EXPANDING QUEST 2.0'S DATA INTEGRATION CAPABILITIES

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Updating QuESt Data Manager Capabilities

Background:
- The **QuESt Evaluation** tool uses data from competitive wholesale energy markets to estimate potential revenue generated by energy storage systems providing market services
- **Quest Data Manager** is the application for to downloading market data
- The data portals hosted by market operators are updated constantly

Project Objectives :
- Update the backend of QuESt Data Manager to support seamless data integration with a comprehensive range of markets
- Enhance the tool's ability to acquire critical energy market data

Relevance of Work:
- QuESt Data Manager is a key differentiator of QuESt as it provides a practical means for downloading market data, therefore maintaining its capabilities is crucial for usability of QuESt
- Energy market data is constantly updated by ISOs, so maintaining and expanding the Data Manager's capabilities ensures that users have access to reliable, timely, and diverse datasets.

All-time peak demand of U.S. wholesale electricity markets
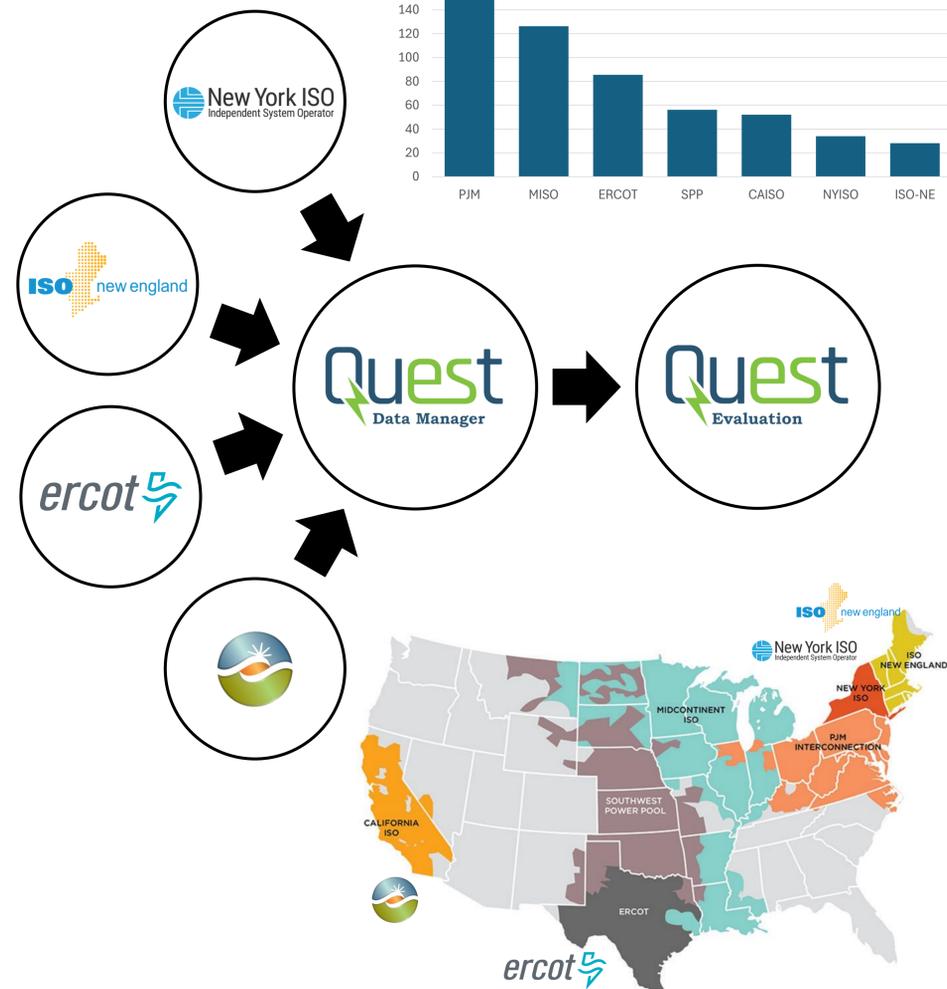
U.S. wholesale electricity markets. Source: Federal Energy Regulation Committee , "An Introductory Guide to Electricity Markets Regulated by the Federal Energy Regulatory Commission," https://www.ferc.gov/media/introductory-guide-electricity-markets-regulated-federal-energy-regulatory-commission

Progress Update

- Successfully implemented and validated backend code to download data from:
  - Independent System Operator New England (**ISO-NE**)
    - Web Services: https://webservices.iso-ne.com/
  - Electric Reliability Council of Texas (**ERCOT**)
    - Data Access Portal: https://data.ercot.com/
  - California Independent System Operator (**CAISO**)
    - Open Access Same-Time Information System (OASIS): https://oasis.caiso.com/
  - New York Independent System Operator (**NYISO**)

Next Steps

- **Develop code to download data from more energy markets:**
  - Southwest Power Pool (**SPP**), Midcontinent Independent System Operator (**MISO**), and **PJM**
  - Integrate developed code with QuESt Data Manager
- Continuously update and validate data acquisition methods to ensure that real-time market changes and data portal updates are accurately captured.

