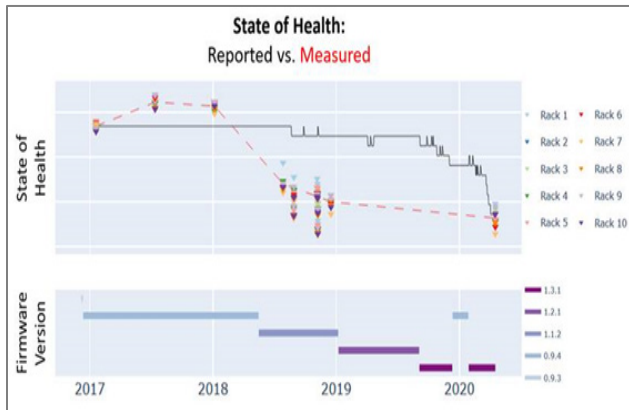


Energy Storage Performance and Reliability Foresight



Background, Objectives, and New Learnings

Understanding the long-term performance of energy storage systems is critical as electric grids become more dependent on this resource to allow for more flexibility and yet maintain reliability. For many years, EPRI has acquired large amounts of fielded storage system data in tandem with the development of a sophisticated, secure platform to analyze past system performance and project overall reliability in order to maintain these systems at the highest possible operational health.

This project proposes to further grow the existing effort to an industry-leading storage performance data platform that allows for expanded data acquisition and analytic processes that present users with clear information about past and projected storage operations. The project attempts to answer key questions about performance, reliability, and degradation, while defining leading operational practices over time. This effort will leverage experiences from EPRI's industry leading performance platforms that analyze reliability and failure modes of a broad range of utility assets. It will also leverage and advance tools and evaluation methods developed through the Energy Storage Integration Council.

Through participation in this project, utilities and other stakeholders can measure energy storage performance consistently, compare system performance to peer systems, and gain insights into reliable energy storage performance and operation practices.

Project Highlights:

- Access to an industry-leading data platform that offers sophisticated and easy to use analytics and comparisons of storage systems
- Analyze past and projected storage system performance, degradation, and reliability, and inform optimized operation schemes and O&M activities
- Develop inputs to standards that are needed to create more uniformity in storage performance assessments
- Create secure and flexible data storage structure accommodating a variety of component and whole system field data

New learnings expected from this project include:

- Comparisons of both energy storage performance and reliability across different technologies and applications with the underlying analytic techniques being continually refined
- Identification of key factors that drive performance, degradation, safety, and reliability
- Identification of inconsistencies and gaps in available energy storage monitoring systems that can inform developing performance standards
- Development of leading practices for safely and efficiently operating, testing, evaluating, and analyzing energy storage technologies

Benefits

This project is expected to result in improved characterization of risk, reliability, and performance for deployed or planned energy storage systems. Participants and the public may use the results to gain insights into the performance, functionality, durability, and trends for energy storage technologies. Additional benefits may include:

- Improved understanding of long-term storage performance based on assessments of real-world operation of wide variety of energy storage systems
- Improved power system reliability, flexibility, and resiliency
- Increased adoption of variable renewable resources

Project Approach and Summary

This project will support distinct data platforms, developed through extensive data collection and analysis of an array of different storage system technologies and sizes. The platforms include:

- **Performance Analysis** – This platform will provide a continually refined set of analytic tools to mine a growing dataset to understand battery performance and degradation under a variety of conditions. The platform is intended to allow users to compare performance for system size, OEM source, and application. All funders will be able to compare anonymized system operations and predictions. Users that contribute data will be able to see details of their system(s) and compare those to others by tapping into anonymized data sets and publicly available data. Sophisticated analysis tools and graphic capabilities will allow in-depth visualization of performance. The platform's flexibility will accommodate a wide variety of data sets. Battery cell level data will be used to understand in-depth degradation while broader readings will gauge overall system performance. Contributors will be afforded flexibility in the data they choose to have analyzed.
- **O&M and Safety Practices** – Using standard data formats aligned to utility O&M asset management practices, this platform will make use of new tools emerging from EPRI's Energy Storage Integration Council and legacy asset management systems designed to gather O&M experiences. Data models will be developed that allow comparable analysis for different system component reliability indices and derivation of leading practices. Safety-related details, including available data sheets, procedures, testing data and equipment listings to standards like UL9540, will also populate this platform.

Participants may request more extensive analysis through separate addenda to the project.

Deliverables

- **Data Platform Access** – Access to both the Performance Analysis and O&M and Safety Practices platforms for the 3-year duration of the project.
- **Secure Data Storage and Archiving** – Database containing funder-supplied and other publicly available data hosted in a secure environment.

- **User Interface and Analytical Tools** – Access to leading-edge analysis and graphical displays of user-selected performance and reliability assessment algorithms. Consultation and dedicated guidance on uploading data to EPRI and use of the interface will also be provided.
- **Annual Tech Update** – A report identifying data acquisition gaps that can inform relevant performance standards and regulatory requirements.
- **Quarterly Webcasts** – Participant webcasts where key data analysis insights and advances in analytical technique will be shared.

The non-proprietary results of this work will be incorporated into EPRI's Energy Storage and Distributed Generation R&D program, and made available to the public, for purchase, or otherwise.

Price of Project

This price of this project is \$150,000. Funding can be split over three calendar years.

This project qualifies for tailored collaboration (TC) or self-directed funding (SDF).

Project Status and Schedule

This project is expected to commence 1st quarter of 2021. All collaborative results are expected to be completed and delivered within 36 months of commencement.

Who Should Join

Planners, financiers, analysts and asset managers seeking to understand the real-world performance and reliability of energy storage systems.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

Technical Contact

Steve Willard at 555.366.7230 (swillard@epri.com)

Member Support Contacts

Brian Dupin at 650.906.2936 (bdupin@epri.com)

Barry Batson at 704.595.2873 (bbatson@epri.com)

Warren Frost at 403.474.4432 (wfrost@epri.com)

Electric Power Research Institute

3420 Hillview Avenue, Palo Alto, California 94304-1338 • PO Box 10412, Palo Alto, California 94303-0813 USA
800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com