



Glacier Battery Storage Pilot Project FAQs

September 2016

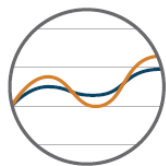
What is the Glacier battery pilot project?

Puget Sound Energy, in partnership with the Washington State Department of Commerce, developed a utility-scale battery energy storage pilot project in Glacier to test the benefits of distributed generation. Improvements in energy storage technology, such as large-scale battery systems, are making it more practical for utilities to invest in distributed generation systems which capture, store and release energy into the power grid.

The Glacier battery storage pilot project entails installation of a 2 megawatt (MW) / 4.4 megawatt-hour (MWh) lithium-ion battery system. The state-of-the-art system is connected to PSE’s electric distribution power grid and located near the existing Glacier substation. The project is funded in part by a generous \$3.8 million Smart Grid Grant from the Washington State Department of Commerce in addition to \$7.4 million invested by PSE.

What are the primary functions of the battery?

The Glacier battery storage pilot project will perform three key functions, including:



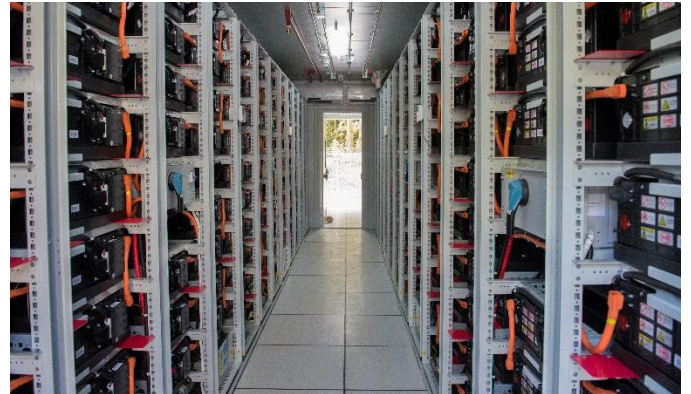
Reducing system load during periods of high demand.



Balancing energy supply and demand, helping to support greater integration of intermittent renewable generation on PSE’s grid.



Serving as a short-term backup power source to a portion of the local Glacier circuit during outages.

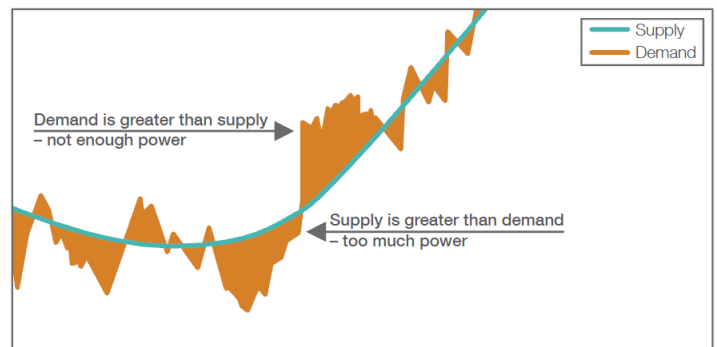


A view of the battery at the Glacier substation.

Will the battery provide back-up power to the entire town? How will I benefit if I’m not in the battery back-up area?

While the battery isn’t large enough to back up all of Glacier, it is expected to back up a core “island” of customers in town. This will allow the central businesses to remain open for use during an outage. In the event of an outage, some residents would still be without power, but they would have access to places with power that would otherwise be unavailable during an outage.

Additionally, all customers in the area will benefit from the battery’s other functions. Energy storage can be used to fill the minute-to-minute gaps between supply and demand. This keeps the system healthy and supports the use of renewable energy supplies, which can fluctuate when wind picks up or clouds pass over solar panels.



Is the battery safe?

There are many different types of lithium-ion batteries using different chemicals to make them work. The specific lithium-ion battery type used for this project, lithium iron phosphate, is one of the safest of its kind. The batteries are larger versions of well-studied lithium-ion batteries that have been used safely in consumer electronics, vehicles, and buses since the 1990's.

