

Electricity Supply in NSW - Findings and Recommendations from the Owen Inquiry

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The first question I address is why is it necessary to hold an inquiry, and you can see from this diagram - I apologise, it's not as clear as it might be - that the New South Wales generation reserve margin is approaching its lowest point for about forty years. In fact no additional base load plant, apart from a small one at Redbank, has been built since 1992, and the bulk of the base load power plants in New South Wales have entered service in the 1980s. So with the possibility that additional base load would be required by the years 2012, 2013 or maybe a little later, the inquiry was established.

Now you can see the terms of reference there. I'll read them out because this is the important slide to put the perspective on what I'm going to say. I promise not to read out all the other slides because it will simply bore you. The first term of reference is to review the need and timing for new base load generation that maintains both security of supply and competitively priced electricity. Second, examine the base load options available to efficiently meet any emerging generation needs; and over the entire three months of the inquiry, every day almost - I mean I may be a bit pedantic - but every day I got annoyed about that split infinitive in the second term of reference. Third, review the timing and feasibility of technologies and or measures, both from technologies and measures available, both nationally and internationally that reduce greenhouse gas emissions, and finally determine the conditions needed to ensure investment in any emerging generation, consistent with maintaining the state's triple A credit rating.

For that purpose we were assisted by a number of individuals - specialists whose names are in the report - and for the technology option Connell Wagner assisted us to look at gas supplies with Mackenzie, and in particular to look at term of reference for Morgan Stanley. The inquiry approach - we started on 9th May. Invitations for a written submission - 74 received. Now, straight after the inquiry was announced I made it clear that I was going on vacation a couple of weeks later, so we asked as many of the stake holders who had expressed interest to attend; to come in the first couple of weeks. That was very useful because we had discussions with them and then they went away and wrote their submissions, so most of the submissions came in after the stake holder meetings. I made it perfectly clear that I didn't expect expressions of faith such as "Dear Sir, [when] is the only way forward, Yours Sincerely..." We got six of those. Six expressions of faith, not that letter. And all the submissions are still on the New South Wales Premier's website. To look at the timing issue we made a revue of the extensive modelling that's being done - a lot of modelling's being done for the NETTs - the National Emissions Trading Taskforce - or many publicly available research papers. The inquiry reported on 11th September - there was a media release - and I went to the World Cup in France the next day.

The key findings - the first key finding was that New South Wales needs to prepare for base load supply to 2013, 2014. Please note the word in italics - *prepare*. There will always be uncertainty, but the consequences obviously of investing late would be quite profound, and also once the process has been set in motion it's much easier to slow it down than to speed it up. And as I said at the bottom there, most of the submissions we received agreed on the need and timing for new investment. They perhaps disagreed on what the investment would be in - whether it was going to be in renewables, fossil fuel base load, or energy efficiency.

How did the inquiry reach this conclusion? I think I've mentioned this already. We just looked at demand forecasts, supply capabilities and interconnector imports, and then we just made the decision that we should prepare, or the government should prepare, from a risk averse position, for additions to base load.

This is just one quote from True Energy - there's a number of quotes in the report where the market participants acknowledge the uncertainty around the timing. So True Energy said, "We believe base load investment could be required from as early as 2012, but there's credible cases going up 2015, 2016. Others have actually put it even later. So we picked a date - or I picked a date - which was early in the process. Again it's risk averse. It doesn't really matter if the date slips out. It's the principle that the base load is needed.

Generally speaking it takes about 10 years from the beginning of the concept to the day that a coal fired power plant can be commissioned; slightly shorter for gas - probably about eight years for gas - but it may be possible to have this process streamlined a little by utilising sites that have already met development approval.

