

On the Critical Strategic Matter of Grid Security

Objection to the Proposed Jupiter Wind Farm

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There are *prima facie* grounds for considering the Jupiter wind farm project to be a threat to NSW electricity security.

Neither the developer nor the Department of Planning & Environment (DPE) have provided the analysis necessary to show with certainty that it will not harm either short-term or long-term electricity security for the State.

Grid connected power plants, whether wind, solar, thermal or other, are unlike all other proposals considered by DPE. They are proposals to connect something to an integrated system, where the parts added to that system have the potential to damage the whole; and that integrated system is **the** most critical infrastructure in the State.

Adding more wind farms to the NSW electricity system puts state electricity security at risk, and the proposed location for the Jupiter wind farm increases that risk.

Before this proposal can be approved, DPE must have access to a thoroughly professional, technically sound, up-to-date NSW Government plan to control the addition of wind and solar power to the NSW electricity grid in such a way as to ensure no reduction in either short-term or long-term electricity security for the State. The Jupiter proposal must not be approved except in conformance with that plan and with conditions which follow from that plan.

Failure to do so would be gross misfeasance and an act of sabotage against the most critical state infrastructure.

Overview

Grid connected power plants, whether wind, solar, thermal or other, are unlike all other proposals considered by DPE. They are proposals to connect something to an integrated system, where the parts added to that system have the potential to damage the whole.

The state's electricity system is also *the most critical infrastructure in the state*, where outages for even a few minutes have massive impact across the whole of the state, affecting almost every other activity in the state and putting lives at risk.

Adding more wind farms to the NSW electricity system puts state electricity security at risk, and the proposed location for the Jupiter wind farm increases that risk. This is in addition to the increased electricity prices for NSW consumers and industry that the development would cause and the flow on losses of jobs and economic activity elsewhere in the state – which the EIS ignores.

While politicians and officials could previously pretend this was not a risk, despite warnings¹ from people more knowledgeable of power system practicalities, the recent recurrent blackouts in South Australia, directly linked to its self-inflicted, high dependence on wind power, have made the risks impossible to ignore.

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Failure to do so would be gross misfeasance and an act of sabotage against *the* most critical state infrastructure.

The Jupiter proposal threatens electricity security in two ways:

- It shares the common damaging characteristics of all wind and solar farms in not being a stable source of electricity and in not being able to contribute to stability of frequency and phase in the system; and
- Because of its proposed location in the Southern Tablelands, it would increase the exposure of the collective wind farm portfolio to simultaneous loss of output due to shared meteorological conditions over a relatively small geographic area.

Further, the EARS issued for the Jupiter proposal require the developer to provide:

“a strategic assessment of the need, scale, scope and location for the project in relation to predicted electricity demand, predicted transmission constraints and the strategic direction of the region and the State in relation to electricity supply, demand and electricity generation technologies”²

¹ See, for instance, Paul Miskelly, “Wind Farms in Eastern Australia – Recent Lessons”, *Energy & Environment* · Vol. 23, No. 8, 2012, pp. 1233-1260.

² *Jupiter EARS*, 2 March 2016, p. 1.

The Jupiter EIS contains no meaningful discussion of the implications of the proposal for the strategic direction of the State in relation to electricity supply. The latter critically includes security of supply, and effects on security of supply. The EIS fails to comply with this aspect of the EARS, as with so many others.

Real Planning

Wind farms and indeed any major power plants are wholly unlike any other projects considered by government. The reason is that they normally operate as part of a complex, integrated system, connected by the grid, where their outputs have to be continuously in synchronisation not just in terms of volume but in terms of particular characteristics (e.g. frequency and phase). That synchronisation has to be on a second-by-second basis and when it fails there can be major consequences throughout the whole of the grid.

Even the water supply system for the State does not have that complexity in terms of synchronous nature, or indeed the same potential state-wide consequences of failures.

In addition, since the power plants connected to the grid compete economically, and “renewable energy” power plants are given a large and growing subsidy, over time the plants with the strongest subsidy tend to drive the others out of the system. The unsubsidised capacity in the system is mainly coal-fired generators that provide inertia and stability to the grid. So the dynamics of adding wind farms to the system, progressively degrades the robustness of the grid as a whole.

Real planning involves the anticipation of such problems and not approving anything that may have such widespread dire effects without ensuring (not hoping) arrangements have been instituted to ensure the dire effects will not occur.

NSW Electricity System and Wind Farms

Since the recent system-wide blackout in South Australia, and the subsequent other blackouts in that state, one would have hoped the NSW Government and its Planning Department would have recognised the threat and instituted a thorough technical and economic assessment to determine under what conditions wind farms can be added to the NSW electricity system without degrading the integrity and security of that system.

