The Team Leader Energy Assessments Energy Assessments 9 February 2023
Development Assessment Department of Planning and Environment
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Coleambally Battery Energy Storage System | Planning Portal - Department of Planning and Environment (nsw.gov.au)
From: saveoursurroundings@outlook.com

Dear Contact Planner, Nestor Tsambos
SOS objects to SSD-23368211 BESS Works

Project summary

Proposer	The Trustee for Coleambally DESS Trust (a subsidiary of Risen Energy Development P/L, ultimately owned by China based Risen Energy Co., Ltd)
Site Location	Cnr Erciloune Rd & Kook Rd, Coleambally NSW (Murrumbidgee LGA)
Site area	5.18ha footprint; 13.74ha development; on 183.3ha lot
Close towns	Coleambally (pop. 133) NE 8.5km; Griffith 59km
BESS capacity	Power capacity of 100MW from Lithium-ion batteries
BESS output	400MWh energy capacity i.e. 100MW maximum for 4 hours; 380,000MWhpa
BESS input	Unclear whether directly from the 150MW Coleambally Solar Works or the National Grid or both
Components Sourced from	Unstated, but the 1440 battery cabinets are made in China by RISEN Energy and these are the bulk of the BESS and weigh about 5,422 tonnes
Purpose stated	To balance electricity grid network by supplying stored electricity during periods of low renewable output into the energy grid. May decrease wholesale prices.
Construction	8-10 months with peak of 4-6 months
Operation life	35-40 years (requires multiple replacement of battery packs)
Jobs	80FTEs peak construction; One Full Time Equivalent during operation
Capital cost	$184,000,000

We require the Proponent to respond in detail to our concerns and issues and the DPE to satisfy itself that all responses are accurate and adequately address the matters raised by SOS. Generalised responses and/or amalgamated answers are unacceptable.

Our Objections Part 1
The Proponent's 879 pages proposal (excluding some appendices not shown on the DPE portal) contains a lot of information. However, there are omissions, incorrect claims, inconsistent information, unsubstantiated claims and repetition. For instance:

1. The sheer size of the document for an apparently small development prevents ordinary people from even reading the document let alone appreciate the impacts that a BESS has locally and globally. SOS has made the attempt. Is this intentional to make detailed scrutiny by those affected by the project very difficult?

2. The BESS is intended to feed into the NEM grid. Unless on a separate grid from the NEM, how can the Proponent claim that "the Proposal would provide local regional centres with a stable and reliable energy supply"?

3. A Community Benefits Scheme is proposed. If the project is so good for the residents of the region, why is a community benefits scheme necessary? Is it really just a bribe to get local support for an otherwise misplaced project that is for the primary benefit of the developer?

4. Much is made by the Proponent of CO2e emissions reductions, but no information is provided on the amount of CO2e emissions embedded and created prior the commissioning of the BESS. These emissions can never be offset. In fact, they will be added to with each replacement of the Battery Packs and other equipment. Is not this a significant omission, as the main purposes of renewables technology is to reduce CO2e emissions and to provide low cost electricity to consumers? This project fails to do either, as expanded in the following points 5 to 9.

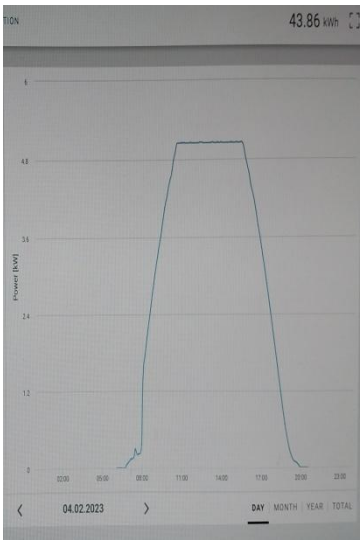
5. The BESS does not generate electricity, but first absorbs it. The Coleambally Solar Works generates 380,000MWh annually (actually year 1 only and then declines) and the Proponent claims the BESS will provide 380,000MWh annually (actually year 1 only and then declines). As at least 20% more electricity is needed to charge the BESS. Hence, the BESS must draw electricity from the National Grid, much of which will be generated for many years yet by fossil fuel generating plants. Factor in the times the Coleambally solar works generates little or no electricity (with a claimed capacity factor of under 29% that means over 71% of the time on average annually) then the BESS causes a net increase in CO2. Its operation can never reduce green house gas emissions, only increase them, let alone offset the huge upfront embedded CO2e. Why did the Proponent claim the BESS will reduce emissions?

6. The claimed 380,000MWh annual output of the BESS means that 950 charge/discharge cycles occur each year (average 2.6 cycles per day). Using the provided 5000 charge/discharge cycles of a Lithium-ion battery, this equals an operating life of the BESS batteries of 5.3 years, not 15 years as claimed. Thus, total replacement of the BESS batteries, and possibly some equipment, could occur about 7 times over the claimed 40 years life of the BESS. Why did the Proponent make such significant errors? How much embedded CO2e in the initial creation of the BESS and will be caused by such frequent replacements of the batteries and equipment? Will the battery components and most/all of the equipment be sourced from China, the world's biggest CO2e emitter? Why did the Proponent claim the BESS reduces emissions? Is not the primary role of the BESS the regulation of the variable frequency caused by the variable output of the solar works?

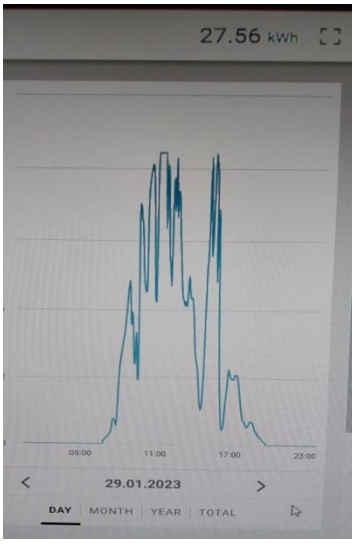
7. The Proponent stated that the equipment will be transported from the ports of Melbourne (424km) and also possibly Sydney (623km). It also stated that 100 heavy vehicles a day would deliver equipment during peak construction. Elsewhere it stated 25 B-double trucks a day (50 movements a day) during the peak. Using Melbourne only, and just taking the 100 heavy vehicle movements a day, during peak construction (say 5 months or 110 work days) and 50 movements in non-peak (say 4 months or 88 work days), a conservative estimate of the diesel fuel burnt and the CO2 produced by these heavy vehicles is 3,909,465 litres and 10,317,944kg respectively. In addition, 29,366 litres of oil would be consumed. Other vehicles and the concrete base also add CO2e to the project. The Proponent does not provide any evidence to support its statements that the BESS will reduce CO2e. Why did the Proponent claim the BESS reduces emissions?

