

# Hunter Power Project Environmental Impact Statement Submission

David Arthur

9 June 2021

Dear Major Projects Personnel,

Thank you for the opportunity to make a submission regarding the Environmental Impact Statement ('EIS') for the Hunter Power Project ('the Project'), a 750 megawatt (MW) Open Cycle Gas Turbine power generator, electrical switchyard and ancillary infrastructure to be located at Kurri Kurri, NSW.

I ('the writer') am an Australian citizen, born and lived in NSW for some decades before relocating to Queensland. I am happy for this submission to be made public at the Department's website, and circulated as the Department of Planning, Industry and Environment sees fit.

## **Summary**

It is the argument of this submission that the Hunter Power Project is neither necessary, given other power supply projects in development (see descriptions below of Clarke Creek and Forest Wind renewable energy generating projects in Queensland, and NSW-SA Project EnergyConnect interconnector), nor desirable, given the high price per megawatt-hour (MWh) of gas-fired power relative to other technologies (see Levelised Cost of Electricity discussion below).

The Hunter Power Project is therefore considered to be a poor use of taxpayer funds.

It is suggested that a \$600 million investment in Australia's future energy supply then this money could more productively be allocated to grid-stabilising community-scale energy storage devices such as batteries.

## **Submission in detail**

The rationale and need for the project is outlined in Section 4.2 – Project Need of the Environmental Impact Statement for the Hunter Power Project, Rev 0 – Final, 22 April 2021, downloaded from

<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-12590060%2120210427T001516.283%20GMT> on 5 June 2021.

I understand the Project is intended to be completed and in operation in time for the scheduled shutting down of Liddell Power Station in 2023. The 19 May 2021 Media Release from the Commonwealth Minister for Energy and Emissions Reductions refers to allocation in the 2021-22 Commonwealth of \$600 million for a 660 MW open cycle gas turbine at Kurri Kurri rather than the 750 MW generator considered in the EIS; \$600 million for a 750 MW plant implies a capital cost of \$800,000 per MW.

It is proposed that the Hunter Power Project would be required approximately 2% of the time which would be about 4 hours per day for 44 days in the year (176 hours per

year). If generated power is dispatched into the National Energy Market at \$240/MWh then the payback period for the \$600 million capital cost of the Project would be 10,000 hours of operation; at 176 hours' operation per year it would take 19 years to reach that milestone (2042) – and that's without accounting for operating costs such as buying gas supplies.

Referring to a previous (15 September 2020) media release places this allocation in context:

*This important project delivers on the Government's [1,000 MW target set last September](#), which was created to avoid unacceptable price increases following the closure of the Liddell power station in 2023 ...*

*This project, together with EnergyAustralia's 316 MW Tallawarra B open cycle gas plant, will help shore up the security, reliability and affordability of electricity for consumers in NSW, with a commitment to be generating in time for summer 2023-24 when Liddell closes.*

However, by the time the Liddell Power Station closes in 2023-24, the National Energy Market will be augmented by three major developments exploiting lower-cost generating technologies (Levelised Cost of Electricity) than gas-fired thermal generation that are likely to render the Project uncompetitive to the point of redundancy.

- 1200 MW Clarke Creek (Queensland) wind and solar farm,
- 1200 MW Forest Wind (Queensland) wind farm, and
- Project EnergyConnect: 800 MW NSW-South Australia Interconnector.

#### *1200 MW Clarke Creek (Queensland) wind and solar farm*

The proposed Clarke Creek Wind and Solar Farm is to be located on the Broadsound Range at approximate elevation 143 m approximately 50 km inland from the Coral Sea, roughly equidistant to Rockhampton and Mackay. The project will include 400 MW of solar PV and 800 MW of wind power and battery facilities to smooth output; wind tower hubs will be a further 130m above ground.

The project is well-sited for power generation during peak summertime NEM demand; wind roses for 3pm in summer for Rockhampton, Mackay and Maryborough are shown below.

That is, for the majority of the time the Clarke Creek wind and solar will be producing as much power as the Hunter Energy Project at lower Levelised Cost of Electricity. Commissioning would be expected in late 2022, although to the writer's knowledge the final investment decision to proceed with the project (expected in mid-2021) has not yet been announced.

