



**Portland General Electric Company**  
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September 17, 2024

Public Utility Commission of Oregon  
Attn: Filing Center  
201 High Street, S.E.  
P.O. Box 1088  
Salem, OR 97308-1088

**RE: PGE UM 1856 2024 Annual Energy Storage Update**

Pursuant to Public Utility Commission of Oregon (OPUC or Commission) Order No. 18-290, Portland General Electric Company (PGE) submits its fifth annual report on the progress of its energy storage proposal which includes: Camino del Sol (formally named Baldock), Coffee Creek, Microgrid pilot, Port Westward 2 (PW2), Residential Storage pilot (called the “Smart Battery pilot”), and the controls for the energy storage systems. During operation of the projects, PGE will submit comprehensive evaluations in the third, sixth, and tenth operating year, along with annual progress updates. The following report details each project and includes progress, challenges, and preliminary learnings, as available.

History of Energy Storage Docket

The Commission opened Docket No. UM 1751 in September 2015 to implement House Bill 2193, which required Oregon electric companies (PGE and PacifiCorp) to submit proposals by January 1, 2018, to procure qualifying energy storage systems with capacity to store at least five megawatt hours of energy. PGE met this requirement and procured 11 MWh of energy storage (Port Westward 2 and a Microgrid site Beaverton Public Safety Center) as of December 31, 2019.

2024 Annual Energy Storage Update

***Camino del Sol Mid-Feeder Energy Storage System (formally Baldock)***

This project was planned to develop and build a 2 MW, two-hour energy storage system adjacent to PGE’s Camino del Sol Solar facility and will be interconnected to the Canby-Butteville feeder.

This project was cancelled due to estimated costs that exceeded the stipulated cost cap for this project with no clear path to complete this project within the cost recovery limits in the stipulation. Due to these circumstances, PGE is not moving forward with the project.

Note that the project name was changed, though it is the same location and facilities. The adjacent solar array had been named after the Baldock freeway and rest area that it was geographically near, but when the Oregon Department of Transportation renamed the rest area in late 2022 PGE followed suit. The name of the solar facility and by extension the battery project were renamed to Camino del Sol.

### ***Coffee Creek Substation Energy Storage System***

This project will develop and build a 17 MW, two-hour energy storage system sited and interconnected at PGE's Coffee Creek Substation.

PGE selected FlexGen as the Engineering, Procurement, and Construction (EPC) Contractor for equipment supply and construction of the project in 2022. Battery module fabrication started shortly after contract award with factory acceptance testing of the modules completed in September 2023. All design is complete and drawing have been approved for construction. This site is planned to be in operation in mid-October 2024.

### ***Microgrid Projects (Beaverton Public Safety Center and Anderson Readiness Center)***

#### Overview

The Microgrid Pilot Project completed its first microgrid at the Beaverton Public Safety Center (BPSC), commissioned in September of 2020. The second microgrid at the Oregon Military Department's Anderson Readiness Center (ARC) was commissioned in May 2023. Both microgrid sites are designed to support community resiliency.

PGE and the City of Beaverton signed an agreement to deploy the 250 kW, four-hour battery and microgrid at BPSC in 2019, with PGE owning and operating the battery. The microgrid is also powered by a 300 kW PV solar array and a 1,000 kW standby diesel generator, both owned by the customer.

PGE and the Oregon Military Department signed an agreement to deploy a 500 kW, two-hour battery and microgrid at ARC in 2020, with PGE owning and operating the battery. The microgrid is also powered by a 270 kW PV solar array and two 800 kW standby diesel generators, all owned by the customer.

#### ARC Construction and Commissioning

ARC houses servers that are critical to the State of Oregon. Keeping this high availability site running during construction and commissioning required careful coordination to avoid any outages greater than ten minutes.

The ARC BESS equipment layout and conduit routing designs went through several iterations. This was partly due to updated requirements from the site owner that were shared partway through the project. Fortunately this was a Design-Build project which made it adaptable to those changes and the site owner has been pleased with the end results.

ARC microgrid commissioning included dozens of grid-connected and islanded tests to verify the microgrid's performance and reliability. One of the main challenges was integrating the existing diesel generation resources that are part of PGE's Dispatchable Standby Generation (DSG) program. The logic for control handover between the microgrid controller and the existing DSG Programmable Logic Controller (PLC) required several iterations to get right.

System Operation

These microgrid systems respond to system frequency events and are dispatched both for contingency reserve and demand response. System frequency is monitored at a central location near Sherwood and if a deviation is detected the site controller immediately dispatches the battery at full output for three minutes before ramping down and slowly recharging. Contingency reserves are centrally dispatched when needed by the Balancing Area Authority Operators. These systems have automatically responded to 234 frequency events and been dispatched for contingency reserves 49 times since September 2023.

