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ENERGY STORAGE CODES AND STANDARDS UPDATE

Energy Storage Management Systems in Grid Applications

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PROJECT OVERVIEW

- Goal: P2688, Recommended Practice for Energy Storage Management Systems (ESMS) in Grid Applications, will provide a reference of best practices to develop hardware and software functions needed by ESMS to dispatch and coordinate energy storage systems to perform grid applications.
- Current Practice: This standard will fill a void in existing standards regarding the role of energy storage in performing grid applications.
- Why Sandia: Sandia possesses a deep knowledge of energy storage technology and grid controls. Sandia is trusted to be an honest broker in developing standards without financial interest in a specific product or technology.
- Innovation: This standard will close the gap between IEEE 2686-2024 on battery management systems (BMS) in grid applications and IEEE 1547.9-2022 on interconnection of energy storage to the grid.
- Duration: FY21-FY27
- Impact: Energy storage manufacturers, energy storage technology suppliers, and electric utilities will all benefit from a consistent set of practices for energy storage in performing grid applications. This enables the apples-to-apples comparison of energy storage technologies and products to assist utilities in selecting the best options for their needs and helping manufacturers/suppliers in production of energy storage solutions that provide the most value for themselves and their customers.
- Vertical/Investment Area:
  - Analytics
  - Grid Integration and Field Validation
  - Safety & Reliability
- Alignment/Supports strategic pathway: Optimizes grid services and enables the growth of grid capacity

PROJECT DETAILS

- Problem: ESMS Prioritization/scheduling of energy storage functions
- Results: Example prioritization of operational modes by ESMS
    1. Maintenance mode
    2. Capacity test (verify SOH)
    3. Black start function
    4. FFR (major freq. excursions)
    5. PSS (damp system oscillations)
    6. External dispatch (operator command)
    7. Reactive power (volt-var support)
    8. Charge/Discharge (restore SOC to desired value)
- This standard leverages the recommendations of P2689 for uniformity in energy storage data management
- Next Steps: ES industry has asked for a new standard:
    - IEEE P1547.9.X – Guide for System Frequency Support Through Application of ES-IBR Performing Fast Frequency Response (FFR) and Active Damping

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REFERENCES

- IEEE Std 2686-2024, Battery Management Systems in ESS Applications
- IEEE Std 1547.9-2022, Interconnection of ESS in Distribution Systems
- IEEE Std P2689, Electrical Energy Storage Data Management (in progress)