NEC Lithium Ion ESS located at Howard Elementary: Resiliency and Utility Support

Sandia – Peer Review 2018
Project Partners

1. EWEB
2. Sandia National Laboratories
3. ODOE
4. CESA
5. WorleyParsons
6. NEC
7. Eugene School District 4J

Special Thanks
Funding from US DOE, Dr. Imre Gyuk Energy Storage Program Manager
Grant Scope

• Install energy storage system equal or larger than 500kW
• Project must run connected to the distribution grid for at least one year
• Provide detailed plan to provide measurement and verification of promised services

• Services (Use Cases) include:
  • Peak Demand Reduction / T&D Deferral
  • Energy Resiliency / Back-up Power
  • Voltage/VAR Support
  • Frequency Regulation
  • Renewable energy ramping, firming
  • Energy Arbitrage
  • Outage Mitigation
  • Reduction of Transmission Charges (reduction of utility co-incident peak)
  • Reduction of Transmission Charges (generation imbalance)

• Optimization study
EWEB Resiliency

- Why? Cascadia Subduction Zone Earthquake
EWEB Resiliency

Electric

- Modernize
- Update and upgrade generation sites

Resilient Spine
- Bolster generation paths to critical loads
EWEB Resiliency

Water

Emergency Water
Distributed water wells
Water Trailer

Second Source
Secondary water supply
EWEB Resiliency

Disaster Recovery (Long and short term)

Distributed Sites
Local water supply and potential staging area
BESS Usage

How does EWEB intend to use the BESS?

1. Resiliency
   • Customer outage resiliency (short outages)
   • Disaster resiliency
     • Community gathering site
     • Water distribution site
     • Staging area
   • Aggregated generation (future)
BESS Usage

How does EWEB intend to use the BESS?

2. Research
   • Help National Labs with PNW economic analysis (use cases)
   • Develop EWEB interconnection standards for energy storage

3. Economics
   • Customer demand bill reduction
   • Utility BPA bill reduction
Project Site

• Howard Elementary
  • Grades K-5
  • 411 students
  • Building area = 88,000 ft²
  • 500 kVA 12.47kV/480V XF

Originally built 1949
Re-built 2016

Howard Monthly Peak Demand
Howard Elementary – Bird’s Eye
BESS Specs

**WSTECH BATD0280-ES-1-480-1**
- 280kVA x 2
- 480Y/277V
- 337A max current output
- Efficiency 92-96% dep. on output

**NEC DSS**
- 280kW/510kWh x 2
- 6 bays
  - 85kWh per bay @ 720VDC
  - 14 batteries per bay @ 51.4V
- C/4 Continuous, 1C once/12hr
- NOVEC 1230 Agent
- Built-in AEROS Controller
Construction Photos

Excavation for pad
Construction Photos

Building conduit runs and ground ring
Construction Photos

Extending conduit through sidewalk cut
Construction Photos

Main BESS pad poured – 12” thick
Construction Photos

Crane picking BESS and Inverters
DSS Weight = 17,371 # ea
Inverter Weight = 4,409 # ea
Routing conduit through storage room to above the electric room
Adding 2-400A breakers and adding wiring for Shark 200 meter
Construction Photos

150’ well drilled – Pump to be installed and wired Q4 2018
Estimated 5HP pump and 80-100 GPM
Construction Photos

Finished install with fencing
Lessons Learned

1. Metering if behind the meter
2. BPA Meter since > 200kW
3. Long Duration Outage
   • UPS issues
4. Not self-starting
   • Requires UPSs to power controller and inverter
5. Unable to charge with solar while islanding
6. Consolidate battery and inverter