BEAVER BAY
ENERGY CENTER

FREQUENTLY ASKED QUESTIONS ON

Battery Energy Storage Systems (BESS)

General Q&A

Why are batteries needed?

As the U.S. energy landscape evolves to more renewable energy sources, such as wind and solar generation, including energy storage will play an essential role in stabilizing the grid. The electric grid matches supply and demand at every moment to function reliably. Energy storage systems store excess energy in times of low demand to be used later, especially during peak demand hours and emergency or grid outages. Storage helps place energy on the grid when needed instead of only when the wind is blowing or the sun is shining.

Why is energy storage important?

Energy storage fundamentally improves the way we generate, deliver, and consume electricity. Energy storage helps during emergencies like power outages from storms, equipment failures, accidents, or even terrorist attacks. But the game-changing nature of energy storage is its ability to balance power supply and demand instantaneously – within milliseconds – which makes power networks more resilient, efficient, and cleaner than ever before.[1]

Will I see lower electricity bills?

Energy storage can lead to cost savings in two primary ways. The first is by lowering the overall cost of providing electricity. The second is by allowing customers to avoid premium pricing (or "peak demand"). Industry insiders call this saving money on "both sides of the electric meter." But broader energy storage deployment can save consumers money in additional ways. Shorter outages for residents after a storm or an equipment failure can help save not only money but lives. And fewer outages overall lead to less economic losses.[1]

How does an energy storage system work?

In the most basic explanation, an energy storage system charges by taking AC power from the grid or colocated generation facility and converting it to DC power to store in batteries. The system will automatically stop charging once the battery is at full charge. When there is an energy need on the grid, the system discharges energy back to the grid by converting the energy from DC back into AC.

Is energy storage technology safe?

Energy storage has been a part of our electricity grid since the 1930s and has a safety record that is similar to, or better than, other electricity generation, distribution, or management methods. Energy storage facilities have multiple layers of protection and monitoring systems in place to help mitigate any unsafe conditions. Additionally, these facilities are secured with perimeter fencing around the entire site to prevent unauthorized access.

Why here?

1. We site energy storage facilities to maximize benefits to the grid and to customers.
2. Stand-alone storage facilities are typically closer to the electrical load and/or connected to the bulk transmission system (transmission lines/substations) in order to service energy users efficiently.

Technical Q&A

How do these batteries compare to the batteries in my phone or computer?

All batteries accept, store, and release electricity on demand. Batteries use chemistry, in the form of chemical potential, to store energy.

The batteries that will be used for this project are Lithium Iron Phosphate (LFP) technology, which is known to be more stable and safer than other older battery systems and even other lithium ion batteries, and will be monitored closely on a 24/7 basis by trained professionals. Grid-scale battery systems utilize the same types of battery cells found all around us, but are incorporated into a state-of-the-art grid-scale resource. Grid-scale batteries are rechargeable, and the heavy-duty design of grid-scale batteries allows them to be charged and discharged daily for decades.

Are they sustainable?

Energy storage batteries have a useful life of approximately 20 years and will require re-powering later in the project life cycle. The original batteries will be removed and recycled for continued use in other applications.

What maintenance do batteries need? How often?

Regularly scheduled maintenance involves visual inspections, various system checks and tests, cleaning, and adjustment as required. The operations team remotely monitors each site 24 hours a day, 7 days a week. A project of this size will have tens of thousands if not hundreds of thousands of sensors and datapoints (actual count to be determined later) that provide a comprehensive and real-time line of sight into the health of the system.

What type of batteries will be used?

Generally, all projects will use Lithium Iron Phosphate (LFP) cells, which are sealed rechargeable batteries ideally suited for decades worth of use. Grid-scale battery systems utilize the same type of battery cells found all around us incorporated into a state-of-the-art grid-scale resource. These rechargeable batteries are monitored closely on a 24/7 basis by trained professionals. Their heavy-duty design allows the grid-scale battery systems to be charged and discharged daily for decades.

How much electricity to they store?

They store the same power (MW) as equivalent solar facilities. The energy (MWh) stored is based upon the power and duration: energy = power x time. The nameplate energy rating will generally be based upon a 1- to 4-hour duration depending on the projected use case. For this project, a 200 MW x 4-hour system can deliver 800 MWh in a single charge.

What size will the system be?

A good rule of thumb is 10-20MW per acre for a containerized 4-hour duration system, though specific site conditions are needed to evaluate the layout fully. For this project and subject to further engineering and equipment procurement, the batteries, laydown yard, stormwater basin, access road, collector substation, and other electrical equipment will be located on approximately 10-15 acres of land within a larger footprint of about 35 acres of land. Battery systems create many positive benefits while maintaining a relatively small footprint.

