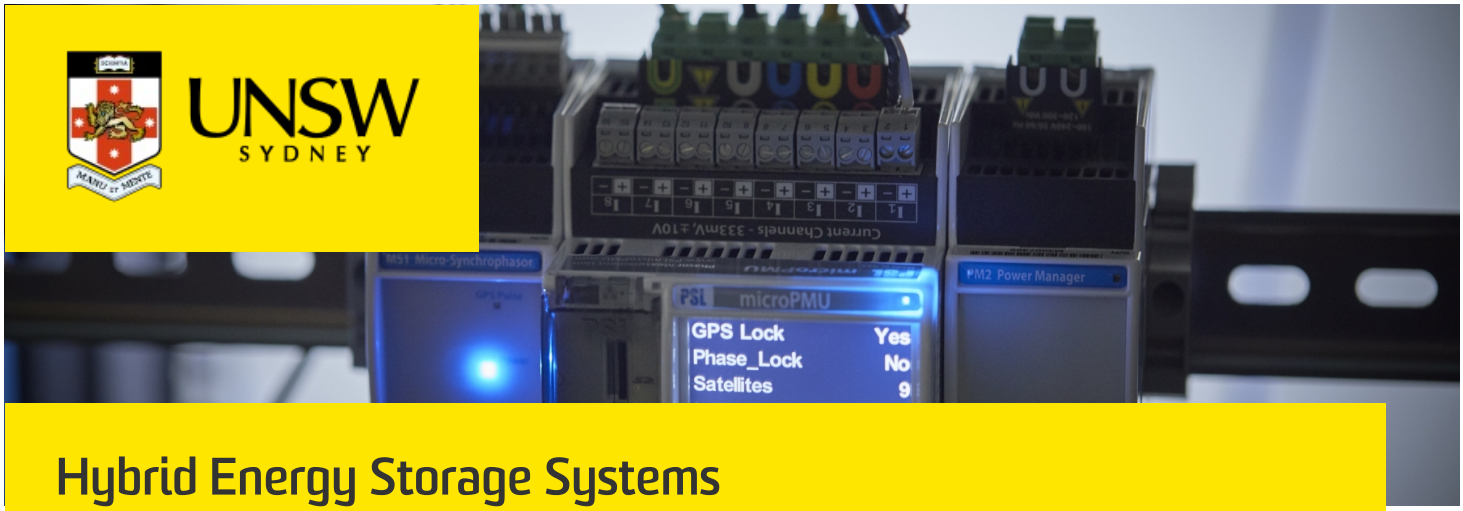

Hybrid Energy Storage Systems

Hybrid energy storage systems (ESS) combine individual advantages of different types of storage to realise a single ESS with both higher power and energy capabilities. Battery-supercapacitor based hybrid ESS help to reduce the battery power rating and extend battery life by minimizing the current variation.

More Information

Dr Branislav Hredzak, Dr Georgios Konstantinou, Professor John Fletcher

School of Electrical Engineering and Telecommunications

T: +61 (0) 2 9385 4895
E: b.hredzak@unsw.edu.au

UNSW Knowledge Exchange

knowledge.exchange@unsw.edu.au

www.capabilities.unsw.edu.au

+61 (2) 9385 5008

Competitive advantage

- Novel energy storage technologies that can be customised based on industry/customer specifications, allowing rapid introduction into the market
- Ability to conduct rapid prototyping and real-time verification of advanced power electronic concepts using Opal RT/RTDS, provide fast verification and quick adoption by industry for mass production
- World-class power hardware-in-the-loop capabilities to enable testing at full power

Impact

- Improving reliability, efficiency and flexibility in grid energy storage, rail systems, residential energy storage and electric vehicles.

Successful applications

- Developed novel DC linked and direct AC linked hybrid (battery/ultracapacitor) energy storage systems. Their main advantages are increased lifetime, improved efficiency, increased reliability and flexibility
- Reconfigurable hybrid ESS that can be adapted online to fulfil different operating modes: feeding the load from the battery system or from a backup power source, regenerative mode, intra-module balancing mode and charging mode. Unlike conventional systems, they share components among the different operating modes making them more compact

Capabilities and facilities

- Hybrid energy storage system prototypes
- Hardware-in-the-loop simulation for rapid assessment of control techniques
- Hardware testing capability up to 50kVA, 1kV, 400A
- Arbin battery and supercapacitor tester with environmental chamber

Our partners

- ABB Corporate Research, Sweden