

COGENERATION AND TRIGENERATION IN NEW SOUTH WALES

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Macquarie *Generation*

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Powering Our Community

Mr Jonathon O'Dea MP
Chair
Public Accounts Committee
Parliament of New South Wales
Macquarie St
SYDNEY NSW 2000

Email: pac@parliament.nsw.gov.au

Dear Mr O'Dea

COGENERATION AND TRIGENERATION IN NEW SOUTH WALES

Macquarie Generation welcomes the opportunity to make a submission to the Public Accounts Committee's *Inquiry into Cogeneration and Trigeneration in New South Wales*, as detailed in the Committee's letter to Macquarie Generation dated 29 July 2013.

Macquarie Generation owns and operates Bayswater and Liddell power stations, two of Australia's largest capacity thermal power stations, with a combined generating capacity of 4,460 MW. The Corporation supplies approximately 12% of the electricity consumed in the National Electricity Market (NEM) and around 40% of the New South Wales market.

Macquarie Generation is aware of ongoing efforts by the Sydney City Council to establish gas-fired co- or tri-generation facilities in the Sydney CBD, which would supply a number of council buildings as well as private office towers in the city. Macquarie Generation does not have a view on whether such projects are worthwhile investments. However, we do observe that there are number of supply factors emerging in the NEM which may adversely impact the financial viability of any new gas-fired co- or tri-generation project.

Macquarie Generation also notes that the Australian Energy Market Commission has recently completed or is currently reviewing a number of aspects of the regulatory environment affecting 'embedded generation' projects (the market participant category that includes most co- and tri-generation projects). We consider that the AEMC review and Rule making processes provide a robust and independent forum for addressing industry concerns with the NEM regulatory regime.

Financial viability of new gas-fired projects

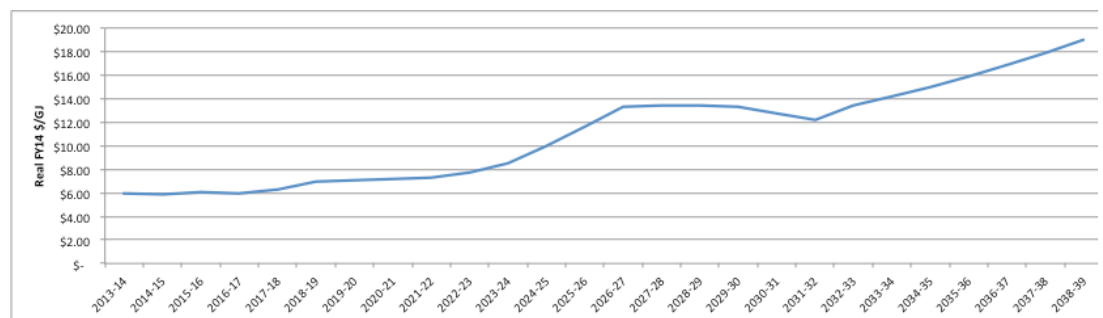
There are a number of fundamental market trends which are making the economics of new gas projects less attractive:

- sharply rising gas costs as interstate supplies to the NSW domestic gas market tighten in line with the final commissioning of LNG facilities in Queensland;
- subsidized entry of wind generation in the NEM artificially suppressing wholesale electricity prices in New South Wales;
- carbon policy uncertainty limiting any competitive advantage that gas plant may have as a relatively low emissions technology; and
- a flattening and possible fall in the bundled price of grid-based supply.

Reliance on interstate gas supplies will see a rise gas prices

All consumers of gas in New South Wales will incur higher costs in the next few years and beyond. AEMO's National Transmission Network Development Plan 2012 includes a range of modeling scenarios based on alternatives states of the world – rate of domestic and global economic growth, technology cost changes and the level of international action on emissions reduction. AEMO's central planning scenario forecast NSW gas prices using mid-points from the various scenarios. AEMO anticipates that NSW gas prices will rise sharply from present levels – an increase of more than 250% in real terms over the next 15 years (see Chart 1).

Chart 1: AEMO gas price projections for NSW, central planning scenario, real FY14



With such rapidly increasing gas prices, the economics of any new gas project in NSW becomes questionable. Macquarie Generation has looked at the levelised cost of new gas peaking plant using AEMO's gas price forecast. This is a proxy for the wholesale price that an investor would need to earn to recover fixed costs, variable operating and maintenance costs, fuel costs and earn a return on the investment (see Table 1). In this analysis, assuming the peaking plant operates at a 50% capacity factor, the investor would need to earn contract revenues and spot sales of more than \$126/MWh on the output of the new plant. This compares with an average NSW spot price of around \$30/MWh (net of the fixed carbon price) in 2012-13.