The Department of Planning has been following a total laissez-faire approach to wind farm approval and construction without concern for how the output, the location and the timing of construction will affect the stability of the electricity grid in NSW and the supply of electricity to all the people and businesses in the state.

The NSW Government may outsource the actual production and transmission of electricity but the electorate expects the Government to properly plan our electricity system so it is highly reliable and provides cheap electricity. If we have South Australia’s experience they will not be blaming the producers. The anger at the Government will make the greyhound debacle look like a storm in the proverbial tea cup.

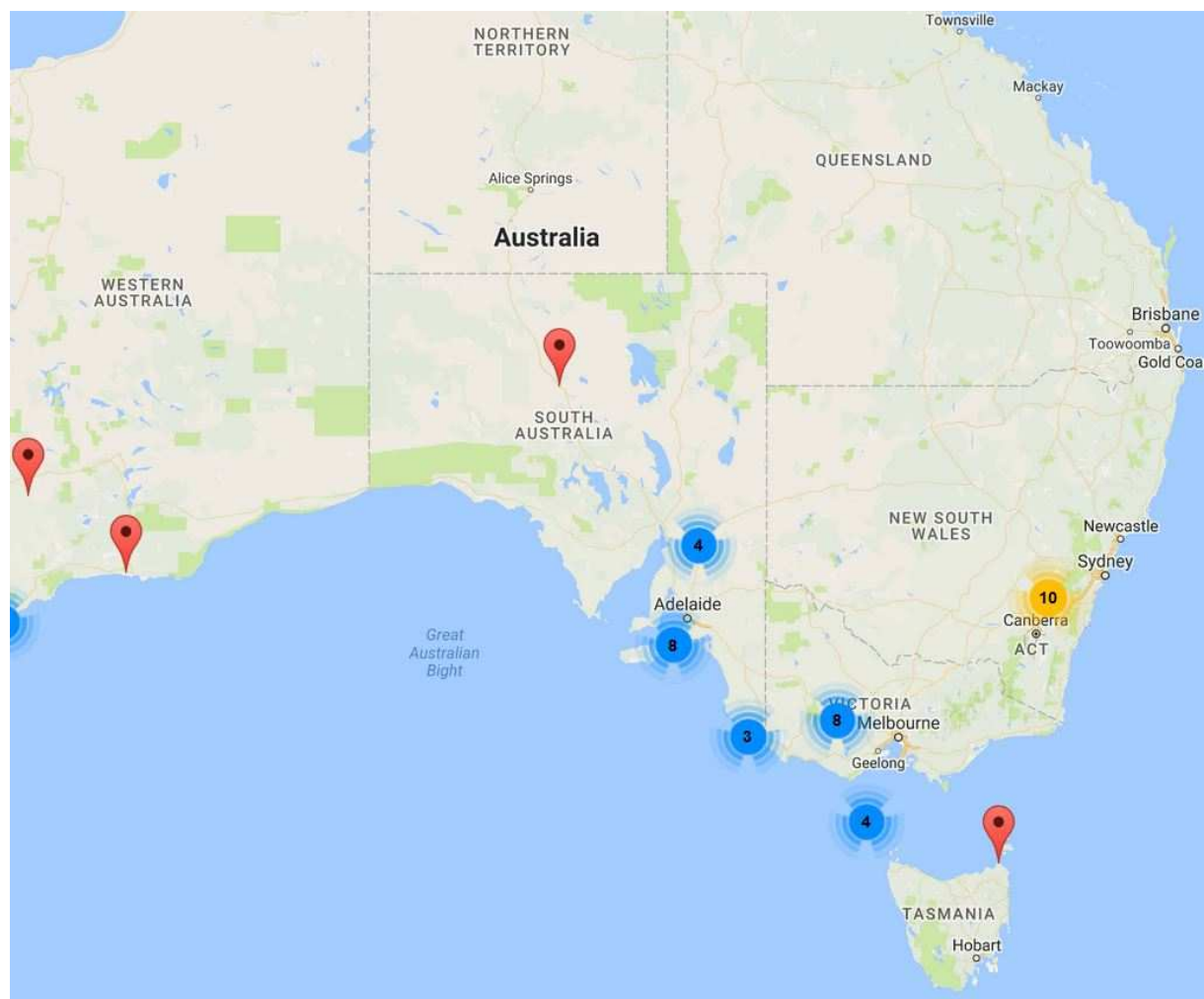
Wind power is inherently expensive and inherently unreliable. Due to the RECs subsidy, renewable energy facilities gradually drive low cost thermal plants out of the electricity system.