The battery electrolyte (the liquid that helps move energy between the positive and negative ends of the battery) is non-toxic and the batteries are recyclable at the end of their 20-year life. The battery containers have multiple safety layers including electrolyte containment, 24/7 remote monitoring by our system operators, security cameras, and advanced fire suppression systems.

How large is the battery and what are its capabilities?

The battery has an energy storage rating of 4.4 megawatt-hours. This translates into being able to back up 53 homes and businesses for about 9 hours when charged to 100 percent capacity. The backup duration will also depend on outside temperature.

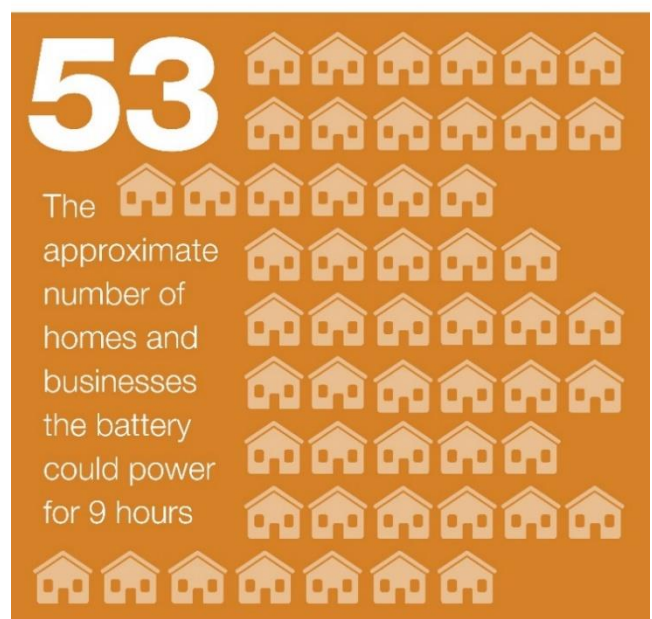
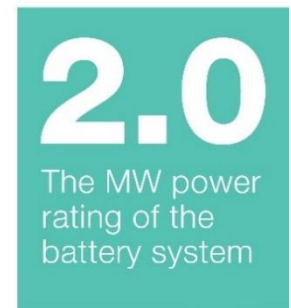
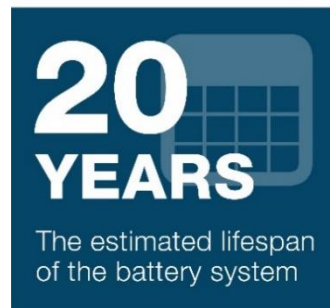
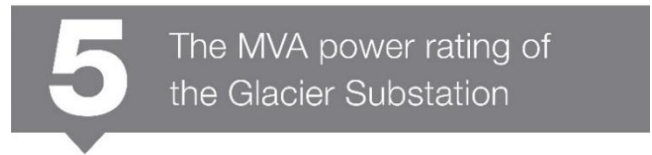
How will the battery be tested? Will Glacier residents be affected?

As we prepare to test the battery backup capabilities, there will be some initial planned power outages during testing. We expect to do this once or twice in late 2016 and will notify customers in advance of any planned power outages. We know being without power is inconvenient, and we'll turn the lights back on as soon as we can.

What other work has been going on in the Glacier area lately?

- Since the installation of the supervisory control and data acquisition technology (SCADA) in 2014, PSE receives information about Glacier's electric system remotely. With the addition of the battery system, we can now learn about outages in real-time and remotely activate the batteries to restore power after an outage.
- Last year, PSE replaced a pole and its switch which allows PSE to more reliably respond to storms and other issues in the area's power system.
- In 2016, PSE worked with Washington State Department of Transportation (WSDOT) to improve safety in the area by reducing the likelihood of pole-vehicle collisions.

- PSE also trimmed and removed trees near poles to reduce the frequency of tree-related power outages.



Learn more

Learn more about PSE's work on the Glacier battery pilot project and other improvements in the area by visiting pse.com/glacierbattery or contact the project team at majorprojects@pse.com or 1-888-404-8773.