8. The Proponent claims that the BESS may reduce wholesale electricity prices, but elsewhere suggests cheaper electricity to the consumers will result. The BESS must recharge from the grid. It therefore places a demand on the grid, which should result in increased wholesale prices, particularly when wind and solar generation is very low or zero. Excess electricity

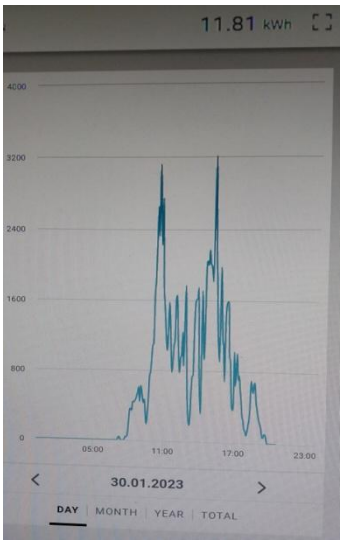
generation is infrequent and of short duration due to the intermittency of wind and solar electricity generation. Wind droughts are common, as are consecutive cloudy days. The charts of actual solar output in summer are shown below to demonstrate the variability of PV solar generation. The best totally cloudless summer day in a NSW REZ is bell shaped, but this is very rare. Cloudy days are the norm. The overcast day produced under 27% of the electricity produced on the rare cloudless day. The other seasons are similar, but of course very much lower total output across all days. The phasing out of coal fired plants will exacerbate the problem of recharging the BESS. Is the Proponent suggesting that its BESS will recharge from other electricity storage facilities when insufficient generation occurs from wind and solar plants? Is this is what is meant by perpetual energy? Or can it be described as a circular economy? What use is a flat BESS?



Cloudless day (rare) 100%



Variable cloudy day (62.8%)



Overcast day (26.9%)

9. The capital cost of the BESS is stated as $184million dollars. The Proponent stated in the EIS that the "Disadvantages of batteries include their relatively limited life, potential hazardous material construction, and sensitivity to climatic conditions." We agree. The simultaneous replacement of the batteries and the upgrades to equipment are frequent and very costly. The initial capital cost, very high operating/replacement costs, the energy losses, the funding costs, the profit margin and the decommissioning, disposal and rehabilitation costs all have to be recovered from the difference in buying electricity and selling electricity. The BESS does not generate electricity and only puts 75 - 80% back into the grid of what it took out to be charged. It is therefore a net consumer of electricity. If the project qualifies for subsidies this may offset some of the BESS costs, but it will increase the burden on State and Federal budgets. Obviously, all these costs increase the overall electricity system cost, which is passed onto the consumers and taxpayers. Will the Proponent's project remain viable if Lithium battery prices continue to increase? Will the Proponent's project remain viable when small nuclear reactors (SMRs) enter the market? Will the Proponent's project remain viable if there is little or no excess electricity available? Will the Proponent's project remain viable if replacement batteries are in short supply due a shortage of battery materials, such as Lithium?

10. Renewables projects usually qualify for subsidies or benefits. The Proponent has not included any reference to these benefits. Does the BESS Project qualify for any subsidies (e.g. RET) or any NSW or Government or assistance (e.g. ARENA loan)? If so, what is the estimated value of the total benefits? Will the Proponent be applying for such benefits?

Our Objections Part 2
Save Our Surroundings (SOS) objects to this BESS project because there are still so many unresolved concerns about risks and issues involved with Battery Energy Storage Systems (BESS), for instance:

1. Lack of research
2. Resource intensive requirements
3. Involves slavery
4. Environmentally damaging
5. Fire starting risks
6. Fire-fighting dangers
7. Local fire risks increased
8. Expensive
9. Short life-span
10. Variable operation
11. Little Australian content
12. Increase energy and sovereign risks
13. Impacts on roads and travel
14. Electricity requirements are high
15. Classed as hazardous goods
16. No certainty at end of life of BESS
17. Increasing dependency on intermittent electricity generation
18. Viability
19. Keep electricity prices high.

Each of these points are presented in more detail below. We require the Proponent to respond in detail to these concerns and issues and the DPE to satisfy itself that all responses are accurate and adequately address the matters raised by SOS. Generalised responses and/or amalgamated answers are unacceptable.

1. Lack of data and research

There is very little research into the life-cycle of BESS works, especially under the harsh conditions found in regional Australia, as stated by TWAICE, as follows:

"Energy storage system projects are designed with an outlook into the overall lifetime of the battery, and the fact that the battery will perform at a certain level during this time.

However, unlike in the mobility sector, energy storage system designers do not have access to a lot of data from the field that indicates how the battery will behave under different conditions in the future. Additionally, energy market regulations and rules are changing, sometimes unforeseeable, and hence not all future use cases can be anticipated."

Therefore, there are valid concerns that regional people have about industrial scale BESS works, whether stand alone or as part of an industrial wind or solar electricity generating works. It the regions of NSW, Queensland and Victoria where Renewable Energy Zones have been declared and these massive industrial developments are proliferating. It is the residents of the regions that have their lives disrupted for decades, their amenity destroyed, their jobs lost, their roads damaged, their travel times extended, their properties put at risk, their wildlife diminished, their health at risk and their lives put at risk.

What we do know already is that the Lithium-ion batteries: are classed as hazardous materials and require special handling and operation under temperature controlled conditions; catch/cause fires;

emit toxic smoke when on fire; fires are chemical reactions and so are extremely difficult to extinguish; increase the danger to fire-fighters; probably involve slavery to mine materials; almost exclusively made by the world's highest CO2e emitter; will periodically require recharging from the grid, which increases demand on the grid; require much more input energy than they can deliver to the grid; are resource intensive; are very costly to produce; increase electricity costs, are environmentally damaging to produce; have much shorter lives than the electricity generators; do not recycled easily; are costly to recycle and dispose of; typically are constructed on agricultural land; only briefly supply electricity to the grid; main purpose is to stabilise voltage frequency variations caused intermittent solar and wind output, and; contain very little Australian content.

