Project: https://www.planningportal.nsw.gov.au/major-projects/projects/pottinger-wind-farm

I object to this Proposed Project because all the real life evidence today demonstrates the claimed benefits of the project will not be achieved. Electricity prices will continue to increase for consumers and the project will have no affect on the climate. The local and global environments (people, flora and fauna) will be substantially damaged, food production compromised and livelihoods destroyed. The project must be rejected.

Mark P Mills'* March 2019 paper 'The "New Energy Economy": An Exercise in Magical Thinking' highlights the physics of energy to illustrate why there is no possibility that the world is undergoing— or can undergo—a near-term transition to a “new energy economy.”

Among the reasons he gives are:

1. *"Scientists have yet to discover, and entrepreneurs have yet to invent, anything as remarkable as hydrocarbons in terms of the combination of low-cost, high-energy density, stability, safety, and portability. In practical terms, this means that spending $1 million on utility-scale wind turbines, or solar panels will each, over 30 years of operation, produce about 50 million kilowatt-hours (kWh)—while an equivalent $1 million spent on a shale rig produces enough natural gas over 30 years to generate over 300 million kWh.*

2. *Solar technologies have improved greatly and will continue to become cheaper and more efficient. But the era of 10-fold gains is over. The physics boundary for silicon photovoltaic (PV) cells, the Shockley-Queisser Limit, is a maximum conversion of 34% of photons into electrons; the best commercial PV technology today exceeds 26%.*

3. *Wind power technology has also improved greatly, but here, too, no 10-fold gains are left. The physics boundary for a wind turbine, the Betz Limit, is a maximum capture of 60% of kinetic energy in moving air; commercial turbines today exceed 40%.*

4. *The annual output of Tesla’s Gigafactory, the world’s largest battery factory, could store three minutes’ worth of annual U.S. electricity demand. It would require 1,000 years of production to make enough batteries for two days’ worth of U.S. electricity demand. Meanwhile, 50–100 pounds of materials are mined, moved, and processed for every pound of battery produced."*

Fast forward to June 2024 and all Mr Mills' March 2019 reasons are fully vindicated:

- Every developer and proponents of wind, solar, and storage (referred to as 'ruinables' in this submission) deliberately mislead the readers of their materials and proposals by ignoring the capacity factor of their proposal. e.g. a 500MW wind or solar project is not equivalent to a 500MW High Efficiency Low Emissions (HELE) coal-fired power plant, or modern gas-fired plant or nuclear power plant (large or small modular reactor). In fact, wind power only generates in Australia an average of 30% of the time over a full year and Solar is even less at under 25% capacity factor. Wind and solar are such a weak and erratic energy source that they cannot compete

with energy dense sources;

- Sweden has abandoned its 100% ruinables policy in favour of nuclear power;

- Finland commissioned a nuclear power plant in April 2023, which immediately reduced the nation's wholesale electricity costs by a reported 75%;

- Germany has reactivated coal mining and restarted producing electricity from coal-fired power stations;

- The UK has recently announced slowing up on net-zero actions as the cost of electricity is hurting the UK population, businesses and industries.

- China, who produces most of the world's ruinables components, is building two coal-fired power stations a week and has issued permits for hundreds more;

- Despite $trillions being spent globally on ruinables in the last 25 years the less than 3% of the world's energy comes from them;

- The cost of ruinables is rapidly rising an projects are only viable if heavily subsidised and given preferential treatment by legislation and policies as well as others (taxpayers and electricity consumers) picking up all the costs for new, otherwise unnecessary, infrastructure to support the ruinables;

- Solar panels have not increased significantly in efficiency since shortly after Bell Laboratories invented the first modern commercial solar panel in 1954. The best commercial panel is still around 26% as it was in 2019, but most commercial and industrial solar panels installed today are a maximum laboratory determined efficiency of between 15 and 22.8% . In 70 years the claimed efficiency has barely trebled. Actual panel efficiency declines annually and is also reduced by high/low temperatures, dirt/dust/grim/algae/bird droppings, panel tilt and orientation, micro cracks, weather related damage (hail, heavy rain, lightning, fire), inverter efficiency, latitude, etc. as well as reduced output from lack of daily and seasonal sunshine/wind;

- Wind turbines operating in Australia have over at least the last nine years have an average annual capacity factor of 30.1%. Australia's two largest wind electricity generating works have never achieved their stated capacity factors of over 30% and have operated under 30% since commissioning;

- Most battery energy storage systems (BESS) contain significant quantities of lithium, cobalt and nickel, all of which have increased massively and are predicted to increase much more annually. Lithium prices have increased from $13/kg in May 2021 to over $19/kg recently. Significant increases in Cobalt, nickel and copper have also occurred. The 400MW Coleambally BESS only proposal in February 2023 stated a capital cost of $184 million for an initial annual output of 380,000MWh later revised to 146,000MWhpa due to an initial "calculation error" by the Proponent. An original

projected life of 5.3 years (2.6 charge cycles/day) before the battery and inverters replacement means a potential total output of 2,014,000MWh at an initial capital cost recovery of $91.36/MWh. The revised figure for 13 years before replacement is $96.94/MWh. Add financing cost, maintenance, payments to hosts and community benefit funds we get a very, very costly backup/firming for ruinables, which is required over not just over 70% of the time annually but with wind and sunshine droughts up to 100% of the time, sometimes for days across the NEM grid;

- For example, on June 4, 2024 during peak demand from 6pm to 9pm all of South Australia's, which has over 60% of its generating capacity in wind and solar and a large battery backup, generated its electricity from 97% gas and 3% diesel. Zero wind, solar and battery output. The whole of the NEM during the same time only got generation from wind (1%), zero solar and zero batteries. AEMO is forecasting blackouts before 2024 winter's end as gas supplies and hydro electric output falls. Proof that wind, solar and BESS capacity cannot and has never provided sufficient electricity for a modern economy like Australia's economy.

- Electricity prices become amongst the highest in the world once any country or jurisdiction exceeds ruinables capacity of 30% in its electricity generation mix. Australia has exceeded the 30% figure and now has joined the other countries, such as Denmark, Germany and the state of California and others with the highest retail and business electricity prices in the world. Ruinables are the cause. They are unreliable, intermittent, resource hungry, idle most of the time and very environmentally destructive.

Conclusion

The claims made by this Proponent do not align with reality, only some of which has been presented in this submission. The project does not justify approval. The Proponent has not proven that their proposed project will even achieve the basic requirements of reduced emissions and lower electricity prices. However, they have demonstrated that their project will harm the environment, will cause further wide-spread economic damage to consumers, will cause more businesses to close or move off-shore, will cause intergenerational harm and will require consumption and utilisation of unsustainable quantities of the Earth's resources.

There are better alternatives, which are already being pursued by other countries who now realise that ruinables is a failed experiment.

It is definitely not in the public interest. Reject the proposed project!

Regards
A concerned citizen.

* Mark P. Mills is a senior fellow at the Manhattan Institute and a faculty fellow at Northwestern University's McCormick School of Engineering and Applied Science, where he co-directs an Institute on Manufacturing Science and Innovation.