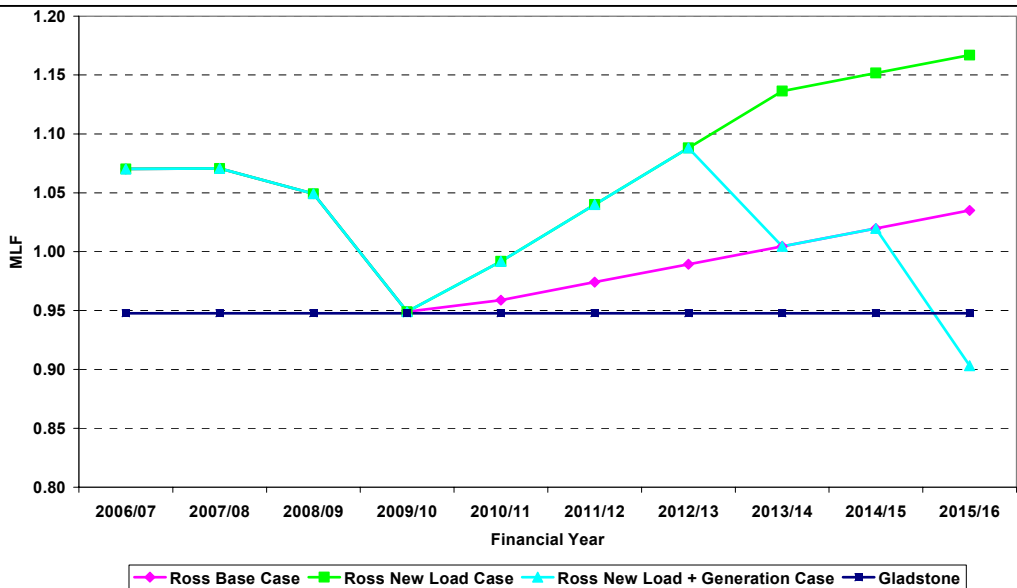
- MLFs in the future will be subject to the combined effects of:
 - Load growth;
 - New generation; and
 - New transmission line developments.
- The combined effects of load growth, generation, and transmission development on projected MLFs have been examined for three development cases- with and without committed AGL 385MW CCGT

Development Options including committed AGL 385MW CCGT

Year	Base Case	Ross New Load Case	Ross New Load + Ross Generation Case
2006/07	-	-	-
2007/08	Broadsound-Nebo Line	Broadsound-Nebo Line	Broadsound-Nebo Line
2008/09	Nebo-Strathmore Line	Nebo-Strathmore Line	Nebo-Strathmore Line
2009/10	AGL 385MW CCGT	AGL 385MW CCGT	AGL 385MW CCGT
2010/11	Strathmore-Ross Line	Strathmore-Ross Line Additional 100MW base load	Strathmore-Ross Line Additional 100MW base load
2011/12		Additional 100MW base load	Additional 100MW base load
2012/13		Additional 100MW base load	Additional 100MW base load
2013/14		Additional 100MW base load	Additional 100MW base load plus new 400MW base load power station
2014/15			
2015/16			Additional 400MW base load power station

Development Options including committed AGL 385MW CCGT

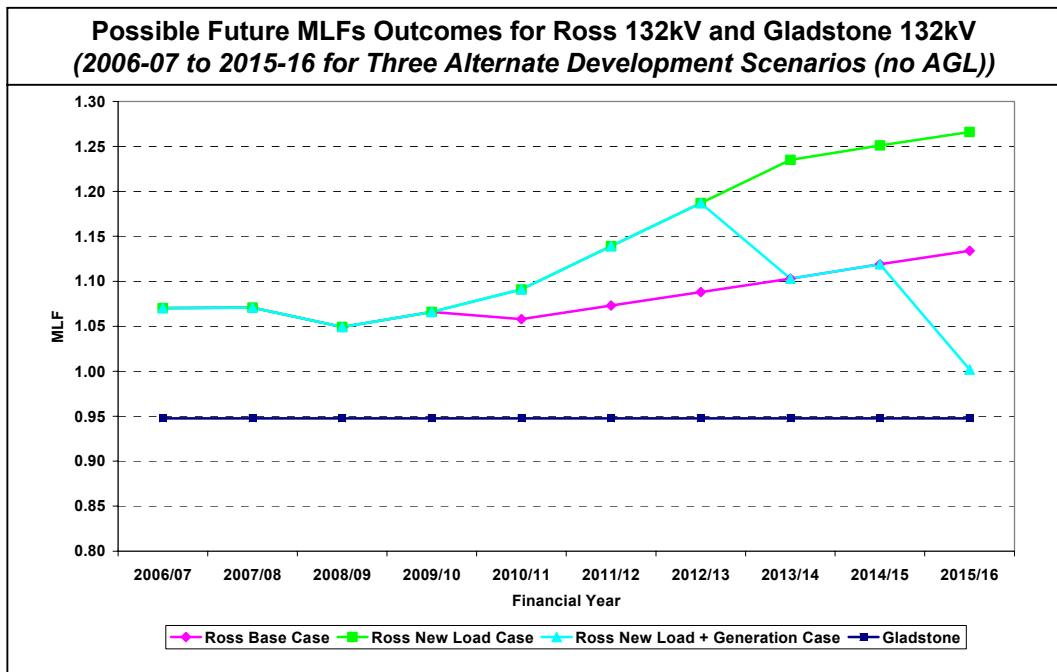
Possible Future MLFs Outcomes for Ross 132kV and Gladstone 132kV
(2006-07 to 2015-16 for Three Alternate Development Scenarios)