At this stage, the batteries are "not fit for purpose" as a near 100% backup supply of electricity to meet Australia's modern society energy needs. There are just far too many risks and issues not being considered. BESS works are being too rushed without due diligence of the short, medium and long term consequences. The precautionary principle and intergenerational equity considerations must be applied.

Detailed research encompassing Australian conditions must be undertaken to fully and properly assess BESS proposals (stand alone or otherwise) before approving any more BESS works.

2. Resource intensive requirements

Studies show, if the TOTAL life-cycle (e.g. mining, processing, manufacturing, transportation, land acquisition/lease, land clearing, construction, operation, maintenance, decommissioning and disposal/recycling/land rehabilitation) of wind/solar/BESS works and the associated extra supporting infrastructure needed creates a greater requirement for varied resources than any other alternate energy generation.

The Kathleen Valley WA lithium project needs to mine **139 million tonnes of ore to get 1.8 tonnes of lithium** (**1.3% yield**). The extraction and processing of lithium requires considerable heat and the by-products, such as chlorine gas, which can contaminate the soil, air and water. More extensive mining and all the habitat destruction, polluting activities and transport will grow and grow as more batteries for renewables backup/grid stabilisation and electric cars expands.

For example, a Tesla utility scale power pack weighs **2199kg** and contains about **45kg** of lithium, which equates to mining **3,475,000 tonnes of ore per power pack**. Lithium batteries used in a BESS weigh many tonnes. A 200MWh battery weighs over 4,800 tonnes and so contains 98,000 kgs of lithium, which involved mining a staggering 7,568 million tonnes of ore.

Open cut Lithium mines, many of which could swallow several regional towns in just the Central West NSW

Lithium-ion batteries require the mining of lithium, graphite, nickel, manganese, cobalt, copper, neodymium and dysprosium, as well as inputs of aluminium and steel. Large concrete bases support

the BESS, so requiring more mined, processed and transported materials. Similarly, a great deal of mining is required for the other metals, some of it in previously untouched wilderness areas.

For example, a Tesla utility scale power pack weighs **2199kg** and contains about **45kg** of lithium, which equates to mining **3,475,000 tonnes of ore per power pack**. The Hornsdale Power Reserve in South Australia uses over **150** Tesla Power Packs. Thus, 521,250,000 tonnes of ore had to be mined, initially processed, shipped to China for further processing and ultimately used to make batteries. Compared with a natural gas power plant, the total mining required for solar, wind and their backup is at least **10** times as many total tonnes mined, moved, and converted to deliver the same quantity of energy.

Batteries are not a good environmentally friendly backup storage solution for wind and solar electricity generators. The industry is not sustainable and the BESS proposals must be rejected.

3. Involves slavery

Cobalt is an input into lithium batteries. Cobalt and copper are mined in the Democratic Republic of the Congo. It is well established that a significant proportion of the mined cobalt comes from artisanal mining. The children and adults, who face death, abuse and poor health, are slaves. As the cobalt mined commercially and that mined by artisans is easily intermingled it should be assumed that some of the cobalt in any BESS is provided by slave labour.

PV Solar Works, at least some of the time, supply the electricity to charge the BESS. Solar panels are mostly manufactured in China. It has been established that slave labour is used by Chinese manufacturers of solar panels. Millions of Uyghur Muslims and other minority groups in China are reported to be used as slaves in the manufacture of polysilicon wafers, which are used in the manufacture of solar panels. 90% of solar panels in Australia are sourced from China. Yet we allow overseas developers to continue to import solar panels from China, which are then used to recharge battery energy storage systems.


Democratic Republic of Congo: E.g. of artisanal mining of cobalt, used in batteries, destroys many African lives

A recent planning panel condition was imposed on a proposed solar works development that required a verifiable undertaking that no solar panels would be used by the developer that had any element produced by slave labour. As a moral company, we hope that the Proponent of this BESS accepts a similar condition. Assurances that they will comply with all Federal and State Modern Slavery Act laws is not sufficient.

The proponent must prove that their BESS will not contain or use materials produced through the use of slavery and accept a condition of independent verification of the source of their BESS components and materials.

4. Environmentally damaging

Lithium batteries used to backup wind and solar industrial electricity generating works contain toxic lead, cobalt and lithium and in themselves pose immediate and future risks to the environment.

Apart from the mining referred to above, the processing of lithium and of rare earths is extremely toxic. Although mostly done in China, the impact on their environments should not be ignored by Australians just for our "benefit". Neodymium, dysprosium, rare earth minerals are mined and processed almost exclusively in China and which have covered large tracts of China with fields and lakes of toxic waste.

Toxic "lakes" in Baotou China from processing rare earths

The extent of increased mining, the toxic processes polluting the environments of other countries, the transport by sea and land, the clearing in regions of Australia of tracts of agricultural and bushland, the reduction of wildlife or the risk of pollution to air, land and water is staggering.

This wholesale destruction of ecosystems, which is against the concept of environment protection, is of very serious concern to regional Australians. Biodiversity is not just endangered flora and fauna in part of a region. Biodiversity refers to every living thing, including plants, bacteria, animals, and humans.

The proponents and authorities are ignoring this environmental vandalism. They must not do so any longer. All assessments of the BESS proposals must take account of the wider damage to all the environments on which the project relies.

5. Fire starting risks

In April 2021 in The Woodlands Houston USA, a Tesla Model S Electric Vehicle crashed into a tree and ignited. It was reported that the fire department took 4 hours and used 30,000 gallons (113,562 litres) of water to try to extinguish the burning lithium batteries, but eventually had to let the fire burn itself out.

In November 2022 alone the ACCC recalled lithium batteries for almost 5000 households with solar systems because they were dangerous (fire risk). Two trucks, one of which was transporting lithium batteries, collided and both trucks we burnt to just ashes. An e-bike warning was issued after Fire and Rescue NSW responded to 180 Lithium-ion battery fires since January 1, 2022. Some of these fires occurred in lifts and homes. FRNSW stated, *"When Lithium-ion batteries fail, they are prone to 'thermal runaway', which sees them build up intense heat until they violently burst, causing toxic , flammable and explosive gases and flames that are extremely difficult to extinguish"*. There are numerous other examples of lithium batteries causing fires spontaneously, while charging, and in accidents.

