



Research case study > energy storage

Hybrid energy storage system design

Version 1 (update May 31, 2017)

Context: Energy storage (ES) is playing an increasingly large role in electricity systems. It can help the integration of renewables, build resiliency and be used to reduce or eliminate infrastructure investments needed to modernize the grid.

Problem: Sharp changes in demand require an immediate response from the grid system. Matching this immediate demand can be challenging and battery ES may not be suitable while power density limitations of flywheel ES also prove challenging.

Solution: Hybrid ES systems that utilize several types of ES such as batteries with high power density and flywheels which can discharge in seconds may be the solution to these problems providing greater flexibility.

Impact: This research will help develop energy storage solutions that are flexible and cost-effective furthering their penetration into the energy system while developing the growing ES market.

CUE's role: Researchers are developing a Hybrid ES system with battery, flywheel and ultracapacitor, performing case studies based on Ontario data. They are also developing scheduling methods for hybrid ES systems to deliver required services and maximize asset life.

Sponsors:
NSERC

Timeline:
June 2015 - June 2020

Research team:
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Key stats

3 energy storage technologies