

Are battery-powered home energy systems the right choice for you?

Your Guide to Battery Energy Storage Systems: **BASICS, BENEFITS, AND SAFETY**

Battery energy storage systems (BESSs), devices that store energy for later use, are gaining popularity due to their ability to provide backup power, reduce energy costs and support the electricity demand.

Since BESSs can store excess energy, they can be paired with renewable energy sources to provide reliable energy, given that renewable energy sources, like solar and wind, depend on natural elements that don't always match energy demand.

Benefits of energy storage include:

- **Cost savings:** They can provide stored energy during expensive peak hours and recharge when costs are lower.
- **Demand management:** They help balance energy demand by charging when demand is low and discharging when it's high.
- **Backup power:** They provide backup energy during outages and blackouts. They can replace diesel powered generators, offering an environmentally friendly back up source.
- **Grid Support:** They ease grid pressure during high-demand situations including extreme weather events.

If you are considering adding a BESS system that ties into the power grid, contact your electric utility early in the process to coordinate safe and proper connection to the energy grid.

How does a battery energy storage system work?

Systems can be installed in residential, commercial, and utility scale environments. Batteries can even be installed in remote and rural areas where the grid may be unstable or limited.



The base capacity for residential systems ranges from 10 to 13.5 kWh, which can power an average home. Your energy needs will vary depending on the appliances you have, how often they run, and how much backup power you want. Appliances such as air conditioners and water heaters may drain the capacity quicker, and you may want to disconnect them during an outage. Make sure to check with Dunn Energy about specific system requirements.

The core components of a residential BESS are:

Battery

The battery stores the energy generated from renewable sources and releases it when needed. There are two main types used in residential installations:

- Lead-acid is the oldest and cheapest storage technology and is used in small projects with a lifespan of three to seven years.
- Lithium-ion is the most common type for home systems, with a lifespan of five to 20 years. They have a higher energy density, faster charging capabilities and are lighter and more compact than lead-acid batteries.

Battery management system (BMS)

- The system monitors battery performance to prevent damage from overcharging, over-discharging, overheating, and short-circuiting. It also provides information on the battery's charge level, health and temperature, helping to maintain its longevity, and ensure safety.

Monitoring system

- The monitoring system provides data about the performance of the BESS such as the energy consumption, charge, and system efficiency. This system provides data and may

provide alerts if issues are detected. It doesn't directly manage or control battery operations like the BMS.

Inverter

- This converts the direct current (DC) electricity from the battery into alternating current (AC) electricity, which is used by home appliances and the grid. Stand-alone inverters are used for off-grid setups or as backup power. Grid-tie inverters sync with the grid, allowing electricity to flow back when demand is low or during peak pricing. **You must have utility approval to tie into the grid.**

What safety risks do battery systems pose?

According to the National Fire Protection Association four situations can cause batteries to fail, which could lead to dangerous conditions:

1. **Mechanical abuse:** The battery is dropped, crushed, or penetrated.
2. **Thermal abuse:** The battery is exposed to external heat sources.
3. **Electrical abuse:** The battery is overcharged, charged too quickly, discharged too fast, or the voltage is too high.
4. **Environmental impacts:** Earthquakes, rodents damaging the wires, extreme heat, and floods.

The most significant safety concern is that these can cause thermal runaway. This is very rare and happens when heat builds up in the battery cell faster than it dissipates.

How to install a BESS safely

- Purchase it from a reputable, certified manufacturer and hire a licensed electrician who follows the manufacturer's instructions.
- Ensure compatibility among the battery, inverter,

controller, and solar system (if using one).

- Install in an attached or detached garage, utility closet, or outdoors as recommended by the manufacturer.
- Use non-flammable materials like masonry or metal and follow the manufacturer's clearance recommendation or maintain a 3-foot clearance around the BESS for cooling and fire safety.
- Consider environmental hazards like flooding, extreme temperatures, snow accumulation, falling objects, or vehicle impact, and keep the system away from heating equipment.
- Ensure the area is well-ventilated and check if permits are needed.

Ongoing safety tips

- Register your BESS with the manufacturer and connect to Wi-Fi for monitoring. Stay updated on firmware and safety recalls.
- Regularly test smoke detectors and maintain the manufacturer's recommended clearance, removing any objects or debris, and trimming vegetation as needed.
- Though you should keep a fire extinguisher nearby for non-battery-related fires, never use it on a BESS fire. If you notice smoke, gas or chemical odors, evacuate immediately and call 911.
- Keep inverters and all BESS equipment out of the reach of children and pets.

It's natural to have questions about emerging technologies like BESSs. Always work with certified manufacturers and installers to ensure safety and **contact your utility early in the process to check for specific requirements for installation, the grid interconnection process, and available incentives.**

When installed properly, a BESS can save money and provide reliable power during emergencies.

FROM THE BOARD ROOM

November 2024 Board Meeting Highlights



Monthly Reports:

The Operations report contained updates on brushing, substation upgrades, and day-to-day work. New service installations to date are 136 and the old dump truck was successfully auctioned off.

The CFO discussed November's financial performance. With the mild weather sales were below budget. The 2025 budget was also presented for approval.

The CEO/General Manager had various updates for open session. The Strategic Plan was discussed as well as updates on various meetings and projects.

The following items were approved:

- Capital credit estate payout for deceased members.
- Audit committee report of all checks, ACH payments, wire transfers, credit card statements, and investment accounts.
- 2025 budget.
- 2025-26 strategic plan extension.

Other Business:

Reviewed the monthly report of new Cooperative members.

Safety Meeting recap was given by Director Dvoracek.