Even worse was the fire that occurred in the 350MW/450MWh Battery Energy Storage System (BESS) during testing on 30 July 2021 in Geelong, Victoria. One of the 13 tonne battery packs caught fire. More than 30 fire trucks and support vehicles and about 150 fire-fighters from CFA and Fire Rescue Victoria responded to the incident. It burned for three days and resulted in the evacuation of some residents and others advised to close all windows and doors, turn off heating and cooling systems, and to bring pets indoors, because of the toxic fumes generated. Fire-fighters had to let the Lithium battery pack burn out, as water and ordinary fire suppression measures cannot extinguish a Lithium chemical reaction fire. If a BESS were consumer product they would be recalled because of the fire risks alone. They are listed as hazardous goods for a very good reason.

A BESS catches fire in Moorabool-Geelong and ties up emergency services for days. How will rural fire services possibly cope with hundreds of BESS installations scattered across a few REZs, mainly in solar and wind works?

The risk of BESS fires interrupting electricity supply for long periods, creating environmental disasters (grass fires and air pollution, risks to fire-fighters) and requiring special air-conditioned cabinets to maintain battery temperatures between 25 - 30C are unacceptable risks to local communities. Especially when BESS are being located in regions where temperatures reach well over 40C and blackouts and power supply interruptions are frequent. Multiple BESS are usually close to populated properties and regional towns. How many BESS will fail! Especially when it only takes one of the many thousands of battery cells in a battery pack to fail. Toxic fumes can cover a large area and so polluting residents' only sources of water, such as tank water and dam supplies, thus endangering the health of people and animals.

The developers may find the risks acceptable now because they will, in all likelihood, not be the owners in the future. The people who live near or work in a BESS Works do not accept the risks. Fire-fighters should not have to endure the extra risks a BESS creates. Truck drivers and other transporters are taking risk with moving the batteries over large distances. The risks are real and occur now.

Yet these risks are largely ignored by the proponents and authorities. They must not do so any longer.

6. Fire-fighting dangers

Most BESS works are located near regional towns. The Rural Fire Service NSW, or its equivalent in other states, is responsible for non-town fires and therefore are the first responders to fires in the sites in which solar, wind and BESS works exist. BESS are usually co-located with wind and solar works but can also be stand alone.

In any case, RFS volunteers are not permitted to enter a solar works and have limited ability to fight a wind turbine fire. Their directive is the preservation of their safety. High voltages and toxic fumes mean that RFS personnel only try to contain the perimeter of a wind, solar or BESS works.
Some RFS units are upgrading their breathing and other equipment, at their expense, and training to even fight a wind, solar, BESS fire at the perimeter. This imposes extra costs and risks to our volunteer fire-fighters. It is only necessary because of the imposition of wind, solar, BESS works in their jurisdiction.

Water will not extinguish a BESS fire, as evidenced previously with the Geelong battery pack fire that burnt for four days. It is a chemical reaction and burns without oxygen. The FRNSW has commissioned an study into how to deal with large Lithium-ion battery fires in EVs, etc. especially when occurring in buildings and tunnels. The report is due in June 2023.

The very volatile nature of large Lithium batteries and their proliferation means the risk to fire-fighters and residents will increase dramatically in the next few years if BESS works proliferate unchecked.

Our fire-fighters and residents should not be subjected to these BESS fire-starting risks. Fire-fighters are not allowed to publicly express their concerns. Their organisations therefore suggest to proponents a mitigation requirement, which is totally inadequate. For example, a 400MW solar works with 200MW BESS near Gulgong NSW was only required to put in one 20,000 litre water tank and a fire management plan posted at the entrance to the fully fenced off 17.72 km2 site. A resident who builds on just a 6 hectare (0.06km2) property near the Gulgong town is also required by Council to reserve 20,000 litres for fire-fighters. See the absurdity?

The proponent of a BESS is putting our fire-fighters and residents at unacceptable risk and cost. BESS projects should be subject to a full enquiry as to all the risks and adverse consequences their projects cause.

Will the proponent and recommending/approving authority require such an inquiry before approving the project? Lives and property are at stake!

7. Local fire risks increased

Apart from BESS starting fires and Fire-fighters at risk of fighting them, there are local risks. Grass and bushfires are a constant risk throughout the year and particularly during dry windy periods. For example, three fires occurred in August and September 2022 in or near the Beryl solar works. The first was an equipment fire. The second was a major emergency, calling in over a dozen fire-fighting appliances and several emergency services crews from a 35km radius, as well as three water-bombing helicopters, to prevent a grass fire from entering the solar works. Conditions were relatively benign, the dams full and the ground soggy, but it took four hours to bring the blaze under

control.

Photo taken from the RFS video. Part of Beryl solar works, near Gulgong NSW, is visible along the top of the photo

In 1983/84 grass fires in the Western Division of NSW killed 5 people and 40,000 stock. An area of 3,500,000ha (35,000km2) was burnt. Today wind, solar and BESS works are being built, approved or proposed to be built on some of this same land, including land that has been classified as fire-prone.

In February 2017 the Leadville-Dunedoo fire, which is now located within the centre of the NSW CWO REZ, started with a spark and proceeded over 24 hours to destroy 35 homes, 6000 livestock, untold wildlife and 500km2 of farmland/bushland. Such can be the ferocity and extent of out of control grass fires when conditions are adverse, which is not infrequent.

With limited road access and access to water it is extremely difficult to contain a grass fire in dry hot and windy conditions. The high fencing surrounding solar works and the 250 metre plus tall wind turbines add significantly to the risks faced by the local communities. Access by road and air is much more limited. The existing, approved and in planning developments will, if all built, cover hundreds of km2 of land within a 20km radius of Gulgong. This additional risk applies to all towns with such wind/solar/BESS developments so close to their properties and towns.

