

Battery Reliability Test Lab at the Grid Storage Launchpad

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PROJECT PROFILE
Topic: Battery Testing and Validation Vertical: Safety & Reliability
Strategic Pathway: Safety & Reliability
Project start and finish: Ongoing

PROBLEM

There is a lack of independent data for how battery cells, modules, and systems perform under grid applications. PNNL is building a world class battery test lab to provide independent validation of battery cells, modules, and small systems performance for grid applications. We will be able to provide data that will validate both initial performance and longer-term degradation. This data will be used to train ai machine learning models to forecast performance of energy storage systems installed on the grid.

APPROACH

- PNNL has build out a wide range of test stands, and battery cyler capabilities dedicated to testing cell, modules and small systems to grid duty cycles.
- 864 Channels 0-5V 10A Charge / Discharge
 - 24 Channels 5-60V 30A Charge / Discharge
 - 16 Channels 0-60V 50A Charge / Discharge
 - 32 Channels 0-60V 150A Charge / Discharge
 - 28 Channels 8-100V 200A Charge / Discharge
 - 5 8ft³ Test Chambers
 - 3 32ft³ Test chambers
 - 3 66ft² Ventilated Enclosures
 - ~4000ft² dedicated to battery testing
 - Interface and measure BMS parameters



Fig. 1. Lab Layout.

RESULTS

Typically, we test to a 4-hour peak shaving duty cycle results shown below. Other duty cycles tested include frequency regulation and ai data center support.

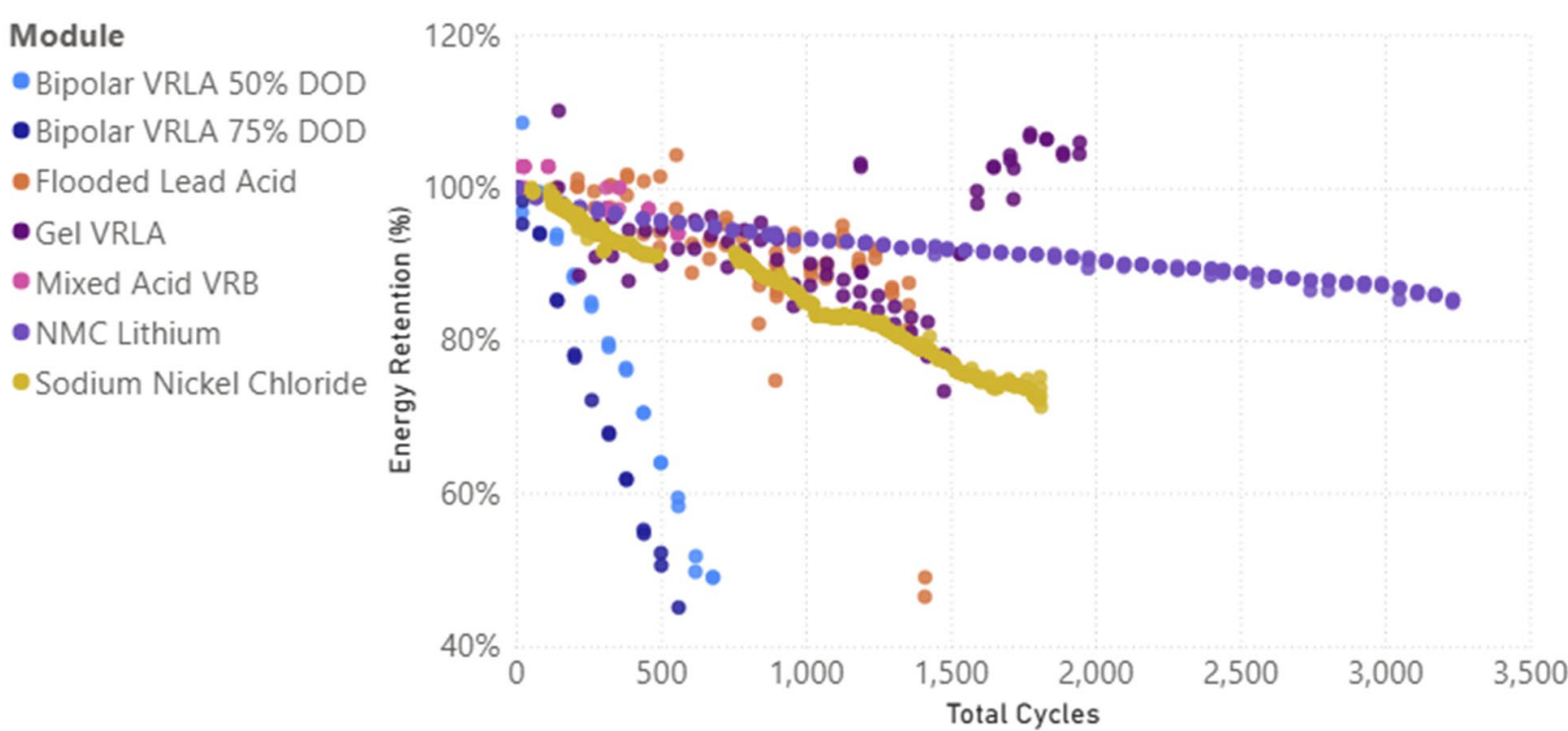


Fig. 2. Modules tested to peak shaving duty cycle.

CONCLUSIONS & IMPACT

PNNL has built vast capabilities to test battery cells, modules, and small systems for grid applications. Testing has been performed on both mature and emerging technologies. This lab supports many programs including OE Safety and Reliability, Consortium for American Lead Battery LDES Leadership (OE960), Rapid Operational Validation Initiative, and work directly for industry.

FUTURE DIRECTIONS

Continue building out more test stands and test channels. Build testing capabilities for AC integrated systems.

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