Development Options excluding AGL 385MW CCGT

Year	Base Case	Ross New Load Case	Ross New Load + Ross Generation Case
2006/07	-	-	-
2007/08	Broadsound-Nebo Line	Broadsound-Nebo Line	Broadsound-Nebo Line
2008/09	Nebo-Strathmore Line	Nebo-Strathmore Line	Nebo-Strathmore Line
2009/10			
2010/11	Strathmore-Ross Line	Strathmore-Ross Line Additional 100MW base load	Strathmore-Ross Line Additional 100MW base load
2011/12		Additional 100MW base load	Additional 100MW base load
2012/13		Additional 100MW base load	Additional 100MW base load
2013/14		Additional 100MW base load	Additional 100MW base load plus new 400MW base load power station
2014/15			
2015/16			Additional 400MW base load power station

Development Options excluding AGL 385MW CCGT

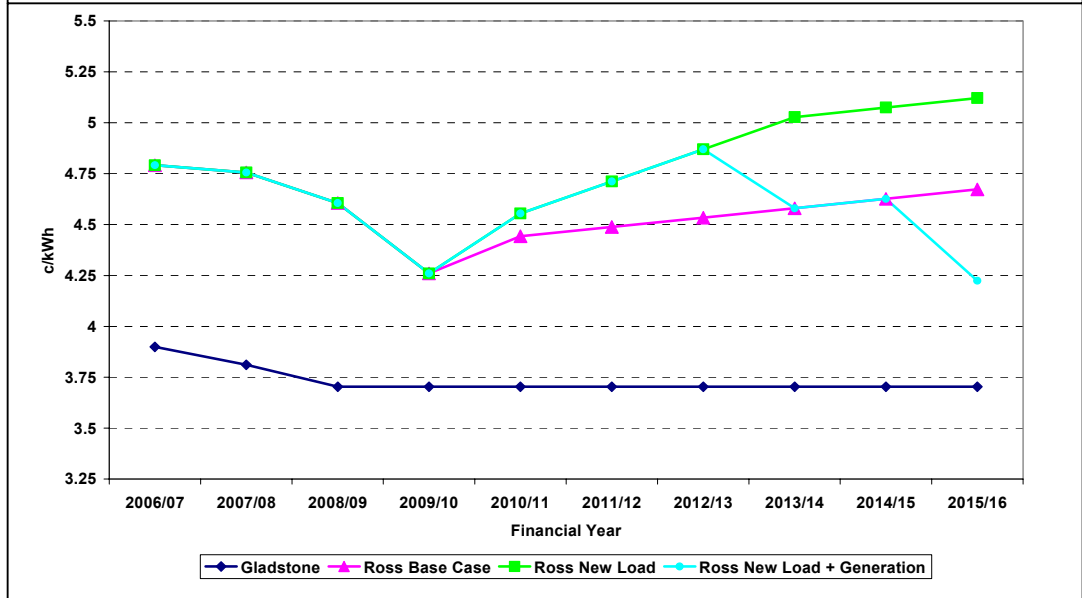


Total delivered energy prices

- Future total delivered energy prices can be forecast by multiplying the reference energy price by the locational MLF and adding the TUOS charges for each location.
- The following charts compare the future energy prices for each set of development options and look at the prices delivered, with AGL committed, if CQ and NQ are 'one' location after 2013/14

