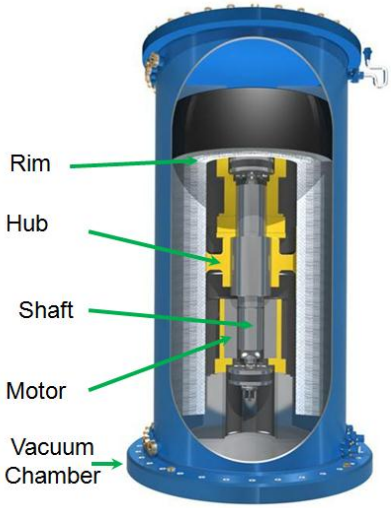
Development of a 100 kWh/100 kW Flywheel Energy Storage Module

Current State of the Art Flywheel

25 KWh – 100KW



Eliminate Shaft and Hub

Levitate on Passive Magnetic Bearings

Increase Rim Tip Speed

Larger Diameter Thinner Rim Stores More Energy

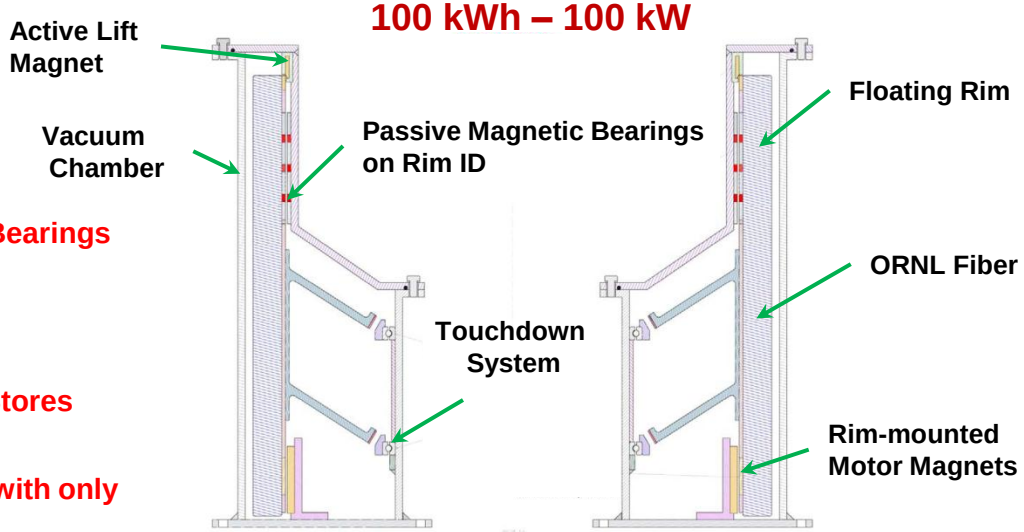
4 X increase in Stored Energy with only 60% Increase in Weight

Limitations of Existing Flywheel

- 15 Minutes of storage
- Limited to Frequency Regulation Application
- Rim Speed (Stored Energy) Limited by Hub Strain and Shaft Dynamics

Low Cost Composite Ring with Bore-Mounted Magnetics

100 kWh – 100 kW

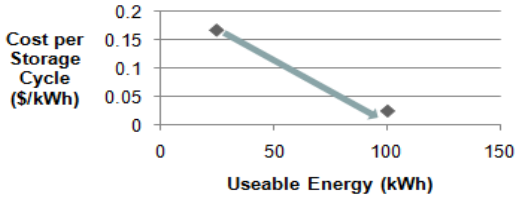


Program Challenges

- Development of Flexible Magnets on Rim ID
- Touchdown System for Earthquake Survival
- In-situ Cure Development for Larger Rim

Program Objectives

- 1 Hour of Storage
- 1/8 the Cost per unit of Stored Energy
- Reduced Parasitic Losses
- Additional Applications Possible
  - ✓ Wind and Solar Ramping
  - ✓ Wind Firming
  - ✓ Peak Shaving – Demand Limiting



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