Application of QuESt Workspace to Support Tool Interoperability

QuESt Workspace allows the creation of workflows that connect several applications into a single process using a graphical interface

Case Study: Integration of QuESt BTM with RAVENS Schema Using QuESt Workspace

Background:
- **QuESt BTM** (Behind-The-Meter) estimates potential cost-savings obtained by operating an energy storage system for utility customers under time-of-use and other flexible electricity rates.
- The **RAVENS MG Schema** is a JSON-based data standard designed to enable integration and interoperability among diverse microgrid and power distribution system analysis tools

Project Objectives:
- Integrate diverse analytics tools from DOE programs by developing an easily extensible open data schema enabling automated, multi-tool workflows via a modular workspace

Relevance of Work:
- Microgrid and energy storage analysts face significant challenges with disparate tools that handle utility rate schedules and location-specific energy data, leading to redundant data conversions and manual interventions
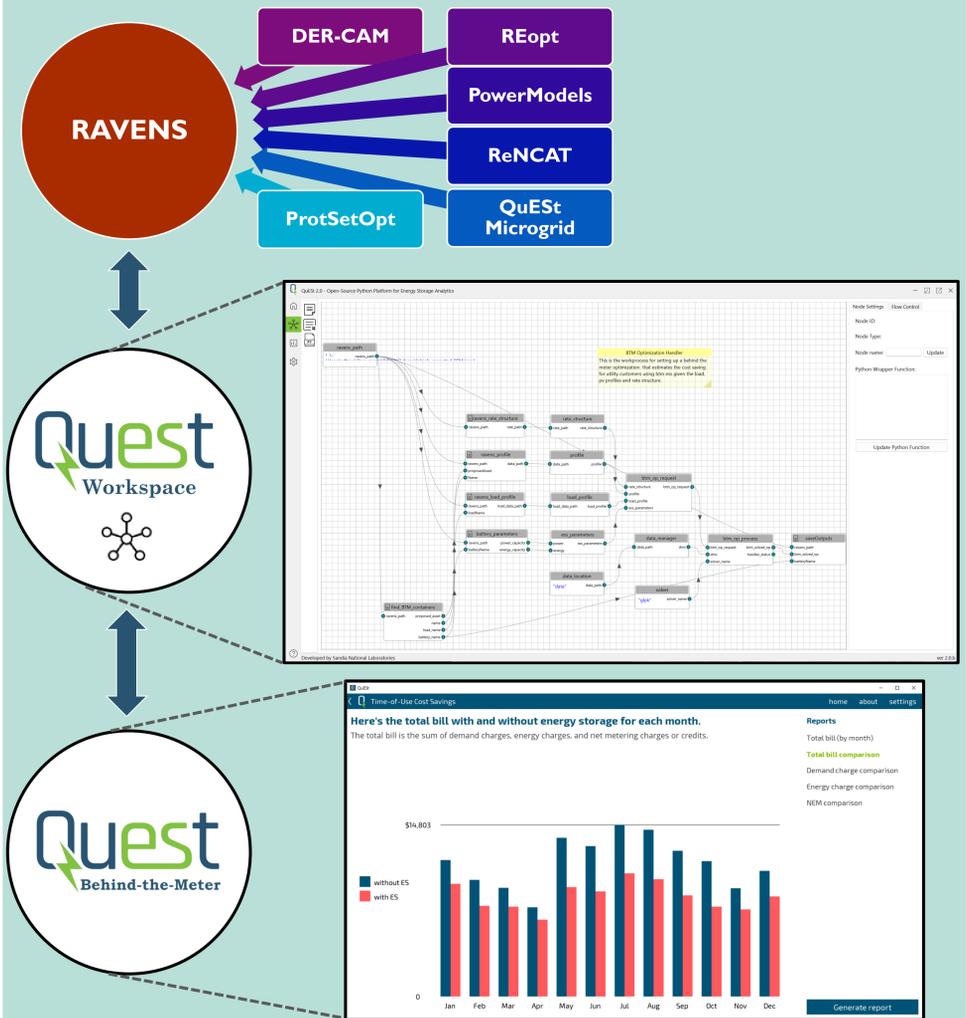
Progress Update

- Developed custom Python code within the QuESt Workspace to translate the native outputs of QuESt BTM into the RAVENS JSON-based schema.
- Integrated the QuESt BTM tool with Ravens through the QuESt Workspace, using recent case studies that incorporate behind-the-meter energy storage systems.
- Leveraged the QuESt Workspace's modular workflow capabilities to link cost savings calculations with other microgrid analytical tools.

Next Steps

- Extend workflow testing and validation with additional case studies and tools from the microgrid program