

Submission to the Owen Inquiry into Electricity Supply in NSW

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1. Introduction

Resolution of the matters raised by the terms of reference of the Inquiry will have a profound impact on the state's greenhouse gas emissions and the development of the electricity industry in NSW over the next half century.

Electricity generation in NSW was responsible for emissions of more than 57.8 million tonnes (Mt) of CO₂ in 2005ⁱ, which is more than 36% of the state's total emissions. Developing new coal fired generating capacity could increase these emissions to more than 65 Mt per annum.

It is therefore important to ensure that all options examined by the Inquiry are tested against:

- ◆ their greenhouse gas emissions per unit of energy generated; and
- ◆ the impact they would have on the rest of the industry and, in particular, on the prospects for increasing energy efficiency and growth in renewable energy generation, both of which are supported by the NSW government.

Further, the concept of base load needs to be examined in the contexts of:

- ◆ a greenhouse constrained environment; and
- ◆ technological changes that create new opportunities for demand side responsiveness to fluctuations in the availability of supply capacity.

The need for new coal-fired base-load generation is far from established, with the market signals causing participants to invest in other technologies such as Combined Cycle Gas Turbines (CCGT).

The terms of reference fail to place the need for new generation capacity in the broader context of an energy and climate policy framework. The NSW Energy Directions Green Paper processⁱⁱ was apparently aborted before the release of a white paper, thus terminating public discussion. The terms of reference of current Inquiry do not explicitly focus on energy efficiency, renewables or climate change targets.

The terms of reference and media reports suggest that the NSW government has set out to have a new coal fired power station, regardless of market signals or the reluctance of National electricity market (NEM) participants to build new base load capacity, presumably because of existing over-capacity and carbon risk.

The onus of proof is thus on the government to demonstrate why new capacity is needed, despite lack any enthusiasm in the market that they so enthusiastically champion.

This submission recommends strongly against the construction of any new coal fired capacity in NSW and suggests that the focus should be on increasing energy efficiency and building a strong renewable energy base. It is argued below that both of these outcomes are best served by publicly owned retailers.

2. Recommendations

Based on the arguments presented below, the Inquiry should:

- (R1) reject the development of any new fossil fuel generating capacity in NSW, and, in particular, strongly recommend that the state should neither support nor grant approval to the development of new coal fired generation;*
- (R2) recommend that NSW act to discourage the development of new coal fired capacity in other states connected to the National Grid;*
- (R3) recommend that technological options for energy supply should be assessed against their vulnerability to drought and water shortages;*
- (R4) critically examine the concept of 'base load' in the context of changes to supply and demand technologies since the early and mid 20th century and find that its relevance is greatly diminished;*
- (R5) recommend that steps be taken to encourage flexible demand side options that can respond to supply-demand balance and thus facilitate the integration of renewable energy technologies;*
- (R6) not accept as relevant to the terms of reference arguments about 'clean coal';*
- (R7) reject the privatisation of the electricity retailers and instead bring forward options for the rejuvenation of their mission to focus on developing partnerships between consumers and retailers to reduce energy consumption and to develop flexible demand side responses;*
- (R8) recommend against allowing the formation of a vertically integrated industry in which generators and retailers have common private ownership; and.*
- (R9) assert that risks associated with potential future carbon pricing policies, including taxes and emissions trading, be carried entirely by the developer of any new coal fired power stations;*

These recommendations are discussed below.

3. No new coal fired power stations

The development, approval or encouragement of new coal fired generating capacity should be rejected because of the unacceptable impact it would have on increasing greenhouse gas emissions.

Two new coal fired units of 700 MW each, operating at 90% capacity factor, would produce 8.8 million tonnes of CO₂ each year, assuming an emissions factor of 0.8 tonnes of CO₂ per MWh.

This would increase the state's stationary energy emissions by more than 11.5%.

Further a sudden increase in capacity would dramatically alter the supply-demand balance on the grid and inevitably lead to pressure to increase demand. Private owners would be seeking to maintain the financial return on their investment and would aggressively work against any increases in energy efficiency or competition from demand side options and renewables.

A failure to significantly increase demand side efficiency or a move to increase demand will have significant impacts on greenhouse gas emissions for some decades to come.

An equally unacceptable outcome would be for load growth in NSW to be supplied by increased capacity in other states connected to the national grid.

It is thus essential that NSW direct serious resources to:

- ◆ the rapid growth of new renewable energy capacity in NSW;
- ◆ large scale increases in energy efficiency, starting with the most cost-effective options; and
- ◆ the development of demand side responsiveness to supply demand balance (see section 4 below)

Wholesale spot prices in the National Electricity Market (NEM) have already risen dramatically in part because the drought in eastern Australia has constrained the supply of cooling water for coal-fired units. The development of new coal-fired capacity in inland NSW would increase price exposure to the drought.

We note that there would be no suitable green-field development sites on the NSW coast for sea water-cooled power stations. Developing new capacity at existing coastal power stations sites would be environmentally unacceptable.

