

Submission Critiquing Draft 2024 Integrated System Plan.

I believe that the Draft 2024 Integrated System Plan has two fatal miscalculations that will lead to the Grid being highly unreliable (with frequent blackouts) by 2030 and in total collapse by 2050.

1. The first miscalculation is that for all the Grid scale wind and solar. And the Distributed solar PV. It would appear that the figures used for all the production from these sources is calculated as if they have weather fuel (wind and sunshine) available so that they generate on a twenty four hour, seven days a week basis.

Grid scale wind and solar 2030 – 57GW, 2050 – 126GW.

Distributed solar PV. 2030 – 36GW, 2050 – 86GW.

Where in fact the actual Industry production average for wind is only 35% to 45% of each day. <https://www.uts.edu.au/isf/news/offshore-wind-could-make-australia-energy-superpower> For all solar, because worthwhile Sunshine is only available in Winter between 8.30am and 4.30pm. This means that solar can only generate electricity for 8 hours or 33% of each day.

Then using these actual figures (rounding down wind to 33%) and solar at 33% the production becomes.

Grid scale wind and solar 2030 – 57GW = (19GW) a loss of 38GW

2050 – 126GW = (42GW) a loss of 84GW

Distributed solar PV. 2030 – 36GW = (12GW) a loss of 24GW

2050 – 86GW = (28GW) a loss of 56GW

The total shortfall between rated production and actual production of Grid scale wind and solar plus Distributed solar PV is:

2030 – a shortfall of 62GW or 66%

2050 – a shortfall of 140GW or 66%

2. The second miscalculation is to assume that the Grid scale wind and solar, plus the Distributed solar PV will all be generating at full capacity when 2050 is reached.

The facts are that Grid scale wind and solar, plus the Distributed solar PV have a 'premium working life of twenty years, after that it rapidly declines.

WHEN 2050 IS REACHED ALMOST ALL OF THE GRID SCALE WIND AND SOLAR PLUS THE DISTRIBUTED SOLAR PV WILL BE WORN OUT. ALL THE COAL FIRED POWER STATIONS WILL BE CLOSED.

2050 WILL BE A TOTAL DISASTER YEAR FOR ELECTRICITY GENERATION.

3. In addition to the above miscalculations above. The rushed roll out of unreliable Solar farms, Wind farms, Battery Energy Storage Systems (BESS) and High Voltage (HV) Transmission Lines. Renewable Energy Factories (REF's) will have huge, devastating consequences for rural Australia.

The effects will be:

1. Permanently removing, millions of hectares of agricultural land from production and permanently contaminating offshore oceans
2. Hugely increasing the risk of uncontrollable wildfires, which will threaten the safety of Country living.
3. Slaughtering our unique wildlife in numbers leading to extinction.
4. Permanently polluting land, along with surface and underground water runoff.
5. Blighting the renowned scenic beauty and peacefulness of the landscape.
6. Despoiling tourism attractions.
7. Devaluing land values and country lifestyles.
8. REFs intermittent and unreliable renewable electricity production increases electricity prices for both country and city.
9. Australia's national security is at risk, with a large part of our electricity production and distribution being controlled by foreign companies.

The details are of this devastation are:

1. The siting of REFs on agricultural land brings a complete loss of agricultural production.

Food production should be the number one priority for every Government. Productive agricultural land is a finite resource which must be carefully guarded. The siting of these Solar farms, Wind farms, Battery Energy Storage Systems (BESS) and High Voltage (HV) Transmission Lines (RFs) will stop the land they are sited upon, from being used for agricultural production for at least twenty years and more likely forever. Even after a very expensive decommissioning, building sites (which these RFs, have now become) can never be returned to their former agricultural condition free from contaminants.

The economic loss of agricultural production for 100 years or more will total such a cost, that it far outweighs by tens of \$A billions, the short lived renewable electricity production from the site. It should be unthinkable to ever site a renewable energy factory on agricultural land.

The siting of offshore wind farms in offshore oceans is equally as shortsighted.

The setting up of offshore wind farms, contaminates offshore oceans with concrete based wind turbines, undersea cables, associated electrical equipment, ships, barges, drilling rigs, and the vast amount of noxious chemicals used in their installation. This leaves offshore oceans, seabeds, sea routes, whale migration lanes and fishing grounds permanently contaminated and turned into graveyards of broken and damaged wind turbines, with the sea floor spoiled with a mesh of cables and concrete blocks.

