QuESt: An Energy Storage Application Suite
QuEST is an open source software tool for energy storage valuation developed in Python.

Provides the public with analysis capabilities that Sandia has developed.

Enables energy storage stakeholders with tools to support project modeling and analysis.
PROJECT TEAM

- Software Development
  - Ricky Concepcion (SNL)
  - Tu Nguyen (SNL)
  - Felipe Wilches-Bernal (SNL)

- Product Development and Support
  - Alex Headley (SNL)
PROJECT OBJECTIVES

- Continued development of QuESt product
  - Updates and new features
  - Conduct outreach to increase userbase

Milestones and deliverables for FY19
- Develop and release one brand new application for QuESt
- Conduct a survey study of energy storage revenue potential among U.S. market areas
- Write a journal publication about QuESt
Develop and release one brand new application for QuEST

- Released version 1.1 in November 2018 to support remaining market areas in QuEST Valuation
- Released version 1.2 in April 2019 to add QuEST BTM
- Released several interim updates to address reported issues
- Released a pre-packaged executable version for Windows to simplify installation
- Conduct a survey study of energy storage revenue potential among U.S. market areas
  - Compiling results into paper
  - Presented by Felipe Wilches-Bernal

- Write a journal publication about QuEST
  - Describes QuEST software architecture and previews theory and case studies for current applications
  - First draft completed; pending authors’ and internal Sandia review prior to submission
- Released QuEST BTM application for behind-the-meter energy storage analysis
- Estimates cost savings using behind-the-meter energy storage for time-of-use and net metering customers
- Developed new tools and interfaces for QuEST Data Manager to download and process new data sources required for QuEST BTM
  - U.S. utility rate structures (using OpenEI API)
  - Commercial and residential building load profiles (hosted on OpenEI.org)
  - Photovoltaic power profiles (using PVWatts API)
**PROJECT RESULTS**

- **QuEST BTM development process**
  - Develop the Python module describing the optimization problem
  - Determine data requirements (utility rate, load profile, PV profile)
  - Find online sources for data and learn their APIs, database structures, etc.
  - Develop backend systems: making API or database calls, interacting with optimization models
  - Design and develop GUIs for downloading data
  - Design and develop GUIs for QuEST BTM wizard and results viewer
  - Conduct usability testing to gather feedback
  - Reiterate to refine product as needed
  - Release product
Looking Forward

- Develop and release new capabilities
  - Integrated resource planning
  - Degradation and cost integration
  - Front-of-meter: T&D deferral, peak shaving
  - Resilience
  - Additional streams for value stacking
- Webinars, workshops, and presentations
- Explore web-based version
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Inquiries to:

snl-quest@sandia.gov

Ricky Concepcion
rconcep@sandia.gov

sandia.gov/ess-ssl/tools/quest/