Liverpool Range Wind Farm

Fact Sheet
15
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Battery Energy Storage System (BESS) Fact Sheet

Project Overview

As part of the Modification Application for the Liverpool Range Wind Farm (LRWF) project it is proposed to include a 150 Megawatt (MW) / 300 MW hour (MWh) Battery Energy Storage System (BESS) with an estimated investment value of approximately $180 million. Generally, the BESS will store energy generated from the wind farm when demand is low, and dispatch energy when demand is high.

A BESS facility was not previously considered as part of the original development application for the LRWF project and there are no references to a BESS facility in Development Consent SSD 6696 that was granted for the LRWF project in 2018. A range of technical assessments have been prepared to understand the potential environmental impacts associated with the BESS, including a Predictive Noise Impact Assessment (PNIA) and Preliminary Hazard Assessment (PHA), and to support the Modification Application.

Benefits

- Approximately **$24.3 million investment** to be retained in the **local area** during construction
- Approximately **150** direct and **240** indirect full time equivalent **jobs during construction**
- Approximately **7** direct and **20** indirect full time equivalent **jobs during operations**
- Procurement of **local goods and services**
- **Reliable** and **affordable energy** supply

Strategic Rationale

As the national grid continues to be supported by more renewable energy sources whose generation relies on variable conditions like the weather, there is an increasing need to provide 'firming' capabilities through energy storage technologies such as batteries.

A large-scale BESS assists with improving grid reliability by storing low-cost electricity (such as renewable energy), when there is an oversupply or during periods of low demand so that it is available when demand is higher.

Large-scale energy storage facilities also stabilise the grid during frequency disruptions and help reduce the occurrence of blackouts and the need for load shedding in instances of supply imbalance.

A BESS co-located with the LRWF will help maintain reliable and affordable energy supply for NSW and supports the state government's plans to drive new investment into as much as 12GW of new wind and solar generation capacity by the end of the decade.

Project Approvals and Environmental Impact Assessments

The original development application for the LRWF project did not consider a BESS facility and there are no specific references to a BESS facility in Development Consent SSD 6696.

As part of the early feasibility phase, we identified key environmental constraints across the LRWF site that informed where the BESS facility could potentially be sited with the aim of minimising environmental impacts wherever possible. Following this, a suite of technical assessments has since been prepared that considers the potential environmental impacts associated with the proposed BESS facility, including:

- Flora and Fauna
- Cultural Heritage
- Landscape and Visual Impact
- Noise
- Traffic
- Preliminary Hazard Assessment

The environmental impact assessments consider a very conservative 'worst-case' impact scenario which assumes that all seven potential locations for the BESS facility are utilised.

The following table summarises the key conclusions of each of the relevant environmental impact assessments and associated mitigation measures related to the BESS facility.

Specialist Assessment	Potential Impacts	Mitigation Measures
Flora / Fauna	All seven potential locations for the BESS facility are within areas that have either been cleared of native vegetation or are within areas of exotic vegetation such that no threatened flora or ecological communities are likely to occur, and no threatened fauna species are likely to occur regularly or be reliant on existing habitat. As such, there are no implications for the BESS facility under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) or NSW Biodiversity Conservation Act 2016 (BC Act).	Where works are required near areas of native vegetation, appropriate vegetation protection zones ('No Go Zones') will be established to ensure no construction vehicles or personnel enter these areas.
Cultural Heritage	Two (2) separate Aboriginal Cultural Heritage Assessments (ACHAs) have been undertaken to assess existing cultural heritage values and to ensure adequate mitigation and management protocols are in place to protect cultural heritage. The field surveys and ACHA reports have been undertaken and prepared in consultation with the registered Aboriginal parties. All seven potential locations for the BESS facility avoid impacts to known cultural heritage values.	All onsite personnel who are involved in ground disturbance works will undertake a cultural heritage induction prior to commencing work. The Heritage Management Plan (HMP) that must be prepared prior to construction will set out appropriately detailed protocols in the event cultural heritage is encountered during construction.
Landscape and Visual Impact	With a capacity of 150 MW / 300 MWh, the proposed BESS facility is anticipated to occupy a 3D envelope approximately 130 m long x 100 m wide x 4 m high. The LRWF site is located in an existing highly modified landscape and six of the potential BESS facility locations are located well within the Site Boundary and in excess of 500 m from nearby public roads. These potential locations are likely to be screened by topography and vegetation and unlikely to be visible to passing motorists. The only exception to this is the potential BESS facility location adjacent to the proposed switchyard at Ulan, which is in a highly disturbed landscape characterised by coal mining operations and high voltage transmission line infrastructure and with no nearby residences. At this location the BESS facility would not be a dominant feature in the landscape and would be co-located with the proposed switchyard.	To reduce potential visual impacts, it is proposed to minimise disturbance to existing vegetation, plant low-level vegetation where relevant to mitigate unreasonable visual impacts, and use materials and colours on structures where possible to blend into the existing environment.