February 2017 Central West NSW Leadville-Dunedoo fire front

Why we hate grass fires

Almost exclusively, the renewable energy zones include mainly agricultural land and some bushland. Therefore, wind, solar and BESS works are not only constructed on such land, but are surrounded by it. Thus, a grass fire, for example, outside of a wind/solar/BESS site threatens the works and can damage it if it passes the perimeter. Burning wind/solar/BESS works are very toxic and very difficult

to extinguish. As different wind/solar/BESS works can and do adjoin each other, it is possible a huge amount of capacity will be lost during a catastrophic fire like the Leadville-Dunedoo fire.

Why should local impacted communities have to live with this additional risk of losing everything, even their towns! Electricity supply capacity is at risk too. The BESS should not be approved.

8. Expensive

A BESS utilising Lithium-ion batteries is an expensive method of storing electricity. Anyone who wants to replace the lead acid battery in their caravan with an equivalent capacity Lithium battery will attest to that.

Using the Hornsdale Victoria BESS, the world's biggest battery in 2017 as an example one sees the size of the issue.

The **7,500** hectare Hornsdale Windfarm in SA has a capacity of **316MW** and a claimed capacity factor of **37.9%** (1,050GWh annually). When the wind turbines are becalmed, sometimes for days, then no electricity is produced. Advocates for renewables claim battery backup (they oppose coal, natural gas and nuclear electricity generation) can fill this void.

On average, wind electricity generating works in Australia do not produce electricity for 72 hours of each week. How much would the Hornsdale Power Reserve batteries (currently **150MW/193.5MWh** in size) need to be expanded to supply the backup electricity needed for, say, 72 hours before being exhausted? A staggering increase of **118** times as large (316MW x 72h /193.5MWh). The Hornsdale Power Reserve cost about **$130m** (stage 1 was $90M), required 1ha of concrete slabs and 4.3T of batteries and inverters). Scaled up 118 times comes to **$1.534 billion cost**, **118ha of concrete slab** and **504 Tonnes of battery equipment.**

Compare this with AGL's previously proposed **250MW** capacity, **90%** (1,971GWh annually) capacity factor, dual fuel combined cycle gas turbine with carbon capture plant (CCGT-CC) on only **91ha** at a cost of only **$400m** and expected life of **25 years**. The CCGT has longer life than the Hornsdale wind turbine plant yet produces nearly twice the electricity output annually and when required almost 24/7 at a very much lower capital cost and demand on resources.

To achieve a backup storage works for when the wind does not blow as required and the sun does not shine when needed the cost of BESS storage is enormous and will increase overall electricity system cost substantially. The short life span of batteries will require replacement relatively frequently, so adding to future system costs. A BESS may be useful for grid stability but it is too expensive compared to better lower cost alternatives of base-load generation.

The BESS is "not fit for purpose" as the costs are prohibitive to be a significant method of back up for intermittent and unreliable wind and solar works. The BESS should not be approved.

9. Short life-span

Unlike in the motoring sector, battery energy storage system designers do not have access to a lot of data from the field that indicates how the battery will behave under different conditions in the future. Additionally, energy market regulations and rules are changing, sometimes unforeseeably, and hence not all future use cases can be anticipated. This is particularly true for Australia.

This lack of transparency leads to increased risks for the integrator, which can be minimized with strict warranty conditions, but which become increasingly stricter the longer the term of the warranty. There are many things that affect BESS performance and longevity, such as:

- capacity usage;
- cycling degradation;
- rest time;
- state of charge (SOC),
- temperature and;
- other metrics,

  which all impact the performance and degradation of battery cells that make up a battery pack. For example, battery cycles per day affect life (capacity retention). When a 70% capacity level is reached at two cycles per day, the expected life is 13 years. At 1.5 cycles/day a 15 years life and at 1.0 cycle/day a 17 years life. This is just one variable.

In addition, battery capacity declines over time, which is why manufacturers limit their warranty, with increasing stricter conditions, to still being above 70% capacity after 7 to 12 years. In any case, the batteries of a BESS, and probably other components, will need to be totally replaced at least once or possibly twice before the wind or solar works charging the batteries reach their end-of-life.

The short life-span of a BESS should be considered a major negative to achieving the claims made about being a major backup for intermittent and unreliable wind and solar works. The proponent must provide transparency of this fact, including life-span and replacement projections and costs.

10. Variable operation

Little detail is given on the operation of the BESS. Lots of things affect the operation and life of batteries, including downtime for maintenance checks, which may take 3 days or more.

In addition, external temperatures can range from well below zero degrees Celsius to well above 40C, especially west of the Dividing Ranges. Thus, the BESS air-conditioning units will have to maintain the ideal battery temperature over extreme external temperature ranges for 24 hours every day. Failure of the air-conditioners to do this could lead to the batteries failing, especially during charging during the hottest part of a sunny day when a solar works is putting out its maximum output. The result may be a shutdown of the charging or a fire. Either way, output capacity would be reduced or lost.

The likely biggest impact on the capacity of a BESS to deliver electricity to the grid will that it is not fully recharged. On average, wind and solar works only produce electricity over a year under 30% of the time. But there are many times when wind and solar produce no electricity or very little. For example, a fully charged 500MW/1000MWh BESS in its first year of operation (it declines after that) can only provide full power for two hours. A single 500MW gas turbine can provide full power night and day. The gap in performance is huge.

The question is how often will a particular BESS not be able to provide electricity when needed, mostly at night or cloudy and windless days/nights? The proponent must be transparent on this. Our electricity system reliability and availability is dependent on the assumption that BESS works are the solution to wind and solar intermittency and unreliability. But the short lifespan, variability and decline in capacity indicates that the operation of a BESS can only provide electricity a fraction of the time when needed. Therefore, the BESS is "not 'fit for purpose" as a backup for wind and solar works.

The proponents of a BESS must explain how their BESS proposal will actually meet the needs of electricity consumers when, over a large geographic area (e.g. most of a state or states) there is no or little sunlight and no or inadequate wind, especially when both simultaneously produce no electricity at all.

11. Little Australian Content

Claims by BESS proponents that their multi-million dollars investment is good for the town/region/country lacks any detail. The BESS components are made overseas, transported by overseas owned ships, pass through Australian ports partially owned by overseas companies, are constructed by overseas companies, employ few workers once operational and any profits are remitted to the overseas owners and investors. The true investment value is the Australian content of the total investment. How can the financial benefit to the community and Australia of a proposal be properly assessed without knowing the Australian content?

