

Battery Energy Storage Systems

Fact Sheet



Private Energy Partners is proposing to build an Energy Hub within the Gladstone State Development Area (SDA).

The Gladstone SDA Energy Hub is proposed as a multi-technology system balancing and grid resiliency solution, designed to help keep the power system in balance between periods of peak renewable supply and periods of peak demand.

The project is planned to be

delivered in three stages. At full capacity, it would be able to generate about 1080 megawatts (MW) of electricity via the gas turbines, and store and dispatch about 780 MW via the BESS.

The project would help keep the electricity network stable by providing extra power when demand is high, when other power sources aren't producing enough, or when unexpected outages occur.

The strategic location of this project supports Queensland's critical heavy industries.

About the BESS

The proposed Gladstone SDA Energy Hub BESS is a large battery that can store 8 hours' worth of electricity. During the day, when there's plenty of power available, the battery would charge. Later, when demand is high, it would send that stored electricity back into the grid.

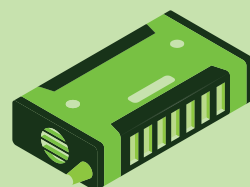
Industry-standard grid-scale Lithium Iron Phosphate (LFP) batteries, one of the safest operations for large-scale energy storage, will be used in the BESS.

Main components of BESS include:

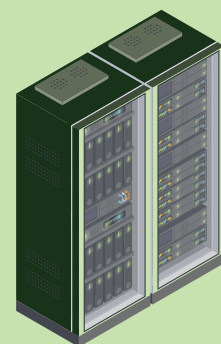
Battery Cell



Module



Unit



Containers



What is a BESS?

A BESS is made up of several parts that work together to store electricity so it can be used at a later time.

These parts are:

- **Batteries:** individual low-voltage, rechargeable battery cells that store energy. These are arranged in racks within a battery module, and then modules are grouped together to form a battery unit.

- **Containers:** similar to shipping containers, these heavy-duty steel boxes each house several battery units. Containers are arranged with variable spacing ranging from 0.3 metres for back-to-back placement to 3.5 metres for primary service access. Each block features integrated fire suppression systems (FSS) and distribution panels, with cooling equipment mounted on the top of the units.

- **Battery Management System (BMS):** monitor and protect each battery cell so it operates safely and efficiently. The BMS manages charge and discharge cycles by calculating safety limits and coordinating with the Energy Management System.

- **Energy Management Systems (EMS):** to determine when to charge the batteries or discharge electricity to the grid.

- **Power Conversion Systems (PCS)** to convert electricity between:

- **Alternative Current (AC)** is received from the grid and converted into Direct Current (DC) electricity so it can be stored in the batteries.

- **DC electricity** is then converted back to AC electricity to return it to the grid.

- **Other equipment:** Other equipment is needed to keep the BESS running safely and effectively will include a switchyard, transformers, cabling and a transmission line.

Safety Systems

Safety first – always. The wellbeing of neighbours, the community and workers is always our highest priority.

The BESS would use components from manufacturers with a strong history of meeting international safety standards, including UL 9540A fire-testing requirements for battery storage. It will also be designed and installed in line with the Australian Standard AS/NZS 5139:2019 for energy storage systems.

LFP is a type of battery chemistry that uses iron and phosphate rather than nickel and cobalt. Compared with some other chemistries, LFP is generally more thermally stable and less prone to overheating. LFP batteries are increasingly used in caravans, motorhomes, boats and household energy storage. BESS fires are considered highly

unlikely due to multiple layers of safety design. However, as part of our planning, we will prioritise fire safety and prevention, and emergency response in the unlikely event of a fire.

- **Safety Systems:** In-built mechanisms will automatically detect fire, allow battery ventilation and manage temperature across the system.
- **Proper setup:** Equipment will be carefully designed, built and installed to meet safety standards.
- **Smart monitoring:** Sensors and automated controls will detect faults and shut batteries down if a fault is detected.
- **Fire safety:** Each unit will include advanced fire detection and suppression systems which automatically activate if high temperatures are detected.
- **Containment:** Battery containers will be fire-resistant and able to hold fire inside without it spreading.

- **Remote control:** The fire suppression system will be able to be activated from a distance if needed.
- **Environmental protection:** Water used in firefighting will be stored in drains and retention ponds, which will be safely contained by shut-off valves and only discharged after the water has passed stringent quality checks.
- **Heat management:** Batteries and inverters produce heat during operation. The BESS will have features to ensure safe and efficient equipment performance, including liquid cooling fans and ventilation systems to keep temperatures within a safe operating range.
- **Engaging with local emergency services:** We will work closely with local emergency services to ensure emergency response preparedness throughout project planning and operations.

Environmental management during operation

The Gladstone SDA is a defined area of land dedicated for industrial development*. The SDA was selected as the best location for this project, due to several technical factors and its distance (approximately 4.5 km) from the closest residential area. In Australia, there are strict safety and environmental standards that will apply to the BESS.

Noise

The BESS uses equipment such as liquid cooling fans and ventilation systems, which can generate noise during operation. The system is designed to keep noise levels at or below 65 dBA when measured from 1 metre away.

To ensure the project fully complies with the Queensland Environmental Protection (Noise) Policy 2019, a site-specific noise assessment has been carried out to confirm that the final layout meets the required noise limits for both day and night operations.

Heat

Batteries and inverters produce heat during operation however, the BESS will have features to ensure safe and efficient equipment performance, including cooling and ventilation systems to keep temperatures within a safe operating range.

Recycling and restoration

We will comply with Australian standards for battery disposal and recycling, including removing batteries, containers, transformers and cabling from the site once they have reached the end of their operational life. We commit to recycling as many of these items as possible and restoring the site to pre-project conditions.

* <https://www.coordinatorgeneral.qld.gov.au/work-with-us/state-development-areas/current-state-development-areas/gladstone>

Keeping you informed

The project is in the planning phase.

We will continue to keep you informed about the project as planning progresses which includes about community engagement activities.

Private Energy Partners acknowledges the Traditional Custodians of the lands on which we operate and meet, recognise their continuing connection to Country, waters and communities, and pay our respects to Elders past and present.



Private Energy Partners Gladstone Project Information Centre - 37 Goondoon Street, Gladstone.

Contact us

Have questions or want to learn more about the project, contact us below:



About Private Energy Partners

Private Energy Partners is Australian founded, owned and operated. We are an affiliate enterprise of Quinbrook Infrastructure Partners (Quinbrook). Quinbrook is a global business founded in 2015 by Queenslanders who have invested in more than 200 low carbon, renewable, storage, gas and critical minerals projects over the past 25 years. Private Energy Partners is Quinbrook's dedicated development, delivery and operations service provider, specialising in renewable energy projects across Australia, the US and UK.

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