91,000 gigawatts are required by 2013, 2014. That's about 10,500 above current annual consumption. That's the projected additional requirement from the modelling of what New South Wales will require. I'm fairly short on time so I won't dwell on this diagram, but this actually, if you're familiar with it, all well and good; if you're not it's probably best to read it up afterwards rather than me take five minutes to explain it to you. But this is a low duration curve, and you can see the bottom block - the greyish blue block - is accounted for by what we say is base load, and that's usually met by coal or combined cycle gas turbine plants or nuclear power - big plants that can run for long periods, relatively cheaply. The intermediate generation just above it is...really it's very difficult to distinguish that from base load now, and at the top left hand corner you can see the little peak generation, which just indicates that peaking power is needed only for a small percentage of the load, and that's why it comes at quite a high cost. But I'll just move on from there - if you're interested you can read that in the report.

Can renewables meet the need? They currently supply 2,000 gigawatts per annum. It's estimated another 2,000 by year 2016, '17. This will reduce but not eliminate the need for new scheduled generation. As I said earlier, it doesn't really matter if those numbers are larger; they'll just push out the need - the date - the implementation is required. Can energy efficiency meet the need? Largely the same answer. Energy efficiency, it seems to me, is having a growing impact on electricity consumption at present. I would anticipate that its impact will grow at a greater rate in the future, how precise this that - I can't tell you, but certainly the rate of growth is slipping below its 30 year average down to what we think will be about 1.8%, and if energy efficiency kicks in a bit stronger then obviously expect that number to go down.

This diagram shows, in the dotted red line, the long term historical trend of energy consumption in New South Wales. The squiggly red line is the actual figure. Now, being an econometrician by training, when the actual and the long term trend look as closely together as that I always get suspicious, and basically they look very close because of the size of the axes, but you can see that the long term historical trend...underneath it are two dotted lines - one's a black dotted line, which is the medium

growth scheduled energy forecast - energy requirements - so that's actually the extension of the solid red line into the future - the prediction. And the green line is the same if you take out the renewables, so it's the black line that matters. But beware of forecasts like this. They're invariably wrong - it's the degree to which they are wrong that's important, and as somebody who lived through the mistakes of the late 1970s and 1980s when we thought electricity demand, and indeed energy demand, was going to take off exponentially for evermore, just beware past mistakes have been made.

I was going to say actually that I read the other day something which emphasises this in a statistical magazine. It pointed out - and you'll remember not long ago was the twentieth anniversary of the death...thirtieth anniversary of the death of Elvis Presley. When Elvis Presley died in 1977 there were 2,000 Elvis tribute bands. In 2007 there were 200,000. By 2060 one in four people on this planet will be an Elvis impersonator. So the dangers of extrapolating a trend are quite clear.

What are the viable options? The inquiry has considered all possible base load technology options. The inquiry has concluded that coal or gas are the only viable technologies at this time to meet the generation needs. We did actually look at geothermal; we looked at nuclear power, but bearing in mind that the Premier is on record as saying that nuclear power would not be considered, at least while he was premier, and presumably the Labour Party are in power. Nuclear power would also take quite some years, maybe up to a decade for the enabling legislation to go through, so it's certainly is not within our time frame. Geothermal would appear to be outside of our time frame as well. As I say, the time frame may slip, but for the years we were concentrating on it was essentially a choice between coal and gas.

The big concern with gas was its availability in the eastern states, and its cost. Now, the one thing I've learnt from being in WA for the last eight months is that the cost of gas is extremely controversial, and there gas fired generation is no longer an option for them under current gas prices, simply because they're paying international gas prices from NG networked back. Is it realistic for New South Wales? Wood Mackenzie did an extensive analysis of gas supplies in Queensland and New South Wales. It cedes there are substantial supplies in New South Wales, and extremely large availability in Queensland. At present, or at least when I was putting this report together, they seemed to be stranded in the eastern states. Now stranded gas is very good for power generation because it hasn't got an international price - it's just got a local price, but Santos promptly announced, as I was crossing the t's and dotting the i's in the final stage of the report, that they were going to build an LNG plant in Gladstone to take the Queensland gas for export. So that gave us a bit of a fright, but Santos assured us there was enough for their LNG plant, which is still perhaps on the drawing board, putting it politely, to allow for domestic use. And there seems to be a fair amount of gas in the Gunnedah Basin, in New South Wales, which will have to be graded up before we know for certain. Combined cycle gas turbines - they are a realistic option. They're cheaper to build than coal fired plant. They're quicker to build than coal fired plant. They are modular too, if you wish to build them as modules. They can run efficiently at high capacity factors, but they have higher operating costs - the fuel costs are around three times the price of those of coal.