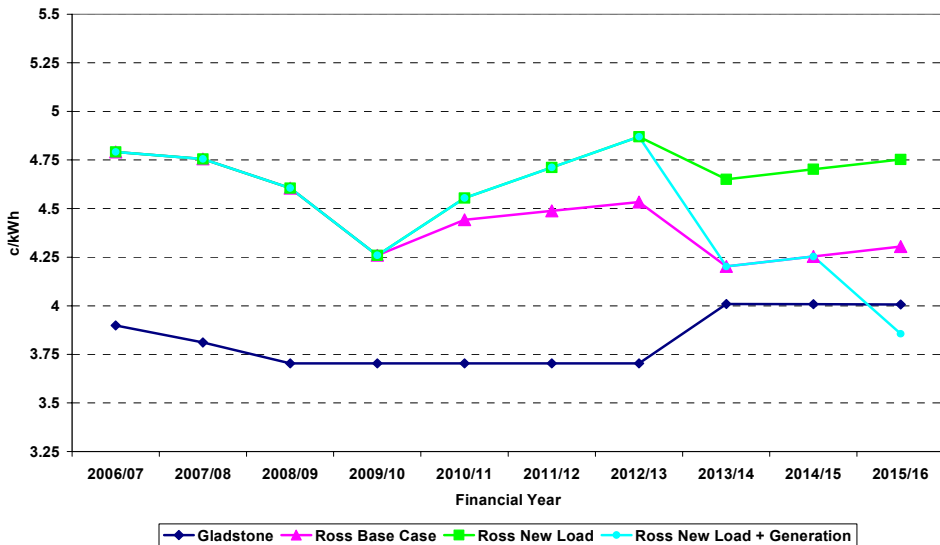
Including AGL – two locations

Possible Future Combined Energy and Transmission Prices for the Ross 132kV and Gladstone 132kV Connection Points
(2006-07 to 2015-16 for Three Alternate Development Scenarios)



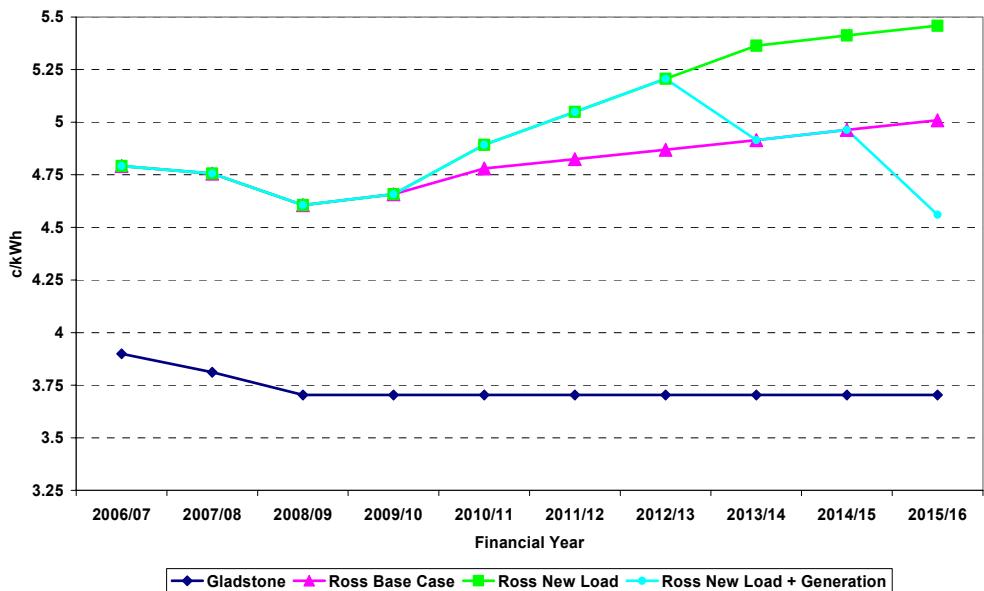
Including AGL – one location

Possible Future Combined Energy and Transmission Prices for the Ross 132kV and Gladstone 132kV Connection Points (Convergence of CQ and NQ locations TUOS) (2006-07 to 2015-16 for Three Alternate Development Scenarios)



Excluding AGL – two locations

Possible Future Combined Energy and Transmission Prices for the Ross 132kV and Gladstone 132kV Connection Points
(2006-07 to 2015-16 for Three Alternate Development Scenarios (no AGL))



Summary

- 2006/07 delivered price gap between CQ and NQ is about 0.8c/kWh
- Difference will reduce slightly over next few years – new transmission lowering MLFs outweighs effects of increased TUOS associated with new lines
- By 2009/10 the MLF of NQ and CQ will be about the same if the AGL 385MW plant comes into service
 - Price differential = TUOS difference (about 0.5c/kWh)

Summary

- From 2009/10 onwards, three alternate development options were investigated:
 1. If generic load growth occurs, MLFs will rise gradually;
 2. If new base load develops without new generation development, MLFs and delivered prices will rise; and
 3. If additional generation develops in conjunction with major load, the difference will tend to reduce.

Summary

- If sufficient generation is developed in NQ by about 2013/14, the conditions for equalizing TUOS charges across CQ and NQ may be created.
- Results in most favourable pricing structure for NQ
 - Modest uplift in CQ prices due to sharing of TUOS charges.

Recommendations

- Delivered energy prices in the North of the QLD region will depend heavily on generation and load developments in the region in the next ten years.
- To help equalize delivered energy prices and promote development in the North, ROAM Consulting recommends the following:

Recommendations

1. Support development of Powerlink's proposed additional transmission.
2. Support the development of the AGL 385MW CCGT plant, with or without the PNG pipeline being developed by that time.
3. Promote the orchestrated development of major additional generation and load from around 2010.
4. Maintain communication between all interested parties.