SAND2026-15601D

Sandia National Laboratories

BATTERY ENERGY STORAGE FOR UTILITY SYSTEM PEAK DEMAND REDUCTION IN VERMONT

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Overview

The Troy Battery Energy Storage Project is a collaborative effort between Vermont Electric Cooperative (VEC), Green Mountain Power (GMP), and Sandia National Laboratories (SNL). Located in North Troy, Vermont, the project addresses critical challenges in managing power grid reliability and efficiency in areas with limited transmission capacity. The 3-megawatt utility-scale battery system is designed to store energy during periods of low demand and release it during peak usage or grid congestion, reducing strain on the electrical infrastructure. By improving the balance between energy supply and demand, the project enhances grid stability and operational flexibility, offering a model for addressing similar challenges in other regions.

Approach & Objectives

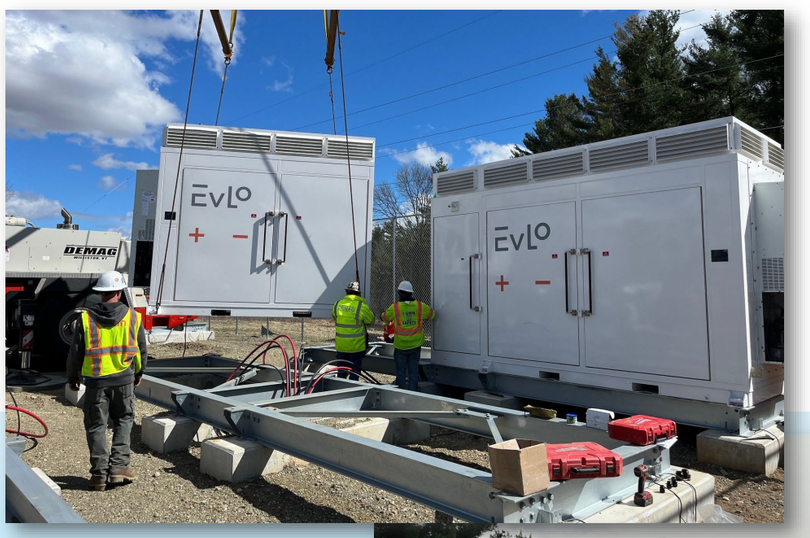
The Troy Battery Energy Storage Project employs a strategic approach to improve grid performance in transmission-constrained areas. Its primary objective is to alleviate congestion in the Sheffield-Highgate Export Interface, a region where energy generation often exceeds the capacity of local usage and transmission lines. The battery system provides critical support to the grid by storing energy during periods of low demand and discharging it during peak load conditions, helping to maintain grid reliability and reduce the risk of outages. Additionally, the project participates in the ISO New England Regulation market, providing ancillary services such as frequency regulation to stabilize the grid. This dual functionality ensures the system contributes to both local and regional grid operations, enhancing overall efficiency and reliability.

Project Impact

The Troy Battery Energy Storage Project demonstrates significant advancements in grid management and operational efficiency. By addressing transmission constraints and improving the balance between energy supply and demand, the project enhances grid reliability and reduces the risk of outages during peak usage periods. Its ability to provide ancillary services, such as frequency regulation, strengthens regional grid stability and supports efficient power delivery. This collaboration has fostered innovative solutions for balancing energy supply and demand, ensuring consistent grid performance. The project's scalable design offers a model for utilities facing similar challenges, demonstrating how energy storage systems can optimize grid performance in areas with limited infrastructure. By improving operational efficiency and resilience, the Troy BESS sets a precedent for future advancements in grid management, paving the way for more reliable and adaptable power systems nationwide.

System Design

The Troy Battery Energy Storage System (BESS) features advanced technology tailored to address grid challenges. Manufactured by EVLO Energy Storage, **the 3MW / 12 MWh, lithium iron phosphate (LFP)** system consists of **16 industrial units equipped** with redundant safety features, including smoke detectors, hydrogen sensors, and natural convection cooling mechanisms. These design elements ensure reliable operation under various conditions while minimizing maintenance requirements.



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NNSA National Nuclear Security Administration

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This material is based upon work supported by the U.S. Department of Energy, Office of Electricity (OE), Energy Storage Division

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