

Achieving Energy Resiliency from Energy Storage Demonstrations

Carl “C.J.” Unis, Benjamin Schenkman

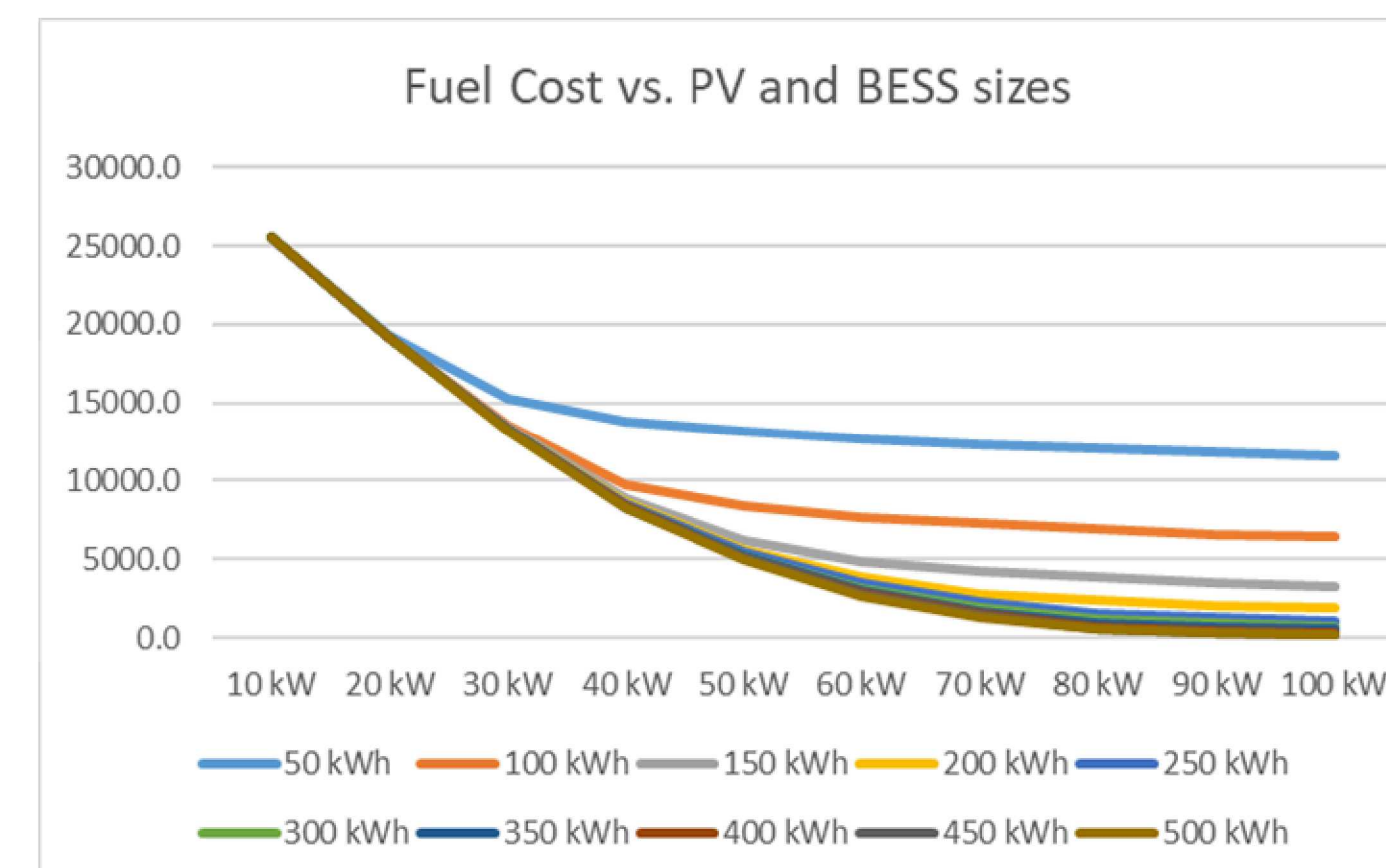
Sandia National Laboratories

Project Overview

There is currently a need to enhance the resilience of energy infrastructure to reduce the impact from natural and man-made disasters, and climate change. Energy systems are becoming stressed by growth and urbanization in these areas. These projects focus on energy storage technologies applied for grid and off-grid resiliency, with guidelines on policymaking, for all relevant stakeholders. Specific focus areas include energy storage technologies, application controls through the view of an operator and current and future policies which enables energy storage systems to be installed increasing resiliency. A major goal will be to incorporate ideas and lessons learned from past projects into resource planning and government procurement systems for community resilience.

Projects

- Albuquerque Public Schools - Cost benefit for educational facilities within New Mexico and similar state electric markets with energy resilient operations.
- Alaska Village Electric Cooperative - Demonstrate the use of an ESS bridging two villages to optimize renewable energy operation and reducing fossil fuel usage.
- National Rural Electric Cooperative Association (4 Projects) - Determine resiliency benefits to electric cooperatives through installation of an ESS within microgrids that may contain defense energy infrastructures.
- Vermont Electric Cooperative – Increase the capacity of existing transmission lines to deliver electrical power from areas abundant in renewable energy sources to dense populated areas
- Hyde Park – Santa Fe, NM. – Provide energy cost reduction with an ESS for customers located at the edge of the grid impacted by frequent outages and reduced to using generators for primary power.
- Santa Fe Community College – ESS integrated into a greenhouse enabling food resiliency for rural communities that are not electrified and poverty stricken.



Example of techno-economic analysis performed on a recent project

FY20 Accomplishments

- RFP's have been issued for National Rural Electric Cooperative Association (NRECA) & Albuquerque Public Schools Project (APS)
- Sandia has performed techno-economic analysis for APS & NRECA
- Sandia also verified & validated analysis for Hyde Park, NM. from the vendor
- Sandia is under contract with Hyde Park, APS, Alaska Village Electric Cooperative (AVEC) & Santa Fe Community College (SFCC)
- Created a document for lessons learned during contracting, design, commissioning & installation. Document to be released in early FY21.



Summary & Path Forward

Upon completion of these projects, Sandia will demonstrate the economic and resilient benefits of energy storage systems integrated into rural electric cooperatives that serve rural critical and defense energy infrastructures. This will allow Sandia and our commercial partners to further collaborate and to build better energy storage systems for future fielded systems. Size & determine technology appropriate for energy storage applied as resilient Distributed Energy Resource (DER)

- Develop an RFP for the storage systems
- Demonstrate the applications, verify techno-economic models
- Evaluate system performance – eg. Lifecycle costs, O&M, degradation of system, etc.