The BESS proponent must declare the actual dollar and percentage Australian content of their proposed project.

12. Increase energy and sovereign risks

China is by far the largest manufacturer and exporter of wind, solar and BESS components to the world. Even a higher percentage is exported to Australia. It is therefore a safe assumption that a BESS will contain Chinese made components. China also controls most of the supply and processing of materials essential for BESS batteries, such as lithium and cobalt. The reliance on China to supply the initial components and then continue to provide warranty support, spare parts and replacement components for the claimed 20 or so years life of the BESS is both an energy supply risk and a sovereign risk to Australia.

Without a reliable, low cost and available electricity supply system Australia is vulnerable to the discretion of the Chinese government. Our ability to run our society would be seriously compromised without enough electricity to run our industries, our businesses, our transport and our households. With no alternative to producing electricity than from wind and solar works, yet at the same time increasing our use of electricity for electric vehicles, wholly electric industries, wholly electric homes and businesses, Australians will be very vulnerable to any geo-political shocks, as is being experienced in the Northern hemisphere with the Ukraine-Russian war.

Overseas developers may care little for what happens to Australia after they have built their project and left. However, it is of serious concern to Australians now and for future generations.

The Proponent must state the sources of all their BESS components, materials, etc. as part of the EIS (or equivalent) and be held to them, so that the energy and sovereign risks can be assessed properly by the communities affected and the public in general.

13. Impacts on roads and road travel

The construction of a BESS involves the movement by heavy vehicles of thousands of tonnes of components over hundreds of kilometres. Often a BESS is also part of a wind or solar project or a standalone BESS that is simultaneously using most of the same transport routes as other projects.

For example, the Central West Orana Renewable Energy Zone is over 300kms from the Newcastle Port, from where nearly all the overseas components are delivered. There are few main roads servicing the region. Many thousands of extra very heavy and very large truck movements are planned for every day, year after year to use these main roads. These roads are already in poor

condition, even before the extra trucks start in large numbers. In addition, increased traffic on local roads results from cement trucks and workers' vehicles.

A rural road intersection with a primary road, used by heavy vehicles for building a solar/BESS works

Three significant outcomes will result from these extra heavy and light vehicle movements. Firstly, the damage to the main roads and local roads will be increase significantly. Secondly, road travel times for road users will increase due to the increased number of slow moving heavy vehicles and the need for increased road works. Thirdly, the financial costs falls on the taxpayers, ratepayers and local businesses. Additional road repairs are a cost to taxpayers and rate payers with little contribution from the developers. Slower travel times will reduce the number of visitors/tourists to regional towns, especially the weekend and festival travellers, which will reduce the income of local businesses. It also impacts the time to get inputs to the farmers, businesses and manufacturers and produce and goods to market, so increasing the cost of food and goods.

Proponents dismiss these cumulative impacts. They also claim business will increase, but do not take into account lost business customers and affects of loss of staff. For small towns this loss of business is very significant. The loss of agricultural land for wind, solar and BESS works also impacts jobs and businesses of regional towns. If businesses fail, especially in hard economic times like now, then the whole town will go into decline.

Another huge cumulative impact that is being ignored is that of what happens in 20 odd years time. The Federal Government's target by 2030 is for renewables to make up 82% of the NEM electricity generation mix. This means that most of the generating capacity from wind and solar will be built by 2030 and so be of similar age. Average economic lives of wind and solar works is 20 -25 years (much less for a BESS). Therefore, a total replacement/refurbishment of most of the electricity system will be required to start before 2050 and be completed in about a decade.

The proposal should be rejected because of the damage done to roads, travel times, businesses and rural towns sustainability. The replacement cycle must be provided.

14. Electricity requirements are high

Charging a BESS requires about 20% more electricity than the BESS will supply. For a standalone BESS this is higher, as they take alternating current (AC) from the grid and then have to convert it to direct current (DC). This involves additional losses in energy transformation. Further losses occur in converting DC to AC and then transmitting the electricity over huge distances to where it is consumed. For instance, all of the electricity produced by the Beryl solar works, located 300kms from Sydney, is contracted to Sydney organisations. Not a very efficient way to distribute electricity.

Because of the efficiency losses, especially for transmission over long distances and for charging multiple BESS works, and the infrequent generation of electricity by wind and solar works, the whole grid has to be very much larger to meet the end demand. The greater the proportion of wind and solar works in the electricity generation mix the very much bigger, and more costly, the electricity system becomes. That is, a lot more electricity has to be produced. The electricity production requirement will be ever expanding just to cope with constraints caused by the design of the grid, even before extra demand for electricity storage facilities, EVs, fully electrified households, businesses and existing and new industries become significant.

The proponent of a BESS must detail the expected alternating current output it will provide over its estimated economic life and the expected electricity it will consume, so that a better understanding of the net impact of the project and the cumulative impact on the system can be properly assessed.

15. Classed as hazardous goods

Lithium batteries are classified as Class 9 Miscellaneous Dangerous Goods. The Australian government product safety department warns that "*Lithium-ion batteries have caused fires and explosions leading to property damage, serious injury, and even death in Australia and across the globe".*

There are many reports of such events, some of which were stated earlier. A freighter carrying electric vehicles sank after a fire started in the hold. A shipping company recently decided to refuse to transport electric vehicles. Trucks carrying lithium-ion batteries have crashed and burned. Whole parked electric bus fleets have burned to the ground after one electric bus burst into flames, so fierce was the fire. EVs have caught fire while being charged. The FRNSW recommends not charging EVs near buildings or in underground car parks. But EVs still catch fire even when not being charged. Of course the battery packs of BESS works have caught fire and have exploded.

The dangers of lithium batteries are well known, yet are given little attention when evaluating wind/solar/BESS proposals. The accumulation of tens thousands of tonnes of battery packs, involving hundreds of thousands of battery cells, almost guarantees that multiple BESS fires will occur over the lives of the BESS works. It only requires one battery cell to fail and catch fire to set off a chain reaction. The accumulation of tens thousands of tonnes of battery packs applies just for one REZ. This can be multiplied dozens of times.