Table 1: Levelised cost of new gas peaking plant, real FY14, AEMO central scenario

Capital \$/MWh	\$22.09
Variable operating & maint	\$11.79
Fuel/gas price (\$/GJ)	\$13.47
Fuel/gas price \$/MWh	\$88.99
Fixed \$/MWh	\$3.39
Levelized cost	\$126.26

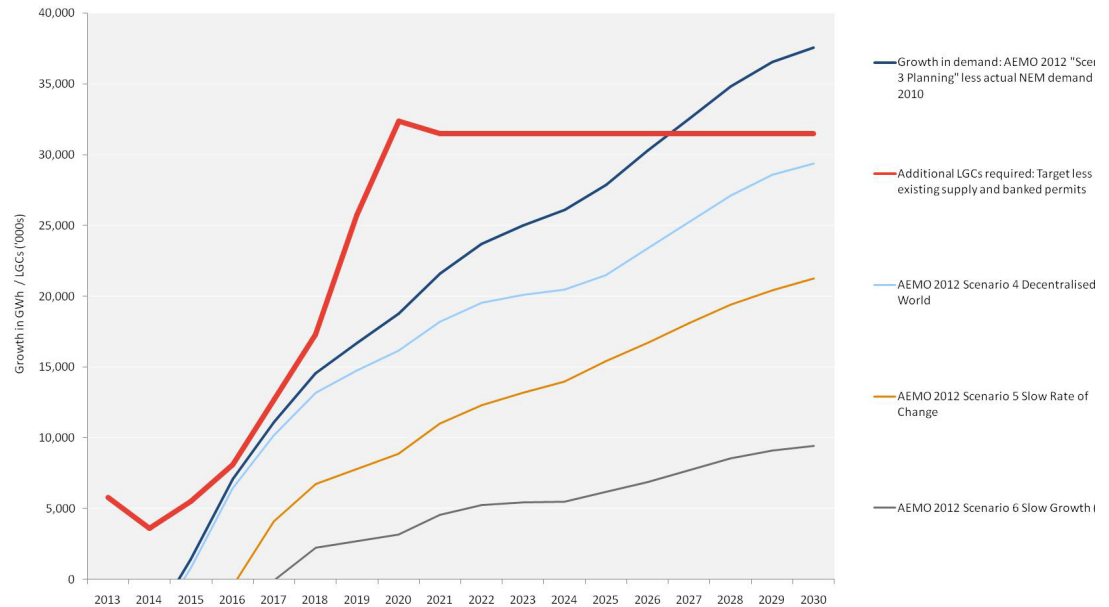
Unless New South Wales is able to secure new sources of gas supply to place downward pressure on gas prices, the returns from investing in new gas plant relative to the likely NSW spot price over the next five or more years are unlikely to be adequate to justify new merchant generation.

Renewable Energy Target – a subsidy for new wind generation

The Federal Government's so-called "20% renewables by 2020" is distorting wholesale price outcomes in the NEM. Chart 1 shows the number of large generation certificates (LGCs) necessary to meet the 'hard-wired' annual legislated LRET trajectory and the 41 TWh by 2020 target taking into account existing eligible renewable projects and banked LGCs (bold red line). The remaining lines show various AEMO National Electricity Forecasting 2012 forecasts of incremental demand growth. The difference between the LRET target and the incremental demand growth gives an indication of the likely level of displacement of existing thermal capacity by subsidised new wind generation

Total energy demand in the NEM and SWIS has fallen substantially in recent years. While AEMO has projected a recovery in demand in past ESOO statements, demand has continued to slide downwards, including for the NEM in 2012-13. The loss of large smelter loads and significant manufacturing operations could see renewable plant accounting for more than 30% of all generation output by 2020.

Chart 1: LRET targets and demand growth scenarios, difference in energy, GWh, 2013 to 2030



Investors may be reluctant to commit to any new long-lived thermal project, including new gas peaking plant, in an environment where there is no or little demand growth, subsidized renewable supply and heavily depressed spot price outcomes.

Gas plant and the effective carbon price

Any new investment in gas-fired generation facilities would need to earn a return over a period of decades. An expectation of a rising explicit or implicit carbon price should support the business case for such projects given the lower emissions intensity of gas relative to coal-fired generation. However, this is not necessarily the case. Uncertainty as to the level of international action to meet greenhouse gas reduction targets makes it difficult to forecast likely domestic abatement activity, assuming there is a degree of international linking of domestic schemes at some point in the future. Such policy uncertainty is reflected in a discount applied to the forecasts of future wholesale electricity prices, making projects with high and rising fuel costs much less attractive.

The price of grid-based supply is likely to fall in the next few years

Over the past five years, transmission and network charges have roughly doubled across NSW as network businesses have invested to replace ageing infrastructure

and meet much tighter reliability requirements. This has led to a sharp and unprecedented increase in retail prices even though wholesale electricity prices have remained flat or fallen in real terms (net of the carbon tax).

There is good reason to expect that the era of double-digit annual retail price increases has ended. NSW DNSP will enter a new revenue reset period from 1 July 2014 with network charges rising by no more than CPI, Australia is likely to shift away from a relatively high carbon tax regime, and domestic coal-fired generators may benefit from a fall in international thermal coal prices.

IPART's 2013 determination of regulated retail prices for the period to mid-2016 provides a good guide to the like trend in grid-based supply costs.¹ IPART has determined that regulated retail prices in the EnergyAustralia area should increase by no more than 3.2% in 2013-14. IPART expects that regulated retail prices will be capped at 1.8% in 2014-15 and forecasts a fall in retail prices of 6.9% in 2015-16. Such a price outlook will make it more difficult to justify the business case for a standalone cogeneration project.