Note that last point. Subsidised renewable electricity gradually reduces the availability of non-subsidised production as plant becomes too unprofitable to operate and is decommissioned some time after introduction of the renewable plant that ultimately forced its closure. So at the point a new wind farm is opened, the system may still look reasonably robust – so long as all the existing thermal generating plants remain, except that eventually they will not.

However, if the NSW Government is determined to inflict higher electricity prices on the people of NSW there are at least some things that can be done in planning to reduce the risks that accompany this policy.

As can be seen from the map below, almost all South Australia's wind farms are concentrated in three main locations spread over a small part of the state. That makes it particularly vulnerable to a local absence of wind or excessive levels of wind. It is, in fact, begging for the sort of wind farm outage that recently occurred in that state when most of them stopped simultaneously.

The map also makes clear that *concentration in NSW* (as in Victoria) *is even worse*. We have an enormous state area that allows the dispersion of wind farms in a way that would make the portfolio much more robust against wind volatility.



Source: http://www.thewindpower.net/country_maps_en_16_australia.php

That will not happen without conscious planning and control about where and when future wind farms are constructed in NSW.

Developers site to maximise their returns. The fact that the wind farm and the state's electricity system may be out for a day or two, and that electricity-dependent process industries may then experience weeks of disruption (because of spoilage and damage during the outage, as happened in South Australia), is irrelevant to the wind farm proprietors.

They bear none of the costs for their harmful siting of wind farms. All the costs fall on the community while the developers walk off with the profits.

South Australia has relied on backup from coal-fired production in Victoria and NSW. That works, to a degree, as long as other states maintain an excess of such capacity. But as you hopefully know, under Premier Andrews, Victoria is now engaged on a path of eliminating some of its coal-fired capacity and South Australia has wiped theirs out. There will be no external backup for NSW if its wind farms all have an off day. The State needs to ensure that it is not at risk of all its wind farms going out at the same time.

Electricity is unlike any other industry. Almost every other activity in our society depends on the instantaneous availability of electricity. No other industry produces output so pervasive and so extensively time critical. The Government can afford to take a relatively hands-off position about the location and timing of most other industrial developments. It cannot do so with electricity supply and in particular when concentrated placement of generators can imperil the operation of the whole system.

The NSW Government needs to plan the placement, across the State, of all future wind farms to minimise the risk of simultaneous outages due to weather. The greater the number of wind farms the greater the need for widespread dispersion.

The Government needs to have a plan for the geographic dispersion of wind farms and advertise what area of the state each new wind farm is to go to in order to ensure that dispersion. The Government also needs to have a strict time requirement for building approved wind farms, such as three years, so that the plan cannot be disrupted by the decision of a wind farm developer to get approval and then bank it.

The Jupiter Proposal

The Jupiter EIS makes no reference to the necessary analysis relating to security of electricity supply. It does contain the usual guff about how many homes will allegedly be powered by the wind farm (when the wind is blowing just right, which caveat is not mentioned).

Since there is little growth in Australia's demand for electricity from the grid, this means that, in order to power those homes, the Jupiter wind farm would be contributing to the displacement of existing generation capacity from the system and thus increasing grid instability. Therefore what the EIS claims is a positive, is almost certainly a negative in terms of electricity security.

In addition, Jupiter is to be added to the Southern Tablelands area which already has the majority of NSW existing wind farms, plus the majority of approved, yet to be built, wind farms. The area is already a timebomb for the NSW electricity system. If approved in the

proposed location, Jupiter would add to the magnitude of that timebomb and add to the likelihood of a simultaneous outage of most of the States' wind power generators.

This threat cannot be managed at a later date without significant costs for the NSW Government. The developer, EPYC Pty Ltd, is more than 90% foreign owned. Consequently, once the project is approved, any action by the NSW Government to impose restrictions on it to protect the NSW grid will be challenged under Investor-State Dispute Settlement agreements with, at the very least, legal costs for NSW but very likely penalties for diminishing the value of the Jupiter assets.

The risk must be clearly determined and managed before approval, not afterwards.

Conclusion

A couple of absolutely fundamental requirements follow from the above analysis.

1. This proposal must be deferred until the Department of Planning has received from the relevant NSW Government agency, a thoroughly professional, technically sound, NSW Government plan to control the addition of wind and solar power to the NSW electricity grid in such a way as to ensure no reduction in either short-term or long-term electricity security for the State.
2. A revised EIS must be prepared, showing consistency with that plan and the Jupiter proposal must not be approved except in conformance with that plan, with consent conditions which follow from that plan.