One the most feared events in regional Australia is out of control grass fires. Yet the concentration of lithium batteries around our towns is scandalous. In addition, they pose dangers when being transported and when in situ. A burning BESS releases extremely toxic smoke and will burn for days, despite the efforts of fire-fighters. Which towns will have to be totally evacuated, have their water supplies contaminated, their roofs covered in toxic materials so that they cannot replenish their water tanks with rain water, and live with the affects of contaminated soil, water and air?

No proponent can guarantee a disastrous fire will not occur in their BESS at some time. The mitigations proposed are more relevant to a standard building catching fire not for the toxic BESS on grazing land and surrounded by grassland. The precautionary principle must apply.

The proposed BESS should not be approved on safety reasons alone. The risks are too great. the Precautionary Principle must be applied as legislated.

16. No certainty at end of life of BESS

Currently, recycling Lithium-ion batteries is not widely practised. Despite the high number of lithium batteries discarded each year from small appliances and devices, only a small percentage undergo any sort of recycling. The advent of growing numbers of large scale batteries in each BESS and in electric vehicles will dramatically increase battery waste this decade and well beyond**.**

According to the CSIRO: only 10% of Australia's 3,300 tonnes of lithium-ion battery waste was recycled in 2021, compared with 99% of lead acid battery waste. Lithium battery waste is growing at 20% a year. Most of Australia's battery waste is shipped overseas, with the remaining waste going to landfill, leading to potential fires and environmental contamination.

The difficulty and high cost of any recycling lithium batteries is still a barrier. Recycling lithium batteries is inefficient, expensive and produces toxic waste. If battery prices fall, as we have seen with solar panels, then recycling of batteries will be even less likely. If battery prices rise significantly due to a shortage of metals then recycling may increase as the metals in the batteries are more valuable. But this also means new BESS works are even more expensive to build too. However, if battery prices rise then demand will fall and recycling may again become uneconomic. Also, if new and improved battery technology is invented then lithium batteries will become obsolete and discarded with little or no value in recycling.

What we know now is that the growing waste from lithium batteries is not widely recycled. There is no guarantee that the batteries in each BESS will ever be recycled, let alone to a 99% level as for lead acid batteries.

With such an uncertain future for disposing of end of life lithium batteries used in each BESS, a precautionary approach must be adopted ahead of any approval of the project. The proponent states that at the end of life of the BESS that they will decommission the BESS, dispose of the infrastructure and rehabilitate the land, which may be contaminated, to its previous condition. At this stage of the planning process they offer nothing to ensure such work will or can be undertaken.

A lot can change over 20 years. The technology could become obsolete, the BESS could change ownership, the developer could fail, the landholder ownership may change, the land abandoned, the BESS become uneconomic to operate, be damaged beyond repair, be unable to acquire spares and replacement components, the BESS owner or/and landholder could have to pay compensation beyond their available funds, so abandoning the BESS.

If the proposed BESS project is approved it must be with a condition that an indexed bond be lodged to a government or Council trust fund before any work is commenced. And that the initial amount will grow annually to sufficiently cover the independently determined estimated future costs of decommissioning and disposal of the BESS and rehabilitation of the site.

17. Increasing dependency on intermittent electricity generation

Of concern with the BESS proposal is that it will become more dependent on intermittent, unavailable, wind and solar electricity generation as coal and gas electricity generation is rapidly phased out. Within the next decade the BESS may be able to recharge at various times of the day and night.

However, each BESS will become increasingly reliant on when excess electricity is available from the a grid that is almost only supplied by wind and solar works electricity generation. We know that solar works or wind works do not generate electricity more than 30% of the time on average over a year. That leaves a huge gap on when a BESS can be charged and also means there is never enough electricity being provided to supply demand, even during the day, when the eastern states are simultaneously in a wind drought and there is little or no sunshine, such as at night. Europe and the UK were in exactly that position in 2021,when they only had less than 30% dependency on wind and solar electricity generation. How will we overcome this problem? High Efficiency Low Emissions (HELE) power plants, and/or nuclear plants/SMRs perhaps.

The BESS proponent must explain how they intend providing electricity when the solar and wind dominated grid is predominately powerless, i.e. little to no wind or solar works electricity generation.

18. Viability

It is claimed by proponents that their project will put downward pressure on wholesale electricity prices. However, the retail costs continue to rise steeply because of increased infrastructure costs (e.g. Tas-Vic underwater cable > $1b), massive subsidies ($13B in 2019 or 39% of household electricity bills), financial support and favourable regulations ($22 billion yearly by 2030), massive losses and write-downs and enormous cost blow outs (e.g. Snowy 2.0 $2B to $10B and growing, NSW-SA interconnector $1.35B to $3.32B before its even started) have to be recovered from the consumer or taxpayers.

In NSW, each landholder, over which new transmission lines will cross their land, will get paid and indexed $200,000/km over 20 years. In addition, each landholder will get a one off compensation payment for compulsory purchase of easements. Over 28,000km of new high voltage electricity transmission lines is now anticipated at a 2022 Federal Budget cost of $80 billion.

In addition, add the failure in 2018 of RC Tomlinson, with a loss of 3,400 jobs and the failure of Clough Group (builders of Snowy 2.0 and the Interconnector) in November 2022 at a loss of 2500 jobs. Also, shareholders in Origin Energy and AGL, both ASX listed companies, have seen nearly 50% falls in the value of their shareholdings in less than 12 months. Both Origin and AGL had losses due to write-downs against profits. Companies like Downers and New Energy have withdrawn from the market place. AGL wrote off over $2.8billion on a wind electricity generation contract in 2021. Sun Cable went into voluntary administration in January 2023.Ultimately the consumer pays for all these extra costs. We suspect there will be many more cost blowouts and company failures to come, both during and when the current boom, as one developer stated in 2021, in "renewables" ends.

Given the turmoil already evident over just the last few years in the renewables industry in Australia, how can anyone have any confidence that the Australian companies or even their overseas owners will exist in a decade or two. Claims by proponents that they are in it for the long haul are not supported by the facts.

If the proposed BESS project is approved it must be with a condition that an indexed bond be lodged to a government or Council trust fund before any work is commenced. And that the initial amount

will grow annually to sufficiently cover the independently determined estimated future costs of decommissioning and disposal of the BESS and rehabilitation of the site. In addition, as the battery units have to be replaced frequently, there should also be a separate replacement fund to ensure the BESS will remain operational for its claimed operating life?