Specialist Assessment	Potential Impacts	Mitigation Measures
Noise	Operational noise associated with substations and the BESS facility is governed by the NSW Noise Policy for Industry (EPA, 2017) (the NPI), which specifies a noise criterion of 35 dB(A) at non-associated residences. To provide a conservative assessment of the substations and the BESS facility, the Predictive Noise Impact Assessment (PNIA) applied a 5 dB(A) noise correction factor at all potential locations and for all day and night periods, which effectively reduces the noise criterion to 30 dB(A) at all non-associated residences. The 5 dB(A) correction factor accounts for the potential emission of annoying noise characteristics such as tonality, modulation or dominant low-frequency content. To model a conservative worst-case noise impact scenario, the PNIA assumed an overall sound power level of 119 dB(A) for the combined noise from the containerised BESS facility and adjacent substation transformers operating at full load. In addition, all seven potential BESS locations were assumed to be operational (only 1 location will be required). The PNIA concludes that no non-associated residence will be subject to noise levels greater than 25 dB(A) from the operation of the BESS and ancillary infrastructure. The BESS facility at all seven potential locations therefore easily complies with the conservatively reduced noise criterion of 30 dB(A) as set out in the NPI	No additional noise mitigation is required for any of the potential BESS locations.
Traffic	As each of the potential BESS facility locations are adjacent to proposed substation or switchyard locations, access to the BESS facility will be along proposed internal access tracks from nearby public roads. During construction of the BESS facility it is anticipated that there will be negligible impact on traffic volumes on the public road network as the civil and electrical works will most likely be undertaken by construction crews, plant and equipment that will be already required on-site for construction of the broader wind farm project. Operational traffic for the Project is expected to be negligible, consisting of infrequent light vehicles.	Any required traffic management treatments and mitigation works are to be identified and addressed by way of an approved Traffic Management Plan.
Preliminary Hazard Assessment	A preliminary hazard assessment (PHA) has been prepared in accordance with State Environmental Planning Policy No. 33 Hazardous and Offensive Development (SEPP 33). As the preferred BESS technology to be adopted at the site is not yet known, the PHA assessed Lithium-ion, Lead-acid, and Vanadium redox flow battery technologies and a wide range of potential hazard scenarios, including explosion, battery cell fire, thermal runaway, vandalism, and arcing or short-circuit. The PHA concluded that all of the potential BESS locations are a sufficient distance from the nearest sensitive receptors that they do not fall below minimum distance thresholds, and that no other hazardous materials associated with the BESS technologies were found to exceed relevant thresholds. All identified hazards are manageable through appropriate technical and management safeguards which reduce the residual risk and make it unlikely that a significant off-site risk is posed.	The PHA recommends the implementation of a range of appropriate technical safeguards are implemented, including: • Design and construction in accordance with relevant Australian standards • Ensuring safe operating temperatures • Incorporation of safety and protective systems • Completion of a Fire Safety Study • Provision of adequate security fencing • Implementation of a Safety Management System that addresses all relevant workplace health and safety procedures, emergency response plan, maintenance and inspection program, and bushfire management plan

BESS Facility Details

The proposed BESS facility is anticipated to have a capacity of 150 MW / 300 MWh, and likely to occupy an approximate area of between 1 – 2 hectares (ha) depending on the final storage capacity, particular battery technology to be utilised, and the topography of the land where the BESS facility will be located.

It is currently not known which particular battery technology will be utilised, however Lithium-ion, Lead-acid, and Vanadium redox flow battery technologies are some of the more likely candidates at this point in time, noting that storage technologies are rapidly changing and other technologies may be utilised at the LRWF site.

The BESS facility is anticipated to be co-located at one of the on-site collector substations within the wind farm site, or adjacent to the proposed switchyard at Ulan where the Liverpool Range Wind Farm (LRWF) will connect into the national grid. A total of seven potential locations have been identified.

Key electrical infrastructure of the BESS facility includes battery pack containers, inverters, transformers, and underground cabling. The BESS will be connected to the grid via an existing step-up transformer (as part of the wind farm substation) or a dedicated step-up transformer. The BESS facility will be enclosed by a security fence and security lighting and CCTV monitoring equipment will be provided.

Assessment against Development Consent

The Modified Project can comply with the intent of the existing conditions of the Development Consent, in particular:

- Operation of the BESS facility will not exceed the specified operational noise criteria for ancillary infrastructure which is 35 dB(A) LAeq(15 minute) at any non-associated residence.
- A Traffic Management Plan will be prepared prior to construction that addresses the traffic generated by the construction of the BESS facility and sets out mitigation measures to maintain the safety and efficiency of the public road network.
- A Safety Management Strategy will be prepared prior to construction in accordance with the Hazardous Industry Planning Advisory Paper No. 9, 'Safety Management'.
- An Environmental Management Strategy (EMS) will be prepared prior to construction that will provide a framework with clear accountabilities for the design, construction and operational phases of the BESS facility to manage key risks and set out environmental management requirements.

The Development Consent will however require minor amendment to reflect the findings of the Preliminary Hazard Assessment (PHA), in particular:

- In the event the potential BESS locations change significantly or if alternate BESS technologies other than Lithium-ion, Lead-acid, or Vanadium redox flow are to be utilised, require an updated PHA to be prepared prior to construction and the recommendations of the updated PHA to be implemented.

For more information, please visit the website below
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