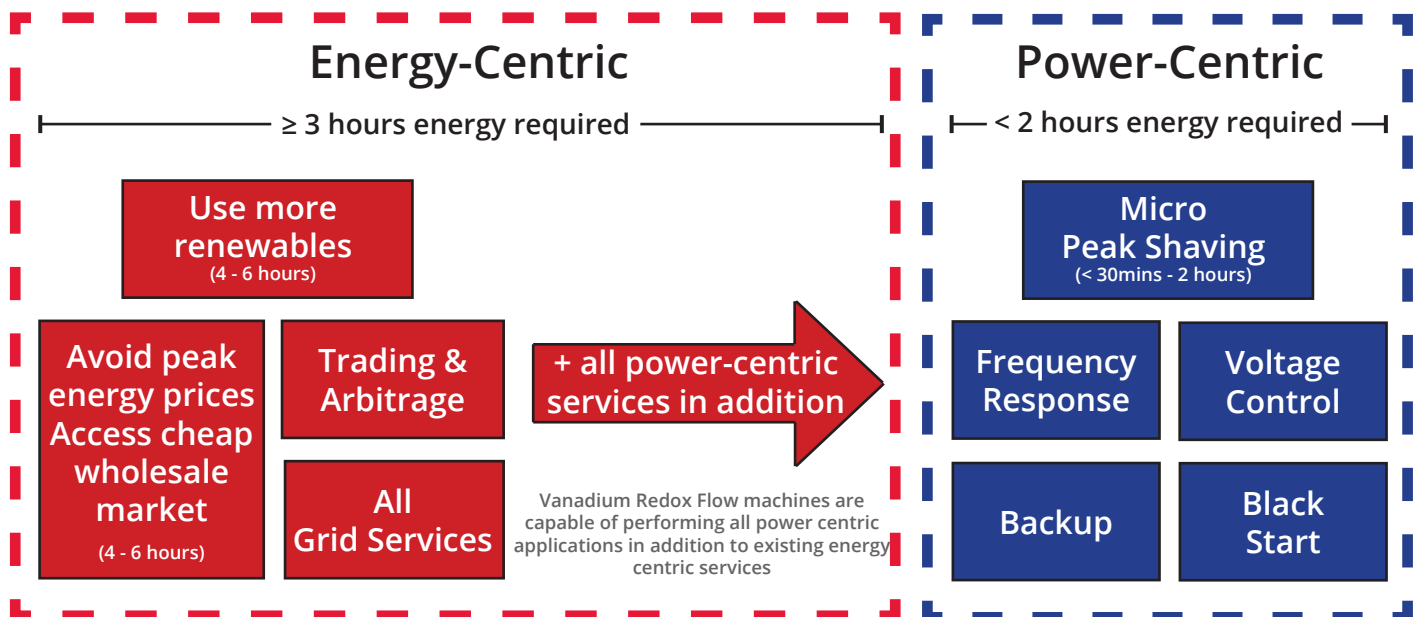
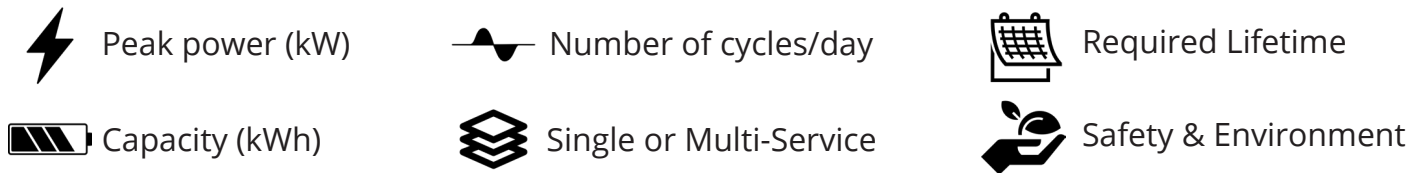


## Comparing Vanadium Flow Machines with Lithium Batteries

Selecting the right energy storage technology depends heavily on how you intend to use the system. The following considerations should inform your choice.



### Vanadium Flow Characteristics

- High Power
- Multi Service
- 20+ years life: electrolyte does not degrade (Infrastructure asset)
- Fully recyclable: electrolyte never degrades & retains value over 20+ years
- 20 Year Warranty: use the system without any limitations on operation
- Low maintenance requirements: no need for active HVAC or fire suppression

- High Energy
- Use multiple times each day
- Use 100% of stored energy

### Lithium-ion Characteristics

- Very High Power
- Low Energy
- Very High Efficiency
- 3-10 years life: usage & chemistry dependant
- Must factor in disposal costs & need to replace cells
- Warranty terms typically limit system operation
- Requires active HVAC & safety equipment

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**In-Depth: Comparing Energy Storage Scenarios**

**Levelised Cost of Storage (LCOS): The most comprehensive metric for calculating the cost of energy storage.**

The LCOS metric takes into account the full spectrum of considerations required to accurately assess the cost of storage for your project. By taking into account how the system will be used and the corresponding costs associated with its operation, you can make an informed decision.

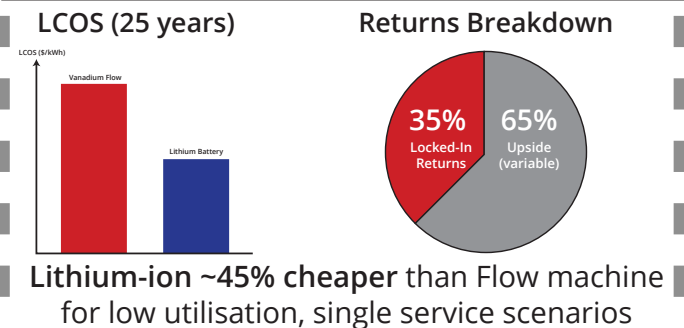
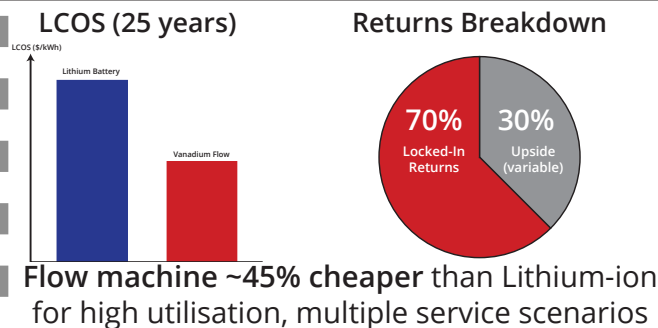
The examples below show how costs differ between energy storage applications:

**Scenario 1 - Locked-in energy savings over 20+ years**

- Commercial site: 100kW peak demand
- Min. 4-5 hours discharge per day
  - Use more renewables
  - Access cheap wholesale energy market
  - Additional revenue from grid services
- Reduce energy costs over 20+ years

**Scenario 2 - Short term grid trading**

- Commercial site: 100kW peak demand
- Offset/minimise peak demand charges
  - Max. 1.5 hour discharge
- Perform frequency response



**Degradation Cost: Understanding how system utilisation affects cost**

This refers to the cost of making your energy storage system perform additional services. The ability to perform new services as new opportunities arise over the course of 20+ years is a key component for attractive investment returns and an important hedge for the future.

**Degradation Cost based on Energy Throughput**

**Flow Machine**  
~0¢/kWh

**Lithium-ion**  
~7¢/kWh

Flow Machines have no degradation cost per additional kWh of usage

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