

DEMONSTRATION OF ENERGY STORAGE USING A BREAKTHROUGH REDOX FLOW BATTERY TECHNOLOGY

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Stationary energy storage applications requiring multiple-hour duration present a large and growing market opportunity. Recent studies have found that energy storage systems with several hours of capacity have high potential for cost-effectiveness as a single system can serve several applications. These applications include utility transmission and distribution (T&D) upgrade deferral, variable renewable resource firming, demand response, and peak demand management. Furthermore, the highest-value location for an energy storage system is closest to the end user. Siting within high population densities elevates the safety requirements in both normal and abnormal circumstances. Additionally, the more distributed nature of energy storage systems requires that reliable operation can be achieved with minimal maintenance. These market realities necessitate that safety and reliability are equally important to cost-effectiveness for multiple-hour duration energy storage applications.

Redox flow batteries (RFBs) are a decades-old technology with intrinsic characteristics providing a high degree of safety: decoupled power and energy and aqueous electrolytes. The simple nature of the

reduction and oxidation reactions underlying an RFB's electrochemical energy storage provides the foundation for long service life. However, cost-effectiveness of legacy RFB designs have been limited by the high cost of components and reactants while complex control requirements have hampered reliable operation. EnerVault is developing RFB energy storage systems based on its patented Engineered Cascade™ technology with a combination of safety, reliability, and cost-effectiveness that satisfies the requirements for multiple-hour duration energy storage applications.

This paper will describe the advantages of EnerVault's novel Engineered Cascade™ RFB system architecture in terms of safety, reliability, and cost-effectiveness. We will also provide an update on the progress in developing systems based on our breakthrough technology. Lastly, the results of our NYSERDA PON1200 Project and the status of our Department of Energy American Recovery and Reinvestment (DOE ARRA) Storage Demonstration Project (in partnership with Ktech Corporation and matching funds from the California Energy Commission) will also be covered.