Loss of generator efficiency associated with current technology air-cooled coal-fired power station technology would need to be carefully analysed.

On the other hand, many renewable energy technologies such as wind do not depend on the availability of cooling water and is thus not vulnerable to drought.

Recommendations

That the Inquiry:

- (R1) reject the development of any new fossil fuel generating capacity in NSW, and, in particular, strongly recommend that the state should neither support nor grant approval to the development of new coal fired generation;*
- (R2) recommend that NSW act to discourage the development of new coal fired capacity in other states connected to the National Grid; and*
- (R3) recommend that technological options for energy supply should be assessed against their vulnerability to drought and water shortages.*

4. Reinterpret the concept of 'base load'

The concept of 'base load' is a product of the economic and technical operating characteristics of large fossil fuel generation, and to a lesser extent nuclear power and run-of-river hydroelectric generation.

Through much of the 20th century, development of demand was consciously encouraged in specific sectors and with specific load factors and shapes to create an underlying steady demand for electrical energy. The aim was to create sufficient minimum overnight load so that large coal fired generators could operate on a continuous basis without modulating their output. This reduced thermal stresses on boilers and turbines from cycling and also maximised the return on investment in plants with low operating costs and capital cost.

Changes in both supply and demand side technology have significantly reduced the relevance of 'base load' to a modern electricity industry.

In particular, developments in information and computing technology and understanding of distributed computing and decision making have created a far greater potential responsiveness in demand. Dynamic prices and other supply-demand balance information can now be cost-effectively disseminated to consumers.

Low cost computing and information processing capacity can create demand side options that effectively act as storage by delaying consumption in non-time-critical applications. For example, for some consumers washing machines can be left loaded and ready to run for days, waiting for available energy.

With the application of appropriate policies, much of the current demand for electrical energy could be made responsive to supply-demand balance.

Further, it is no longer correct to assert that adequate levels of reliable base load power can only be provided by large-scale central generation and in particular in the NSW context by coal fired power stations.

As Diesnedorfⁱⁱⁱ argues, renewable energy can play an important role in maintaining supply demand balance and can supplant the need for new traditional, fossil fuel fired base load plant because:

- ◆ even coal-fired power stations are not 100% reliable and thus the electricity industry has already evolved to cater for large fluctuations in supply as well as demand;
- ◆ some renewable sources such as solar thermal, geothermal and bioenergy have availability characteristics that are similar to coal-fired boiler turbines;
- ◆ by geographically dispersing wind farms, variability in total generation can be reduced; and
- ◆ for wind power penetrations of up to 20%, the additional costs of back-up generation is relatively small.

Thus traditional understandings of base load need to be critically re-examined to ensure that they do not irrationally prejudice decisions towards coal and nuclear generation.

Further, if NSW achieves its renewable energy target, the inflexibility of large coal-fired units will become a limiting factor on the operation of the national grid. Increasing the amount of inflexible plant in the system works against integration of variable renewables.

Recommendations

That the Inquiry:

- (R4) critically examine the concept of 'base load' in the context of changes to supply and demand technologies since the early and mid 20th century and find that its relevance is greatly diminished; and*
- (R5) recommend that steps be taken to encourage flexible demand side options that can respond to supply demand balance and thus facilitate the integration of renewable energy technologies.*

5. The concept of 'clean coal' is not relevant to the Inquiry

The concept of 'clean coal' has entered the debate over the future of base load generation with the intent of signalling that coal can be a low emissions fuel for electricity generation. Labor and Coalition climate change policies at both state and federal level rely heavily on the idea that coal can be a low emissions primary energy source in order to justify continued growth in the coal industry.

'Clean coal' has developed as a term to refer to a number of different technologies, including:

- ◆ carbon capture and storage (CCS) (geo-sequestration); and
- ◆ higher efficiency combustion of coal such as Integrated Gasification Combined Cycle (IGCC) generation.

While higher efficiency generation will reduce emissions per unit of energy generated, the size of reductions will be limited and will soon be overcome by increasing load growth.

CCS technologies on the scale that would be needed to make an impact on electricity industry emissions are at least 15 years away from commercial application, if they work at all. To be successful, they would have to overcome a number of technological, economic and legal barriers, including the cost-effective transport and burying of more than 80 million tonnes of CO₂ and other gases each year from NSW generation alone.

The risks that an effective CCS technology will fail to materialise means that any policy that relies on it is in effect a massive gamble. In particular approving the expansion of coal fired generating capacity based now on the chance that CCS or other clean coal technology might be proven to work in the future would be irrational and dangerous.

Further, the Inquiry should reject the concept of 'CCS ready' generation which implies that plant is built to facilitate later retrofitting capture technologies. In the absence of knowledge of either the technologies that will be used to separate the CO₂ and the location of potential reservoirs, specific design engineering decisions would be problematic.

The MIT interdisciplinary study^{iv} "The Future of Coal" is critical of capture-ready options.