This is what I've said already. This is just a graph showing that with a high gas demand case in the eastern states, there's plenty of gas around, certainly until the early parts of the second decade - the third decade of the 21st century. Coal fired technology is the one we looked at in detail, or Connell Wagner looked at in detail. They looked at all of the options, but ultra-super-critical coal fired plants - the new generation, so to speak, as opposed to the current generation which we have today. They run at very high temperatures and compared to current generation they've got significantly lower CO₂ emissions, but compared to combined cycle gas turbines they're still relatively high. The other two technologies you see there are really only in the demonstration phase, so they really weren't considered to be options.

So here we have...you can see the greenhouse emissions intensity of ultra-super-critical coal as compared to sub-critical power plants, and you can see that they are significantly lower, but combined cycle gas turbine would come in at about half of that, and thermal efficiency you see has been increased. So it's cleaner, but gas seems to still have the edge as regards CO₂ emissions.

Greenhouse gas emissions - we nearly had a separate report the same size as the existing big volume on the greenhouse gas issue and its implications for New South Wales electricity sector. When we were talking with stakeholders one of the major concerns, and it was fairly obvious to everybody, was that if there was going to be a new power plant, whether it be peak, base load or intermediate, was it going to get emission certificates credits, or was it going to have to account for all of its CO₂ emissions and buy credits for all of them. That question still remains. The major question, to get rid of some policy uncertainty however, was what would be the date from which new plants would have to have emissions credits, and any plant existing before that date would be given credits, or probably given credits, on the grandfathering basis. We mentioned...I only had one meeting with the Premier, after the initial meeting before I started the inquiry, until the very last days of the inquiry where I was, as I say dotting the i's and crossing the t's. I only had one meeting with the Premier and at that meeting I said to him that this was a major concern - what was going to be the day when you would no longer get credits for your emissions, and he used it to political advantage, and John Howard came back with the answer just a week later, so from memory I think it's 14th June this year - I could be wrong, but I think from memory that's what it was.

We did have other, as I say, greenhouse gas emission problems with schemes, and I'll come back to those in a minute. We looked at the situation with the existing coal or gas fire generation being expanded to 2025, and retrofitted with carbon capturing sequestration. We also assume that new coal fired power stations - sorry that's only the coal retrofitted, not the gas - we also assume that new coal fired generators would be built ready for retrofitting with CCS, and this was the projection that some of the experts came up with that we'd been...we asked to do this. The...just make sure you can see it as well as I can. The light blue line is looking at emissions - CO₂ emissions - from coal and you can see that in 2020 carbon capturing sequestration is assumed to come in, and immediately the line drops quite dramatically. Ok, that's retrofitting new plant. And the same with combined cycle gas turbine where just the coal plant is retrofitted with CCS. So you can see actually that it comes back to meet the State's target for CO₂ emissions in 2025. So that's one way of meeting the State's target.

There are a few problems however. First of all the potential for CCS is in the future, not now. It's unlikely to be available before 2020, and although carbon capture is a well known technology, and it's probably been around for 30 or 40 years, it's never been, to the best of my knowledge, attempted on the scale of a base load coal fired power plant, and this question of sequestration is probably even more important - where are you going to put the carbon? And for New South Wales that is a problem of concern. A second concern is that a power station with carbon capture and storage or sequestration requires a lot of electricity to drive it, so for every three power stations you build - coal fired power stations you build - you have to build another one to operate those three.