What type of enclosure will be used?

The type of enclosure varies by manufacturer, but the project will utilize outdoor container design. Batteries are installed in climate-controlled outdoor containers, with multiple containers daisy-chained to central inverters. Typically, they are housed in an enclosure similar to a 40' ISO shipping container or smaller. Some may be smaller module-type units that measure 5ft x 5ft x 7ft.

Fire & Safety

How will offsite personnel know if an incident has occurred onsite?

Remote monitoring will occur over the lifetime of the battery, ensuring that personnel are remotely notified of problems via alarms as soon as they occur. The project will have thousands of active sensors operating 24/7 throughout the project to monitor battery containers and even individual battery cells.

How will our local fire department be prepared or trained to handle a fire situation at a battery storage system?

An emergency response plan will be developed which will provide detailed response procedures. This plan will be reviewed by the local fire marshal and department, and training will be conducted to familiarize local responders. Development and implementation of this plan will be a required permit condition in the Site Permit to operate the project which will be obtained from the Minnesota Public Utilities Commission prior to constructing the project. The emergency response plan, including regular training with local responders, will be maintained throughout the life of the project.

What does a developer do to work with the local fire protection personnel to prepare for a new energy storage system?

Emergency signage, emergency operations plans, and training are provided in conjunction with local fire services to ensure the hazards are communicated and planned for. An emergency response plan will be developed which will provide detailed response procedures. This plan will be reviewed by the local fire marshal and department, and training will be conducted to familiarize local responders.

Does an energy storage system create noise?

Yes, energy storage systems do produce some noise, primarily from cooling fans and electrical equipment. However, the facility will be designed to comply with all applicable local noise regulations, including the Minnesota Pollution Control Agency (MPCA) 50 dBA nighttime standard.

During normal operations, the main sources of sound are the substation transformer and fans used to cool the inverters and battery units. These sounds are comparable to those produced by common equipment such as residential HVAC units or electrical transformers and are generally consistent with typical background noise in developed areas.

Noise levels are expected to be highest during construction, which is temporary. Once operational, the facility will maintain compliance with state noise standards at nearby homes and other sound receptors. Compliance with the MPCA 50 dBA nighttime standard will also be a condition of the project's Site Permit that will be enforced by the Minnesota Public Utilities Commission for the life of the project.

If a fire does take place, what measures are taken to help minimize the extent of fires?

1. In response to a fire in a containerized battery system, fire water will be available to use defensively in the event that nearby equipment appears to be at risk. Per the latest best practices in the energy storage industry, a container that is on fire will be de-energized but otherwise will be monitored from a safe distance as it eventually burns out. By their nature, battery fires will continue to burn despite extinguishing efforts, and the safest response is to let the fire consume the container's contents while protecting surrounding areas. Full details of the approach will be included in the emergency response plan and fire safety plan.
2. Battery installations also incorporate a form of flammable gas detection, elimination, or ventilation equipment in conjunction with NFPA 855 requirements.
3. In instances where self-contained outdoor enclosures are utilized, the enclosures are tested per UL 9540a and equipped with relief mechanisms as required.

Environmental & Impacts

What can I expect to see during construction?

The process for constructing an energy storage facility is relatively simple. The construction process may require some heavy machinery or trucks. Typically, there are a few deliveries per day but not enough to provide a large increase in traffic. Workers arrive and leave at the beginning and end of each workday, and work occurs during typical business hours.

What positive impacts will an energy storage facility have on the local community?

Energy storage facilities provide positive impacts to the local economy through increased tax revenues to local governments, the creation of new jobs (during the construction phase), participating landowner payments. They can also help stabilize energy markets, potentially preventing higher energy costs and reducing price volatility. At the same time, energy storage facilities do not strain public infrastructure, schools, or emergency services, making energy storage facilities a true silent revenue generator that benefits the entire community over several decades.

Decommissioning

What happens to them at the end of life?

At the end of the project's life, all battery equipment will be removed and recycled or disposed of in accordance with applicable regulations and industry standards.

Under the Minnesota Public Utilities Commission (MPUC) permitting process, the project is required to have a detailed decommissioning plan in place before construction begins. This plan outlines how the facility will be safely dismantled and how the site will be restored.

In addition, the project must provide financial security—such as a bond or letter of credit—to ensure that funds are available to carry out decommissioning, regardless of project ownership at that time. This ensures that the equipment will be properly removed and the site restored at the end of the project's life.

[1]American Clean Power, "Resources-Thought Leadership-FAQs-Why is energy storage important," EnergyStorageAssociationArchive.org, 2023, http://energystorageassociationarchive.org/resources/thought-leadership/faqs/