No geological sites suitable to sequestration have been found in NSW and the indications are that there may be none. Failure to find sites in NSW would present additional barriers to CCS.

Recommendation

That the Inquiry:

(R6) not accept as relevant to the terms of reference arguments about 'clean coal'.

6. Privatisation of the retailers would work against reducing greenhouse gas emissions

The debate surrounding this Inquiry has also raised the issue of privatisation of the state-owned retailers, presumably under the fourth term of reference relating to maintenance of the state's AAA credit ratings.

All consumers of electricity in NSW can currently exercise choice of their supplier and there are a number of privately owned retailers operating in this state. However, the existence and dominance of publicly owned retailers provides important current and potential environmental and social benefits. The Greens believe that with innovative political leadership, public ownership can lead to significant energy savings that privatised retailers could not deliver.

If this state is to move to a low carbon future, active involvement of the consumers will be required to both increase efficiency and to become more responsive to fluctuations in supply-demand balance. This involvement will only work as part of a partnership with retailers, who are uniquely placed to supply advice and technologies to facilitate this change in consumer behaviour.

The development of such partnerships between consumers and their retailers relies to a large degree on trust and goodwill. However, privatisation would serve to increase the level of consumer

suspicion as to the motives of the retailers. Further, private ownership would bring with it the drive to maximise profits which under almost any regulatory environment would undermine the incentive to reduce demand.

The problems would be massively exacerbated if retailers and a generator fell under common ownership. The incentives for the retailer to sell more would be amplified by the increased profits made by the generator. Any increase in vertical integration of the industry would work directly against the need to reduce greenhouse gas emissions and should not be countenanced.

Experience with the media shows that legislated rules that prohibit or limit aggregation of ownership or cross-ownership are inevitably weakened over time by political pressure.

Privatising the publicly owned retailers can therefore be assumed to create the risk of retailers and generators being owned by the same corporate entities, regardless of the restrictions put in place at the time of privatisation.

Privatisation is a dangerous path in an industry whose future is so important to reducing greenhouse gas emissions.

Public ownership of the retailers, on the other hand, offers the potential to develop new and exciting relationships between consumers and their retailers that are not constrained by the need to generate profit from the transaction.

Realising the potential to reduce consumption and to facilitate the grid integration of renewable sources of electrical energy would require significant changes to the regulation and objectives of publicly owned retailers.

Public ownership of the retailers also provides other significant benefits, including:

- ◆ opportunities for workforce development, including training and innovation in the areas of energy efficiency;
- ◆ security of employment; and
- ◆ employment opportunities in rural and regional areas.

These benefits would be lost under privatisation.

Recommendations

That the Inquiry:

- (R7) reject the privatisation of the electricity retailers and instead bring forward options for the rejuvenation of their mission to focus on developing partnerships between consumers and retailers to reduce energy consumption and to develop flexible demand side responses; and*
- (R8) recommend against allowing the formation of a vertically integrated industry in which generators and retailers have common ownership.*

7. Risk must be borne by the owners

The construction of new capital-intensive base load generating capacity would bring significant economic risk to the owner, including from price and quality fluctuations, and from any future carbon pricing regime. Attempting to transfer the risk to the public by government guarantees of price, promoting load growth or underwriting carbon risks would not only distort competition with lower carbon sources but would also undermine efforts to reduce greenhouse gas emissions.

Reports of an attempt by the NSW government to attract increased aluminium smelter capacity to NSW are alarming. International competition means that the price paid by smelters will never be attractive. Further, smelters will inevitably require that price risk be carried by the public purse.

Any attempt to carry the carbon risk of a new coal fired power station will egregiously undermine the integrity of any future scheme. The granting of a one-off exemption will inevitably lead to other large polluters applying pressure to receive equivalent favourable treatment. Further, externalising large sources of CO₂ is unfair to other competing technologies and will lead to distortions.

Given the current uncertainties about the nature, scope and timing of a carbon market, it is impossible to assess the value of an exemption. In effect the NSW government would be handing over a property right of indeterminate value and might be exposing future governments to large financial risks

Recommendation

That the Inquiry:

(R9) assert that risks associated with potential future futures carbon pricing policies, including taxes and emissions trading, be carried entirely by the developer of any new coal fired power stations.

7. Conclusions

It is time to begin the transformation of the energy industry in NSW and to move towards the alternatives to large scale coal fired generation. The Inquiry has the opportunity to show leadership by rejecting the conventional wisdom that NSW needs to maintain its reliance on coal. We urge it to do so.

ⁱ <http://www.greenhouse.gov.au/inventory/stateinv/pubs/states2005.pdf>

ⁱⁱ http://www.greenhouse.nsw.gov.au/actions/agencies/cabinet/nsw_energy_directions_green_paper

ⁱⁱⁱ http://www.cana.net.au/documents/Diesendorf_TheBaseLoadFallacy_FS16.pdf

^{iv} <http://web.mit.edu/coal/>