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Question 3.10 The reporting on the experiences and lessons learned from realised microgrid projects is an important contribution to the knowledge base. What kind of information and data need to be collected to properly document best practices? How can those lessons learned be shared with potential stakeholders and users (utilities, manufacturers, customers, academia/research)

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### **Project Summary :**

Snohomish County Public Utility District (PUD), a public electric utility in Washington State, commissioned the Arlington Microgrid demonstration project in early 2022.

The microgrid consists of an NMC Lithium Ion 1MW/1.4MWh battery energy storage system, a 500 kW AC photovoltaic (PV) system, two vehicle-to-grid (V2G) EV chargers, a 350 kW standby generator and a microgrid control system.

This project was partially funded by a grant from the Washington State Department of Commerce and was designed to demonstrate the full potential of the microgrid's distributed energy resources while making sure that it is able to meet critical loads during an emergency. The microgrid is also an emergency backup power supply for the local data center and will feed Snohomish PUD's Arlington office once it is built later in 2023.

To demonstrate the benefits of the Arlington Microgrid, we analyzed four use-cases:

- Disaster recovery and grid resilience;
- Renewable energy integration;
- Grid support and ancillary services;
- Vehicle-to-grid integration.

### **Data Collection Method :**

High-accuracy utility grade meters (Schneider Electric ION 8650) were installed in front of each distributed energy resource as well as each load. And all circuit breakers and switches were monitored via Schweitzer SEL relays. The data is continuously collected and stored in a data historian for analysis and SCADA display.

## **Important Data and Lessons Learned**

During the past year of operations and testing at the microgrid and multiple conversations with other utilities and vendors, it has become very clear and important to monitor the microgrid and establish baselines on battery capacity, round trip efficiency and system functionality. The following are two that we will focus on for this discussion.

- **Battery Capacity and Round Trip Efficiency**

Monitoring battery capacity and degradation over time is critical to establish compliance with warranties and capacity guarantees. And in addition it helps predict battery maintenance and augmentation needs. We are continuously collecting energy (kWh) throughput for the battery energy storage system and annually we conduct a BESS Capacity and Round Trip Efficiency test.

- **BESS and Microgrid System Functionality**

Validating the function of the BESS Grid Forming Inverter is important to establish confidence in the system when high value loads -like data centers – are being served.

Data is collected during system testing for use by Hitachi Energy to properly configure the grid forming inverter for seamless transitions from grid connected state to islanded state and back.

## **Importance of Sharing Lessons Learned**

Utilities have standards for substations, distribution and transmission systems due to the fact that we've been designing and building these systems for more than 100 years. But there are very few mature standards for microgrids, vehicle -to- grid systems, modeling and data collection.

Demonstration projects like this help inform utilities who are thinking of building these systems themselves – either for their own learning or for clean energy requirement compliance.

It is important that utilities share lessons learned and help accelerate the « Utility of the Future » and some of the ways we are share information is via conferences such as CIGRE, magazine publications and white papers, participating on standards committees such as MESA – (modular energy storage architecture – mesastandards.org), and collaborations with vendors such as Hitachi Energy and with local Universities and National Labs such the University of Washington and Pacific Northwest National Lab.

Thank you for your time and please feel free to email me with questions

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