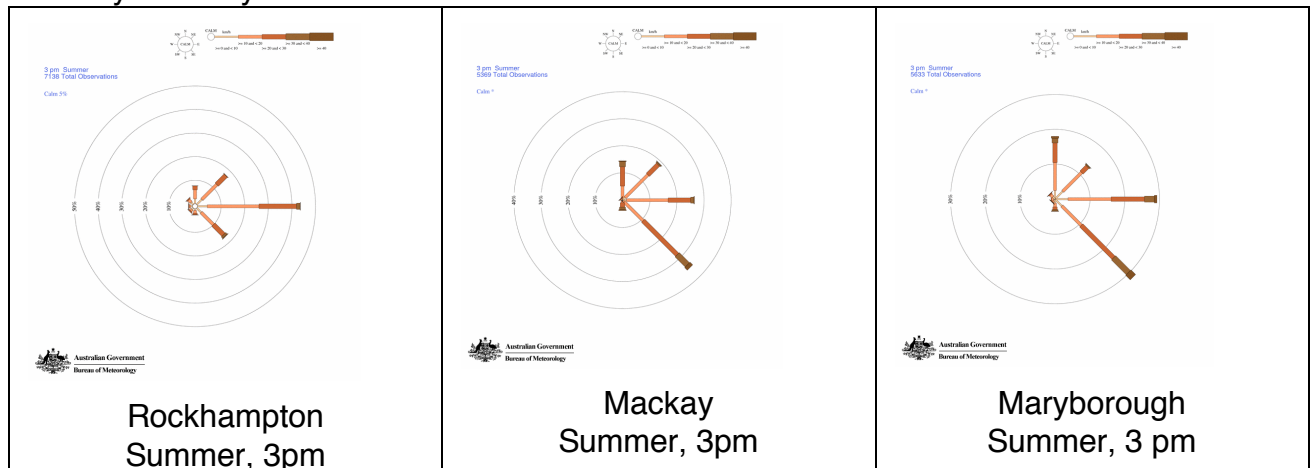
#### *1200 MW Forest Wind (Queensland) wind farm*

The writer notes that the 1200 MW Forest Wind project (between Gympie and Maryborough, about 600 km south-east of Clarke Creek) is presently expected to commence construction *after* the 4<sup>th</sup> quarter of 2022<sup>1</sup>, and will take about 3 years<sup>2</sup>;

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<sup>1</sup> Forest Wind Newsletter #8 (personal communication dated 4 June 2021)

the author expects that with a couple of years of Liddell's 2023 closure the opportunity for the Project to profitably operate during summer afternoon-evening peaks will be severely constrained, and the Hunter Power Project's commercial viability severely constrained.



Wind roses for Rockhampton, Mackay and Maryborough, 3pm on summer days.<sup>3</sup>

### *Project EnergyConnect: 800 MW NSW-South Australia Interconnector*

Surplus variable renewable energy generated in South Australia can only be exported into the rest of the National Electricity Market via the interconnector to Victoria. Capacity constraints are relatively common, and South Australian generators are often required to curtail their output<sup>4</sup>.

A proposal for a new 800 MW interconnector between NSW and South Australian power networks was announced in February 2019<sup>5</sup> scheduled to be in place “by the time the coal-fired Liddell Power Station is due to retire”, with the intention of providing “additional transfer capacity to allow for the sharing of reserves between South Australia, Victoria and New South Wales”.

The 800 MW, 900 km transmission line will link Robertstown, north-east of Adelaide and Wagga Wagga in New South Wales; it will also include a 500 MW branch line from Red Cliffs in northern Victoria to Buronga, north-east of Mildura (see map).

This will facilitate connections from renewable energy generation proposals in north-west Victoria such as the solar-hydro plant being developed by Liddell owner AGL and partner RayGen 17 km from Red Cliffs at Carwarp<sup>6</sup>. The same article reports

<sup>2</sup> <https://www.forestwind.com.au/development-process-1>

<sup>3</sup> [http://www.bom.gov.au/climate/averages/wind/selection\\_map.shtml](http://www.bom.gov.au/climate/averages/wind/selection_map.shtml), accessed 7 June 2021

<sup>4</sup> Generation curtailment commonly occurs, and is reported in AEMO's quarterly energy dynamics report series <https://aemo.com.au/energy-systems/major-publications/quarterly-energy-dynamics-qed>.