Table 1 below shows the number of contingency reserve and frequency response dispatches of both the BPSC and ARC microgrid batteries over the last 12 months.

*Table 1*

Month and Year	BPSC		ARC	
	Number of Contingency Reserve dispatches	Number of Frequency Response dispatches	Number of Contingency Reserve dispatches	Number of Frequency Response dispatches
September 2023	0	10	0	4
October 2023	0	7	0	6
November 2023	0	3	0	1
December 2023	0	6	0	3
January 2024	0	5	0	7
February 2024	0	2	0	0
March 2024	0	3	0	4
April 2024	0	11	0	8
May 2024	0	20	0	19
June 2024	0	7	0	4
July 2024	1	5	0	4
August 2024	0	30	0	12

Preliminary Learnings

Our learnings to date include confirmation that the system can reliably respond to system frequency events and be dispatched for contingency reserve to provide those useful grid services to PGE's operators. Future operations testing plans over the 10-year life of this project will include expanding the BESS use to the other identified use cases, including testing that is being done for for autonomous proportional frequency support (freq/watt) and proportional voltage support (volt/var).

Both microgrids have the ability to support the customers' load during a utility outage, with the system at BPSC reacting numerous times to utility outages. The BPSC system's ability to form an island and support load has not been 100% successful and required several software and firmware

changes. Since these changes were made, the system seems to be functioning as designed however more time is required to assess this.

The microgrid at ARC employs a simpler system for islanding during outage events and based on testing, this system seems to have worked properly from the beginning. However, the site has not been subjected to an actual outage since commissioning. Therefore, more time is required at this site as well to assess the efficacy of islanding.

There have also been additional learnings related to operations and maintenance (O&M) on the microgrid projects. O&M activities such as troubleshooting when equipment trips, resetting components, control system updates, and procuring replacement parts has been more involved than initially anticipated. PGE is capturing these topics and making updates to our project requirements and specifications in order to better address these items on future projects. Future operations testing plans over the 10-year life of this project will include expanding the BESS use to the other identified use cases.

### ***Port Westward 2 (Generation Kickstart) Energy Storage System***

#### Overview

This project has developed and built a 5 MW, two-hour energy storage system coupled with PGE's Port Westward 2 Generating Station (PW2). By coupling the energy storage system with PW2's reciprocating engines the combined resource becomes enabled to qualify as contingency reserve, even while the engine is not running.

The project design work was completed in November 2020 and the battery energy storage equipment was delivered to the site in December 2020. Construction and controls integration work commenced and continued through August of 2021. The battery was energized and the system testing and commissioning were completed in September 2021, upon when the project was put into service.

#### System Operation

Over the last year the system has continued to respond to system frequency events. System frequency is monitored locally and if a deviation is detected the site controller immediately dispatches the battery to full output and discharge for three minutes before ramping down. The system has automatically responded to approximately 69 frequency events since September 2023.

Table 2 below shows the number of frequency response dispatches of the PW2 battery over the last 12 months.

Table 2

Month and Year	Number of Frequency Response dispatches
September 2023	6
October 2023	6
November 2023	0
December 2023	3
January 2024	2
February 2024	8
March 2024	3
April 2024	7
May 2024	9
June 2024	3
July 2024	4
August 2024	18

### Preliminary Learnings

Our learnings to date include confirmation that the system can reliably respond to system frequency events and provide that useful grid service to PGE’s operators. Future operations testing plans over the 10-year life of this project will include expanding the BESS use to the other identified use cases. From a maintenance standpoint, Tesla has been monitoring the system and performing planned maintenance as required for the system.