The economic loss of tourism, fish production for 100 years or more will total to such a cost, that it will 100 times greater than the short lived renewable electricity production from the site. The offshore oceans will be contaminated forever as the sites become wind turbine graveyards. It should be unthinkable to ever site a renewable energy factory in offshore oceans.

2. REF's will create a huge increased risk of wildfire ignition. Eastern Australia is known worldwide as one of the most bushfire prone areas in the World. Which greatly increases on Total Fire ban days with high temperatures and strong winds.

Because of the high amount of electrically charged components. And the particular firefighting problems associated with them, such as:

- A. Solar farms with solar panels being packed tightly together, surrounded by a 2m high security fence. Are treated as 'No Go areas' for fire fighters, because of the risk of getting trapped among the electrified panels. Water bombing is unlikely to be successful, because of the densely packed area. This leads to the early control of a wildfire in a solar farm becoming extremely difficult if not impossible. And the fire fighters have to wait for the fire to leave the area by which time it may have become uncontrollable.
<https://www.insurancebusinessmag.com/us/risk-management/news/fire-a-major-hidden-danger-for-solar-farms-419868.aspx>
- B. Wind turbines being on 250m high towers, are inaccessible to being controlled by on ground firefighters. And because of the high towers, huge diameter span of the blades and the downwind turbulence created by the turbines, water bombers have to keep a 5 to 8km distance from wind farms. Rendering them ineffective. This leads to the early control of a wildfire in a wind farm becoming extremely difficult if not impossible.
- C. BESS Lithium battery fires pose particular problems for emergency responders and other stakeholders which include: A greater fire intensity often accompanied with the violent ejection of vapors and other materials; exposure to toxic and corrosive vapors, gases and fire effluents; increased risk of vapor explosion in confined environments; stranded electrical energy from energized high-voltage battery cells; protracted processes for extinguishing and cooling the reaction; the risk of secondary ignitions following the initial event; difficulties rendering the site safe; the containment of contaminated fire water; and issues with handling, transporting, and disposing of fire-affected batteries. THESE ARE ISSUES THAT ARE YET TO BE FULLY RECOGNISED
- D. HV transmission lines, because of the high voltages in HV Transmission Lines. Fire fighting vehicles have to stay a long distance away and water bombers are not able to be used near HV transmission lines. This leads to wildfires near HV transmission lines being difficult to control.
3. REFs will slaughter of our unique wildlife leading to extinction. Australia's wildlife is unique and needs to be protected at all costs. In particular the affect that wind turbines have on birds, bats and bees is devastating. As birds, bats and bees can move over a wide area, wind turbines can have an effect over a very wide area. Particularly with Wedge Tail Eagles, if one pair is killed off, another moves in to take their place, they are killed off and the cycle continues. As Wedge Tail Eagles, live long and breed slowly it is not beyond the possibility of them becoming extinct. In any other areas to kill off Wedge Tail Eagles, bring with it heavy fines and even imprisonment. The operators of Wind Farms should not be exempt from these provisions. **Wind turbine wipeout: Rare and endangered eagle's days are numbered.**
<https://stopthesethings.com/2023/10/07/wind-turbine-wipeout-rare-endangered-eagles-days-are-numbered/> **Onshore wind turbines kill Wedge Tail Eagles. Offshore wind turbines kill sea eagles and albatrosses** <https://www.youtube.com/watch?v=8NAAzBArYdw>

