



**UNSW**  
SYDNEY



## Flow Battery Storage for Integrated Energy Systems

**World first developments in energy storage and flow battery technology including the vanadium redox flow battery provide opportunities for maximising renewable energy power plant performance and improvements in electricity quality and supply. Advancements made on flow battery technology have been utilised globally in large scale demonstration and commercial projects.**

### Competitive advantage

- Redox flow batteries offer lower cost and longer cycle life than conventional battery systems with no thermal issues
- Up to 200,000 cycles for a vanadium flow battery demonstrated in commercial wind system
- Lower risk than Li-ion technology - no emissions or fire hazards
- Advanced battery control approaches based on mechanisms of electrochemical reactions to improve efficiency and flexibility of battery operation
- Use of vanadium batteries for simultaneous electricity quality control and power demand/supply balance (without supercapacitors) to reduce the capital and maintenance costs of systems

### Impact

- The vanadium flow battery developed at UNSW is currently manufactured commercially by companies in Japan, China, USA, UK and Germany. A 200 MW/800 MWh VRB is currently being installed in Dalian, China.

### Successful applications

- Vanadium flow battery developed at UNSW now manufactured commercially
- Licensing of vanadium battery technology to international sponsors
- Development of a vanadium oxygen laboratory scale fuel cell system
- Scale-up of an iron slurry flow battery system

### Capabilities and facilities

- 30 kW/130 kWh commercial VRB system
- Dedicated computation laboratories for advanced simulation modelling and associated facilities for validation studies
- Extensive state-of-the-art electrochemical and mechanical laboratories
- Advanced additive and automated manufacturing facilities

### Our partners

### More Information

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