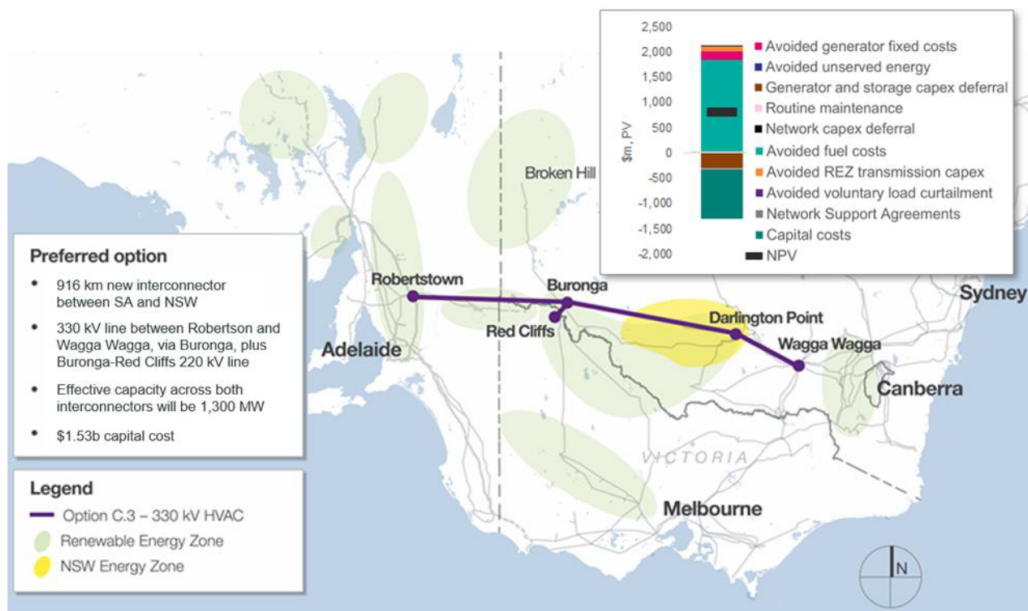
<sup>5</sup> “Interconnector proposal between SA and NSW to 'reduce bills'”, ABC News, 13 February 2019, <https://www.abc.net.au/news/2019-02-13/sa-nsw-electricity-interconnector-proposal-to-reduce-bills/10806376>. Accessed 6 June 2021.

<sup>6</sup> “Solar-hydro energy plant to be built on Liddell coal-fired power station site”, ABC News, 8 June 2021, <https://www.abc.net.au/news/2021-06-08/solar-hydro-plant-to-be-built-on-liddell-power-station-site/100198274>. Accessed 8 June 2021.

that after the shutdown of the Liddell power station, AGL is planning to continue using the site and its electrical connections to the grid by constructing a solar-pumped hydro project on the site.

The Australian Energy Regulator granted final regulatory approval for “Project EnergyConnect” in May 2021<sup>7</sup>, and final investment approval South Australian transmission grid owner-operator Electranet announced its final investment approval on 7 June 2021<sup>8</sup>.

Construction is expected to commence in late 2021 and commissioning is to be underway in 2023, so that the commercial viability of the Hunter Power Project will certainly be adversely impacted by Project EnergyConnect.



Map illustrating route of SA-NSW Project EnergyConnect Interconnector<sup>9</sup>

The commercial viability of the Hunter Power Project will be adversely affected by construction of Project EnergyConnect, the 800 MW transmission interconnector between NSW and South Australia, scheduled for completion in 2023 around the time the Liddell power station shuts down and before the demand peaks of the 2023-24 summer.

<sup>7</sup> “Electricity interconnector tipped to drive down prices in NSW and SA approved by regulator”, ABC News 31 May 2021, <https://www.abc.net.au/news/2021-05-31/sa-nsw-electricity-interconnector-gets-approval-from-regulator/100177928>, accessed 6 June 2021; the same reference also reports that NSW transmission grid operator Transgrid has already made a final investment decision to proceed with the NSW section of the project.