The National Electricity Rules and embedded generation

Macquarie Generation is aware of three AEMC processes that specifically address concerns that embedded generation owners may have with the National Electricity Rules relating to regulatory requirements for connecting and operating cogeneration facilities:

1. Connecting Embedded Generators Draft Rule, June 2013

The connecting embedded generators Rule change sets out a range of proposed changes to Chapter 5 of the NER to standardize the connections process, appoint independent experts to look at the reasonableness of technical requirements and provide a range of technical information to connecting parties at various stages of the connection process.

2. Small generator aggregator framework

The small generator aggregator framework provides flexibility for the owners of small generating units, giving them the option to join a 'small generator aggregator' and not be required to individually register and classify each unit with the AEMO to participate in the NEM. The small generator aggregators are financially responsible for trading in the NEM and can earn NEM spot prices for output exported to the grid.

¹ IPART, Review of regulated retail prices and charges for electricity, from July 2013 to June 2016, Final Report, p.2-3.

3. *Distribution Network Planning and Expansion Framework Final Rule, October 2012*

The AEMC's final rule established a national framework for distribution network planning and expansion. This included new demand side obligations on DNSPs to develop and document a demand side engagement strategy and engage with non-network providers, including possible network support contracts with embedded generators.

Recovery of shared network costs

NSW electricity distribution network service providers must comply with jurisdictional reliability standards and design planning criteria. The NSW Government effectively determines the level of redundancy that different parts of the network must be built to achieve. For the Sydney CBD, Ausgrid must be able to supply forecast peak demand against an N-2 security standard for sub-transmission assets and zone substations: that is, maintaining the supply after the failure of 2 assets in the same part of the network. Ausgrid will have spent more than \$1 billion in the ten years ending 2014 to upgrade its network infrastructure in the Sydney CBD to meet these planning requirements.²

Macquarie Generation understands that some proponents of large embedded generation projects are dissatisfied with the current cost allocation arrangements built into existing DNSP network charges. There is a view that these projects should be exempt from some or all network charges in situations where 'on-site' embedded generation customers use the shared network infrequently or 'off-site' customers use a relatively small part of the shared network.

Macquarie Generation agrees with the Productivity Commission that it is equitable and efficient to charge all network customers for existing shared network assets, particularly as such customers may rely on the shared network during peak periods or when the embedded generation facility is not in service. Commenting on submissions by co-generation investors proposing changes to the allocation of shared network costs, the Commission concluded:

This solution appears predicated on the principle that users of electricity should only incur a network charge in proportion to that part of the network used by the electrons they consume. However, identifying the source of any electrons used by consumers and identifying that part of the network used in getting those electrons from generation to final consumption, is impossible. Moreover, paying a theoretical marginal cost or 'use of service charges' for

² Ausgrid, Sydney CityGrid Project, www.ausgrid.com.au

transport DG-produced power to nearby users ignores the cost of providing a network that can deliver power should that DG-produced power fail. These considerations underpin the existing postage stamp basis for network charges.³

Energy and peak electricity demand have fallen dramatically in the past few years. Overall NSW energy demand in 2012-13 was lower than that recorded in 2001-02, a shift that has defied many decades of growth in line with economic activity and population growth. Winter 2013 peak demand in NSW was lower than that last recorded in winter 1999. While demand has been falling, NSW transmission and networks businesses have spent substantial capital on upgrading and augmenting their network infrastructure. New cogeneration projects that supply customers through dedicated network infrastructure, may duplicate existing investments with surplus capacity. Given network businesses are able to recover all past expenditure and earn a guaranteed return on that investment, those remaining customers in that part of the network may face increasing network charges to recover sunk investments. From an economy-wide perspective, this may not be an efficient level of investment.

Downsides to large-scale cogeneration rollout in CBD areas

While proponents of cogeneration plans are successful in focusing media attention on the possible benefits of cogeneration in areas like the Sydney CBD, some of the potential downsides are infrequently reported:

- gas-fired generation releases nitrogen oxide at the local area – a form of air pollutant harmful to humans;
- potential disruption for all CBD businesses if there is a need to augment the gas reticulation network; and
- gas plant operating in a population dense area raises public safety risks associated with earthquakes or security breaches.

³ Productivity Commission, Electricity Network Regulatory Frameworks, Vol.2, p.513.

Summary

Macquarie Generation strongly opposes any government program that provides an artificial commercial advantage or preferential regulatory treatment to particular forms of technology or fuel types in the NEM. In an oversupplied market with the subsidized entry of new wind capacity, wholesale market prices are likely to remain low for some time. Combined with a real cap on network charges and the removal of the carbon tax, grid-supplied electricity should become more cost competitive in the next few years. Macquarie Generation observes that it may be a commercial reality that co-generation proponents find it difficult to finance new gas-fired projects.

Macquarie Generation is confident that the AEMC's current work program, looking at regulatory matters relevant to embedded generation facilities and the gas market more generally, will deliver a robust and workable regulatory framework for co- and tri-generation proponents.

Yours sincerely



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5 September 2013