



Battery Energy Storage Systems (BESS)

Frequently Asked Questions

This image is indicative of a Battery Energy Storage System (BESS) project.

Frequently Asked Questions

Question	Answer
<p>Background Information</p>	<p>By 2050, nearly 50% of the electricity fed into the grid will be generated from renewable sources. However, their intermittent nature means that solutions must be found to match electricity production with demand. In this respect, Battery Energy Storage Systems (BESS) are highly effective. They use batteries to store energy and then release it as needed. According to the Australian Renewable Energy Network Agency (ARENA), batteries are particularly valuable because they provide flexibility. They can respond faster than other energy storage or generation technologies and help maintain grid stability by turning on and off in fractions of a second. By storing renewable energy (plus other energy sources), BESS reduces reliance on fossil fuels, leading to lower carbon emissions. Deploying cost effective battery storage allows greater use of renewable energy, supporting global net zero decarbonisation targets.</p>
<p>What is a Battery Energy Storage System (BESS)?</p>	<p>A BESS stores electricity in rechargeable batteries for use when demand is high or supply is low. A BESS stores electricity using rechargeable batteries. These systems can be used to store electricity from various sources like renewable energy generators or from the electricity grid during times of low demand, and then release it when needed, such as during peak demand periods or power outages.</p>
<p>What does a BESS look like?</p>	<p>BESS come in various shapes and sizes; they typically look like shipping containers. They often consist of several lithium battery modules placed side by side. The appearance of a BESS can vary depending on its capacity, the type of batteries used, and its intended application. BESS projects can be standalone systems or co-located with solar or wind farms.</p>
<p>How does a BESS integrate into the power grid?</p>	<p>They connect to the grid to store and release electricity and help stabilise voltage and supply. BESS can generally be connected to the electricity grid in two different ways. They can store electricity only from the renewable energy plant to which they are connected, or from both the plant and the power grid. In the second case, BESS also perform a function as regulators of the power grid. BESS feature inverters that convert the direct current into alternating current for grid transmission. A standard BESS installation encompasses not only transformers and substations but also an operations and control center. It is equipped with sophisticated management systems that oversee voltage levels, temperature, alarms, and the state of charge. Additionally, these systems include advanced software like Energy Management Systems (EMS), which are responsible for regulating the charging and discharging cycles of the batteries, ensuring optimal performance and longevity.</p>

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Why are BESS useful?	They play a crucial role in balancing energy supply and demand, enhancing grid stability, and integrating renewable energy sources into the power grid.
When is the electricity stored in BESS used?	The electricity stored in a BESS is typically used during periods of high demand, also known as peak hours. This helps to stabilise the grid by providing additional power when it's needed most. BESS can also supply electricity when the generation from renewable sources like solar and wind is low, ensuring a consistent energy supply. Additionally, BESS can be utilised for energy arbitrage, which involves storing energy when prices are low and using it when prices are high, ultimately leading to cost savings for consumers. Furthermore, in the event of a power outage or other emergencies, BESS can provide crucial backup power to maintain essential services.
Are storage systems useful for communities?	Yes, BESS are useful for communities. They reduce reliance on fossil fuels and make the power grid more efficient and stable, guarding against malfunctions and blackouts. They also bring indirect benefits like environmental sustainability since they don't produce pollution and don't require large infrastructure.
Do BESS projects create job opportunities for local residents?	During the construction phase, there are typically job opportunities in various fields, including construction, engineering, electrical work, and environmental monitoring. Contractors and subcontractors involved in the construction process often hire local labour whenever practicable, which can contribute to job creation in the community. Once the BESS is operational, ongoing maintenance, monitoring, and support activities may continue to provide some employment opportunities for local residents. These jobs may include technicians responsible for routine maintenance and repairs, as well as administrative staff and support personnel.
How much noise does a BESS generate?	BESS facilities typically generate low levels of noise, similar to background noise in a residential area (such as an air conditioner). The main sources of noise are on site cooling fans and inverters, which operate intermittently depending on temperature and energy use. Noise assessments are carried out during project planning to ensure the facility complies with local regulations, and measures such as sound-insulated enclosures, vibration controls, and strategic equipment placement are used to further minimise impacts.
How will a BESS be maintained?	Maintenance involves remote monitoring, routine inspections on site, testing and replacement of parts when needed. A proactive and systematic approach to maintenance is essential for optimising the performance, reliability, and safety of a battery energy storage system throughout its operational life.

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<p>What measures are in place to prevent environmental impact?</p>	<p>Projects follow strict site, noise, biodiversity, and emergency protocols to minimise impacts. A number of measures are typically implemented to prevent or mitigate environmental impacts associated with BESS installations. Some of these include diligent site selection, environmental assessments prior to construction, vegetation management, noise and vibration control, biodiversity controls and emergency protocols.</p>
<p>Are BESS safe?</p>	<p>Yes, BESS are generally safe as they are highly regulated and include multiple safety systems to reduce fire risk. Cell failure rates are extremely low, and safety features are incorporated into the design and layout of BESS to further reduce the probability of fires. BESS fires cannot be fought with water, which negates the risk of toxic water runoff into local water streams. If water is required to fight a fire associated with the BESS asset, it will be collected in a water retention basin, treated and safely disposed of.</p>
<p>Are a BESS a fire risk?</p>	<p>Fire risk is low and managed with temperature sensors, fire-resistant design elements, and emergency plans. While BESS offers significant benefits, safety remains a priority. Manufacturers and operators continually improve safety features to mitigate fire risks and ensure reliable operation. For example, manufacturers incorporate temperature sensors to monitor cell temperatures and trigger safety protocols if abnormal heating is detected.</p>
<p>Do a BESS pollute?</p>	<p>No, BESS do not release air or water pollution during normal operation. They are fully enclosed, produce no greenhouse gas emissions, and are built with safeguards to prevent leaks or spills. At the end of their life, some of the components can be safely removed and recycled under strict regulations.</p>
<p>What is the lifespan of a BESS?</p>	<p>At present, BESS typically operate for between 15 to 30 years, depending on the model. As technology continues to advance, the lifespan of BESS is expected to improve, providing even more efficient and sustainable energy storage solutions for the future. At present, BESS typically operate for between 15 to 30 years, depending on the model.</p>
<p>What happens to the batteries once they reach the end of their life?</p>	<p>Once the batteries in BESS reach the end of their life, they are typically reused, recycled or disposed of in an environmentally responsible manner. Battery recycling involves reclaiming valuable materials such as lithium, cobalt, nickel, and other metals, which can then be reused in the production of new batteries or other products.</p> <p>Potentia Energy has agreements with its suppliers to mandate waste hierarchy principles which include reusing, recycling, and finding new uses for the batteries when they are replaced.</p>