<sup>8</sup> “ElectraNet approves landmark “freeway” for wind, solar and storage”, Renew Economy, 7 June 2021, <https://reneweconomy.com.au/electranet-approves-landmark-new-link-to-unlock-wind-solar-and-storage/>. Accessed 7 June 2021.

<sup>9</sup> <https://www.energycouncil.com.au/analysis/sa-energyconnect-riverlink-with-rigour/>, accessed 8 July 2021.

## Levelised Cost of Electricity

Figure 5-3 Calculated LCOE by technology and category for 2020 of Graham, P., Hayward, J., Foster J. and Havas, L.2020, *GenCost 2020-21: Consultation draft*, Australia estimates the Levelised Cost of Electricity for various power generation technologies (LCOE; factors in both capital and operating costs) for gas (no carbon price or risk premium) in the range \$65-\$115 per MWh, wind in the range \$50-\$60 per MWh and solar photovoltaic (PV) in the range \$45-65 per MWh.

It is because of the lower costs of non-thermal renewable technologies that improved availability of South Australian renewably-generated energy throughout the National Energy Market that in the longer term (once Project EnergyConnect construction costs are amortised) that power prices are expected to decrease in the National Energy Market; the author expects that similar considerations will hold for power supplied from Clarke Creek and Forest Wind projects.

It is this writer's view that, given these planned power generation and transmission projects, at least some of which will be in place by the time the Liddell power station is closed, there is a significant risk that the Hunter Power Project may be mothballed before it even recovers its \$600 million capital cost.

If the Commonwealth government is prepared to invest \$600 million in energy security, then a better investment might be community-scale batteries such as the 274 kWh battery being installed at Yackandandah, Victoria, to store surplus energy generated from Yackandandah's rooftop solar and/or community wind turbines when the sun is shining and/or the wind is blowing for use when people want power to cook and heat during the evening demand peak after the sun has set <sup>10</sup>. Yackandandah's battery is understood (same reference) to have cost about \$200,000 and has storage capacity of 274 kWh.

However, community batteries have more application than in small remote towns; Sydney and Hunter region network operator Ausgrid has installed a similarly-sized community batteries in Bankstown <sup>11</sup>, and further installations are planned.

\$600 million could fund the purchase of up to 3,000 Yackandandah-sized community batteries that could be installed at electricity distribution substations in suburbs where network overvoltages occur on sunny days due to a large number of rooftop solar arrays exporting power to the grid at the same time. Local network voltages would be stabilised during the day and the stored power released into the local network when voltage drops due to evening demand peak after the sun has set.

This would also limit spot price spiking in the National Electricity Market (NEM) <sup>12</sup>.

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<sup>10</sup> "Yackandandah's community battery may not be 'big' but it's enough to 'petrify' energy providers", ABC 24 May 2021, <https://www.abc.net.au/news/2021-05-24/community-battery-yackandandah-ausgrid-electricity-shakeup/100159460>. Accessed 6 June 2021.

<sup>11</sup> "Ausgrid installs community battery in Bankstown", 23 April 2021, <https://www.ausgrid.com.au/About-Us/News/Ausgrid-installs-Community-Battery-in-Bankstown>. Accessed 8 June 2021.

<sup>12</sup> For explanation of Spot and Contract Markets in the National Electricity Market, see <https://www.aemc.gov.au/energy-system/electricity/electricity-market/spot-and-contract-markets>. Accessed 8 June 2021.

## **Conclusion**

It is possible that the Hunter Power Project may require a decade or more to recover its capital outlay; however, construction of renewable energy projects such the Clarke Creek Solar and Wind Farm, and Forest Wind farm, both in Queensland, and de-bottle-necking of transmitting low-cost renewably generated electricity from South Australia to NSW via the Project EnergyConnect interconnector preclude there being market demand even one decade, let alone two.

The Hunter Power Project is therefore considered to be a poor use of taxpayer funds.

It is suggested that if the Commonwealth Government wants to invest \$600 million in Australia's future energy supply then this money could more productively be invested in grid-stabilising community-scale energy storage devices such as batteries.

Thank you for considering my submission.

David Arthur

Maryborough, Queensland