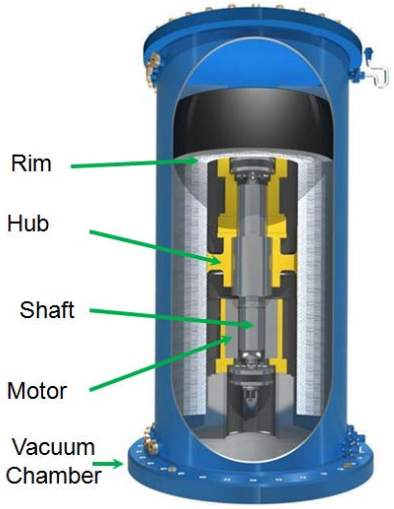
Development of a 100 kWh/100 kW Flywheel Energy Storage Module

Current State of the Art Flywheel

25 KWh – 100KW



Eliminate Shaft and Hub

Levitate on Passive Magnetic Bearings

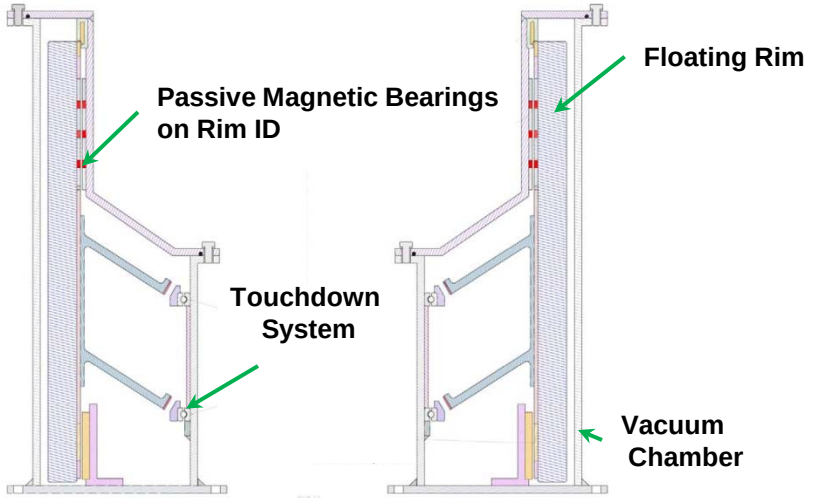
Increase Rim Tip Speed

Larger Diameter Thinner Rim Stores More Energy

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

High Speed, Low Cost, Composite Ring with Bore-Mounted Magnetics

100 KWh – 100KW



Limitations of Existing Flywheel

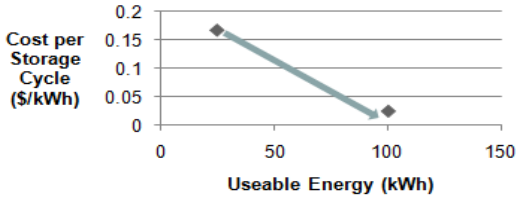
- **15 Minutes of storage**
- **Limited to Frequency Regulation Application**
- **Rim Speed (Stored Energy) Limited by Hub Strain and Shaft Dynamics**

Program Challenges

- **Development of flexible magnets on Rim ID**
- **Touchdown System for Earthquake Survival**
- **Process Development of 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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