4. REFs are a great risk to cause contamination of land, surface water and ground water. No thought appears to have been given to the fact that solar panels contain heavy metals (such as cadmium telluride), glass, metal, sealants, copper, concrete steel reinforced blocks, steel stands, electrical cables, etc. In the case of a hail storm or being subject to a fire, the risk of toxic contamination of the land and ground water is great. There is a risk that as the solar panels deteriorate with age, the ground will become contaminated. In the decommissioning process it is highly likely for contamination to occur. <https://www.popsci.com/environment/solar-farm-construction-epa-water-violations/>
5. REFs will cause the loss of the peace and quiet serenity of rural country sides. The people who live in Rural Australia. Those originally born there, people retreating from the 'rat race' and tourists, value, extremely highly the quietness, visual serenity, natural beauty and isolated safety of rural Australia. Solar farms, wind farms, BESS's and HV Transmission lines are extremely disruptive and are irreversibly damaging the peaceful and visual serenity of Rural Australia. This is by the hundreds of square kilometres of shimmering solar panels, the never ending, horizon of constantly turning and swishing wind turbines, the 20,000 kilometres of HV Transmission lines. The thousands of kilometres of access roads and the nightmare of whether all this toxic junk is going to be left as a blight on the landscape. Creating a haven for feral pests and increasing the bushfire risk.
6. REFs will damage the attractiveness of the countryside and the tourism industry. The tourism industry is particularly affected by the renewable energy industry. Tourists come to rural areas for the beautiful scenery, wildlife, and peacefulness. To blight it all with millions of solar panels and thousands of wind turbines on skylines, for uncertain short term economic gain is very short sighted. The long term damage will be enormous. Will all tourists have to be evacuated on Total Fire Ban Days?
7. REFs will lead to devaluing land values and country lifestyles. Siting RFs on rural land immediately devalues surrounding properties and communities by:
 - A. Irreversibly damaging the peaceful and visual serenity of country living. Who wants to buy a property and look out on a sea of solar panels, or live beside a wind farm, or on a property divided by HV Transmission lines?
 - B. The hugely increased wildfire risk (See 2. Above), creates great danger and anxiety for adjacent farms and downwind communities. This will lower all properties value in the surrounding area.
 - C. The increased Public Liability Insurance Premiums for adjacent properties, in the case of burning off escaping into a RF. <https://www.wangarattachronicle.com.au/rural-news/farm-insurance-fear-over-solar-neighbour>
 - D. The risk of contaminated water from RF's, both surface water and ground water running onto and contaminating surrounding properties. <https://www.popsci.com/environment/solar-farm-construction-epa-water-violations/>
8. REFs intermittent and unreliable renewable electricity production increases electricity prices and increases Grid instability for both country and city consumers.

The Australian Energy Market Operator (AEMO) at the present time in order to obtain the cheapest price and to accommodate the intermittent production of solar and wind farms. Has an

auction taking bids to supply electricity in 5 minute blocks from Batteries, Biomass, Black Coal, Brown Coal, Gas, Hydro, Liquid Fuel, Solar and Wind. The lowest bid wins that 5 minute block.

The AEMO conduct six auctions each 30 minutes (half hour) and averages the six winning bids to be the price to all retailers for that half hour.

An illustration of the supply of electricity to the grid from the AEMO dashboard. 31st Oct 8.15pm EDST. Batteries 1%, Biomass 0%, Black Coal 48%, Brown Coal 15%, Gas 9%, Hydro 13% Diesel 0% Solar 0%, Wind 14%. <https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/data-nem/data-dashboard-nem>

In my opinion this is very inefficient letting wind and solar to bid for just 5 min blocks. This allows them to undercut coal and gas generators that operate most efficiently when they are producing electricity at a steady rate and price for 24hrs a day.

It also makes it very difficult for the Grid operators to keep the Grid stable. Keeping the electricity grid's frequency stable is a complex balancing act. For generators to safely run, Australia's grid frequency needs to stay as close as possible to 50Hz. Any deviation away from this can have catastrophic consequences, like the state-wide power outages in South Australia in 2016. <https://www.enelx.com/au/en/resources/frequency-grid-support-explained>

There is also a 'frequency control market' which pays energy consumers to reduce their consumption by: <https://www.enelx.com/au/en/resources/frequency-grid-support-explained>

From enelx • We set up our customers so that they can respond when the grid is unbalanced. They do this by curtailing energy use of non-critical equipment or seamlessly switching to their onsite backup generator

- *Our market-leading technology means our customers can respond to deviations in the grid's frequency in less than one second*
- *The grid receives immediate support, and the markets' response helps to: stop the fall in frequency, bring it back up to the normal operating range, and ensure the grid is stabilised moving forward*
- *Our customers are financially rewarded for helping to keep the grid stable by participating in the FCAS markets.*

John Moore: I believe that in order to have a reliable supply of electricity 24/7. At an even low cost and for investors to be able to invest with confidence. The AEMO bids should be auctioned in four hour blocks and only generators that are able to supply electricity in four hour blocks should be able to bid. (Generators unable to supply electricity for four continuous hours at a time, are too inefficient to be worth consideration).

9. Australia's national security is at risk, with a large part of our electricity production and distribution being controlled by foreign companies.

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