19. Keep electricity prices high

It is often stated that renewables put downward pressure on wholesale prices. However, what the consumers are interested in is what they have to actually pay for their electricity. It is a fact that no country or jurisdiction with over a 30% proportion of renewables has achieved lower electricity prices for consumers. This diagram from the NSW Energy website shows why:

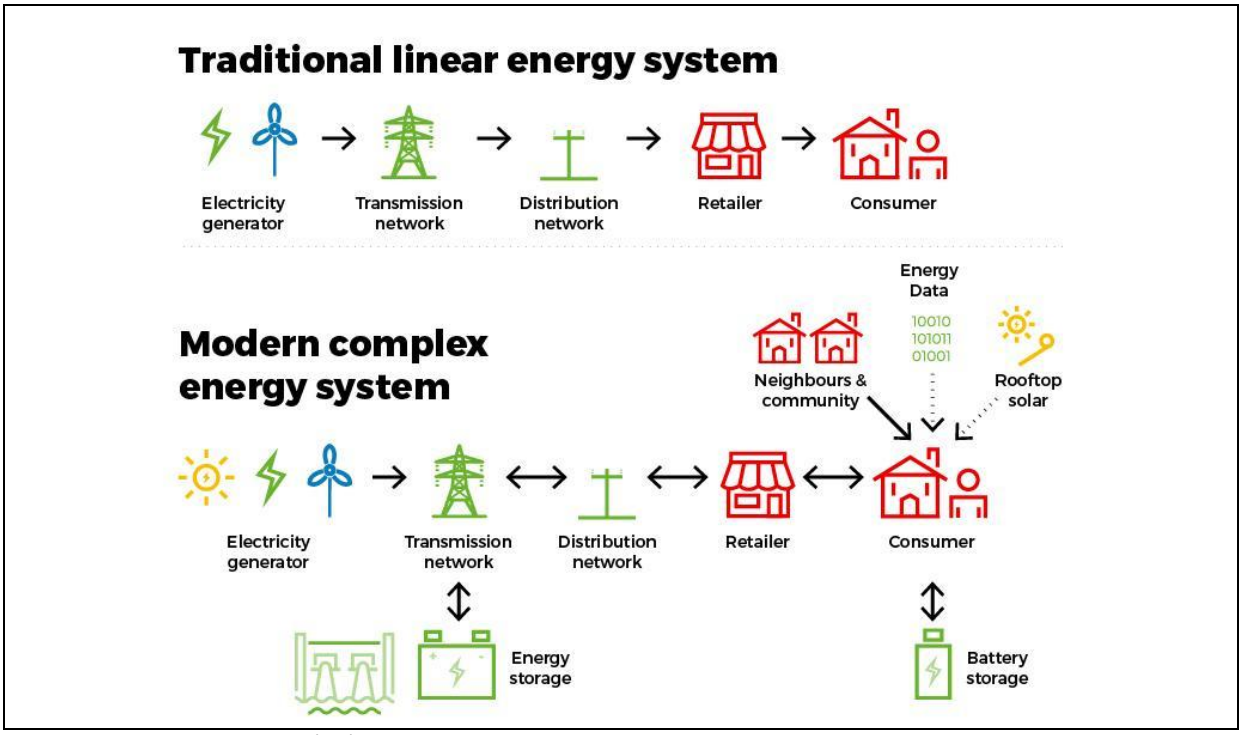


Diagram from NSW Energy 18/12/20 Renewable Energy in NSW | Energy NSW

Complexity adds cost and risk. Weather-dependent renewables alone cannot provide the electricity to run our society. They have to augmented with: expensive pumped hydro, of which Australia has virtually none; prohibitively expensive batteries that have to be charged frequently, so requiring even more wind and solar works and favourable weather; upgraded or new transmission lines and infrastructure, specifically to accommodate wind and solar generation; very much more difficult management of an unstable and complex system, something in which Australia has little experience.

Since late 2020 a lot has continued to occur that shows electricity prices must continue to increase, not decrease. UK, Western Europe, and the USA all face a bleak 2023 winter as electricity prices and power shortages were rising well before 2022, and then many-fold in 2022. Australia's AEMO had to suspend the spot market for wholesale electricity in June 2022 because of soaring prices and diminished supply to avoid wide-spread blackouts. The Federal government has just introduced in December 2022, price caps on coal and gas to hopefully reduce the extent of the budgeted 56% in electricity price rises in 2023 and 2024. But, any lower retail prices are just offset by subsidies to the coal and gas industry. Just moving costs around, but not fundamentally reducing electricity costs.

Proponents must stop making obviously false statements about downward pressure on wholesale electricity prices as this misleads consumers into thinking that the proposed project must be good if

it will reduce their electricity bills. It has not occurred anywhere in the world. To do otherwise is, in our opinion, outright deception.

The Proponent must remove any reference or suggestion that their project will reduce electricity prices and in fact indicate that electricity prices are likely to rise due to increased system costs.

Conclusion
The BESS proposal must be rejected.

The claims that the project will result in clean, cheaper and reliable energy generation are unsubstantiated and are contrary to the real world facts evidenced by both domestic and overseas experiences. It increases CO2e globally and the cost of NEM electricity. It therefore fails the two fundamental justifications for approval.

This proposed project will do little to address the already compromised energy needs of the NEM grid, let alone, Australia. In fact, it will make it worse as evidenced by overseas experiences in recent years and our own experiences in 2021 and 2022, with soaring electricity prices, blackouts, energy rationing and more business closures predicted for years to come.

The costs in net jobs, environmental damage, destruction of wildlife and habitats, visual pollution of natural landscapes, immediate significant increase in global greenhouse gas emissions, increased cost to electricity consumers and tax payers, cumulative disruption to local communities and others along transport routes, health and fire risks, possible use of slave labour, energy and sovereign security risk, and unfunded end-of-life costs, are just a few more reasons this project should not proceed.

Reject **SSD-23368211 BESS Works!**

Regards
Save Our Surroundings (SOS)
Save Our Surroundings (SOS) is part of a network of community groups across multiple states that share their experiences about, and research into, industrial wind, solar, BESS and pumped hydro proposed and developed projects and their impacts on affected individuals and regional communities.