Investors need certainty on emissions trading. This came back all the time from the stakeholder meetings. The policy uncertainty is delaying the investment. Apart from the date, which was resolved, there are a number of other issues. First of all how permits were going to be allocated, and how many permits, or what proportion of permits, to a plant's CO₂ emissions historically were going to be issued. What would be the penalty price, if there were to be one, for the ceiling of the trading scheme. The national emissions reductions target and how it impacts on the electricity sector. All of these were very big issues in determining what technology would be the appropriate technology for a new base load, or indeed for new electricity generation capacity. The uncertainties here, I think were one - apart from the long time horizon too - the uncertainties here were a major factor in stakeholders telling us that it was extremely unlikely that they would build coal fired plant for base load. Gas has the advantage that it's

quicker to bring on line, capital investment is lower, the CO₂ emissions are lower, and it can come on in modular form.

Some figures derived from Asle Tasman] indicated that the cost to the State of investing in generation capacity over the next 12 to 15 years would be \$7 billion to \$8 billion. The other amounts there are relatively small amounts to make the state retailers more competitive - put them in a more competitive environment - in the market, and about - I can't remember the exact numbers - but it may have been about \$3 billion to \$5 billion for a retrofitting of existing stock to meet environmental standards. So \$15 billion was what would be required if the government was to retain ownership of the electricity sector.

This is a diagram of total state debt as a proportion of gross state product. It's probably the upper line that you're more interested in. You can see that in the early 1990s, where it says Moody's places New South Wales on credit watch, total state debt was up around 13% of gross state product, and has been coming down since then, but the expectation from the state plan is that to 2020 there's going to be quite a considerable rise in state debt, and if you're going to add in generation you get the dotted line there. So state debt is going to rise to a level which hasn't been seen for some years of the government persist in generation. I think that's basically what I said - it needs to invest \$15 billion in security of supply, and so on. And the final line is fairly obvious actually - state generation does provide more flexibility to fund other priority projects. I think you must remember that generation is a very risky business, particularly going forward into an environment of carbon pricing, so it's...I think the rating agencies - and the triple A rating came from Standard and Poor's - would look very closely at a large volume of debt in generation.

Investors need certainty on emissions trading. Policy uncertainty is delaying the investment - that's very clear. And the Commonwealth - these are just a few recommendations given because we know, or I know, perfectly well that Commonwealth would find it very difficult to meet those, but nevertheless I'm a very great advocate of emissions trading. I think it's coming very late and I'd like to see the process speeded up rather than dragged out. Oh sorry, I'm going the wrong way. I thought I was repeating myself. So basically policy conditions for private investment. Certainty of government intentions and investment intentions basically is a concern of the private sector, but we need adequate levels of certainty over greenhouse gas policy.

So, sorry I've run out of time, but I'll just go through the inquiry recommendations very quickly. Now that's the state of the retail arms - that's the state of the generation businesses. Now, I realise that the Premier was on record as saying that - and this is in Hansard - that he would not sell generation, so I obviously too had to be modified to incorporate that statement, and that statement's in the report as well. And therefore I've recommended that appropriately structured long term leasing of current generation assets should be undertaken. I should point out that that was a recommendation. It has not been accepted as yet by the Parliament, the Premier, and therefore it's no good asking me about how I'm going to implement this because that's the implementation stage, ok? It's a very complicated range of possibilities for leasing and that will be - if this report is accepted, or the recommendations are accepted - that will be...take some time as subsequent inquiries. Four and five - four is just enabling recommendation - suggesting that a few things get speeded up. Five just looks at the retail market and indicates that there is going to be a review of regulated retail price cuts in 2010, so just support the review. Six encourages the Commonwealth Government to bring forward the timetable for establishing the national emissions trading scheme. I think it's a good idea to bring it forward as soon as possible, but basically, realistically, I understand that there's not much the government can do to move on what I've said there. Develop and implement clear and timely transitional rules for existing state based greenhouse gas and emission scheme - a national scheme. In particular there's a concern about the current support of renewables from the states. In theory that should no longer be necessary when the emissions trading scheme comes in, but my own personal view is that the scheme is going to have a lot

of problems associated with finding the appropriate control costs for emissions of carbon dioxide, and my own view that some of those schemes should be retained. And finally encourage and support energy efficiency initiatives where possible. We go into that in much greater detail in the report, talking about smart metering and so on. Thanks very much.

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