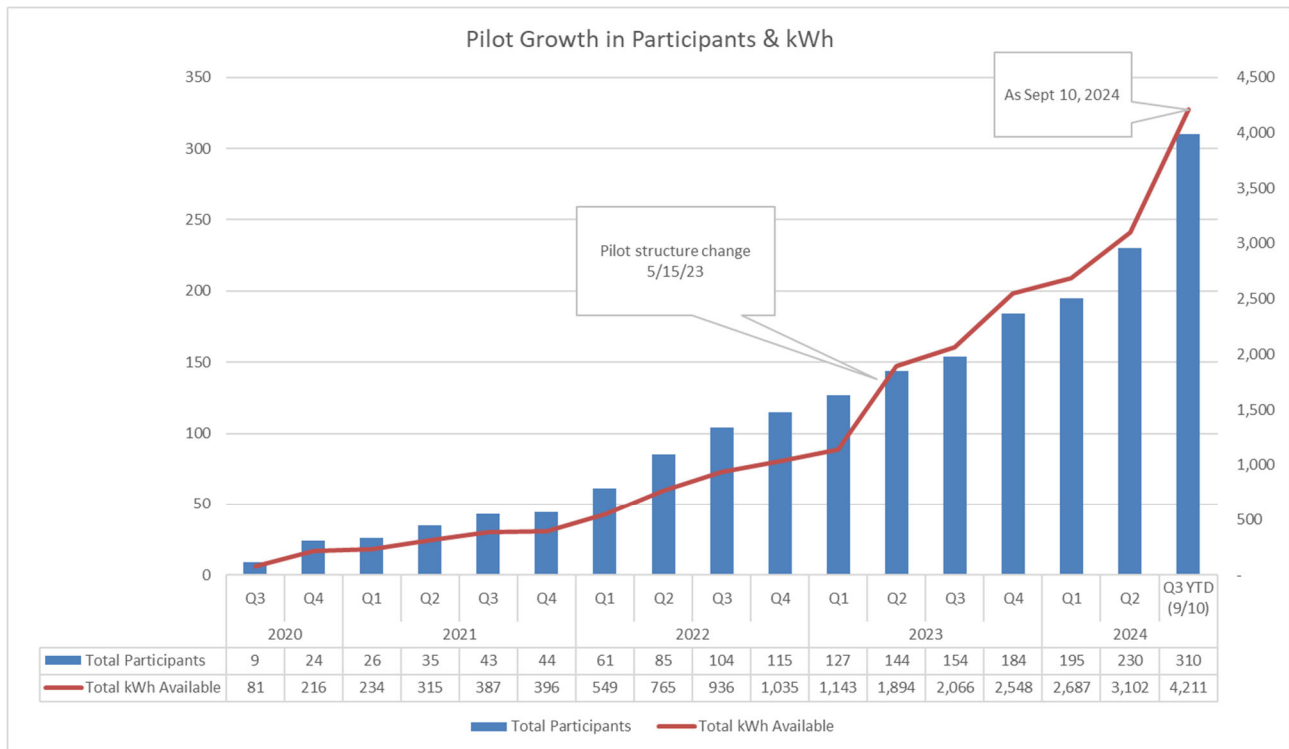
Since commercial operation date, there have been very few maintenance problems. The problems that we had early on were de minimis. Since correcting those, the system has been 100% reliable.

Future operations testing plans over the 10-year life of this project will include expanding the BESS use to the other identified use cases.

### ***Residential Storage Pilot***

#### Overview

PGE’s Smart Battery Pilot became effective in August 2020, and had a tariff update effective May 2023. As of September 10, 2024 the Pilot has 310 enrolled customers and a dispatchable potential of 4.2 MWh.



The pilot has seen tremendous growth and activity in 2024, with 68% year-over-year growth from 2023 in the first three-quarters of 2024. This growth can be attributed to a few factors:

- The Solarize campaign in partnership with Energy Trust kicked off in late 2023 with projects installed throughout 2024. The campaigns are projected to bring in 45 new customers by the end of 2024, or one-quarter (24%) of the annual growth of the pilot.
- Two new brands were added to the Smart Battery pilot, Enphase and FranklinWH.
  - FranklinWH is a new brand in the market, but Enphase is well-established, and PGE was able to onboard 28 new customers with a recruitment campaign in August of 2024.

### System Operation

PGE continues to be interested in pursuing additional grid services beyond demand response for the battery fleet, and is preparing to do a customer test for autonomous frequency regulation in the fall of 2024. The previous frequency regulation test was only with the PGE-owned battery, and this will be the first test of this grid service with customer-owned devices. If the customer and grid functionality are successful and the dispatch does not negatively impact the customer programming this can be rolled out in a larger fashion.

The other grid service PGE is actively pursuing is contingency reserves. This is more complicated, requiring new programming from PGE’s third-party DERMS software as well as an interconnection with PGE systems for an automatic dispatch in response to a system generated signal. Due to the software provider’s own update roadmap as well as PGE’s internal efforts on building out Virtual Power Plant (VPP) functionality with new information systems, this work has not yet been completed. The VPP project currently underway will involve new and more

sophisticated dispatch software from an enterprise standpoint than what currently exists, but that project will not be live for a few more years. PGE is assessing the best way to achieve this goal without making investments in a system that will not continue to be used in the future.

This concludes PGE's Annual Energy Storage Update for 2024.

Please direct any questions regarding this filing to Chris Pleasant at (503) 464-2555. Please direct all formal correspondence and requests to the following email address [pge.opuc.filings@pgn.com](mailto:pge.opuc.filings@pgn.com)

Sincerely,

*\s\ Robert Macfarlane*

Robert Macfarlane  
Manager, Pricing & Tariffs

cc: UM 1856 Service List