

# Enhancing the Dispatchability of Wind Energy Using Inertial Storage and Hybrid Systems

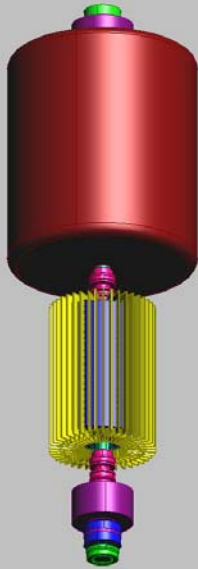
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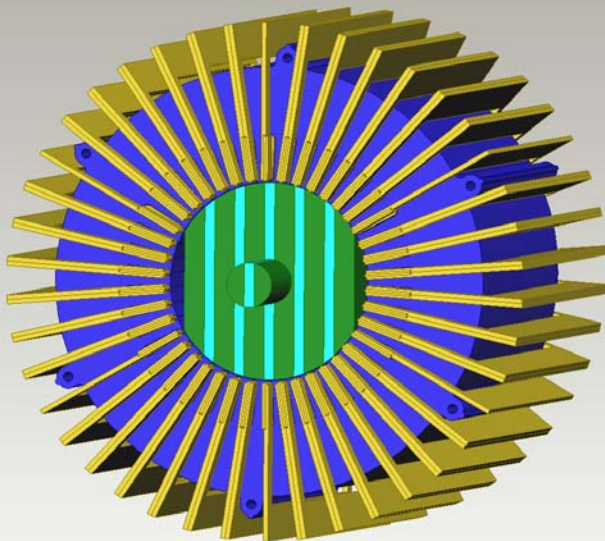
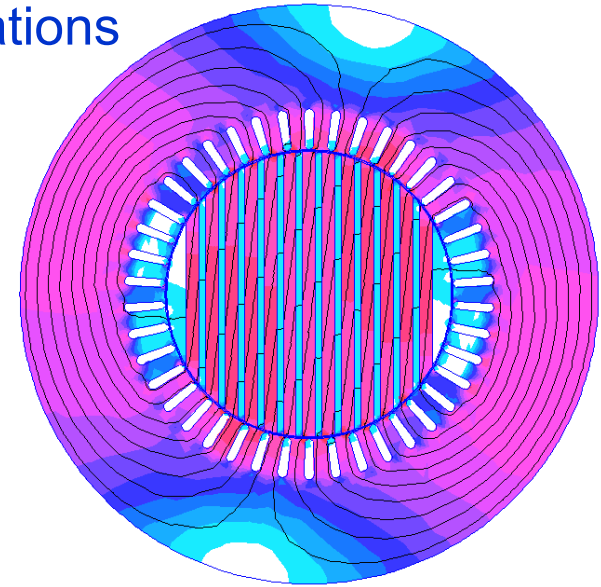
The project deals with inertial storage for wind energy. The inertial storage is in the form of a high speed flywheel. The major investigation has been the development of a motor/generator for the flywheel. The machine technology used has been the synchronous reluctance machine. This machine is able to survive the vacuum environment in a flywheel system and provide excellent efficiency at a low cost.

# Flywheel and Synchronous Reluctance Machine

Flywheel

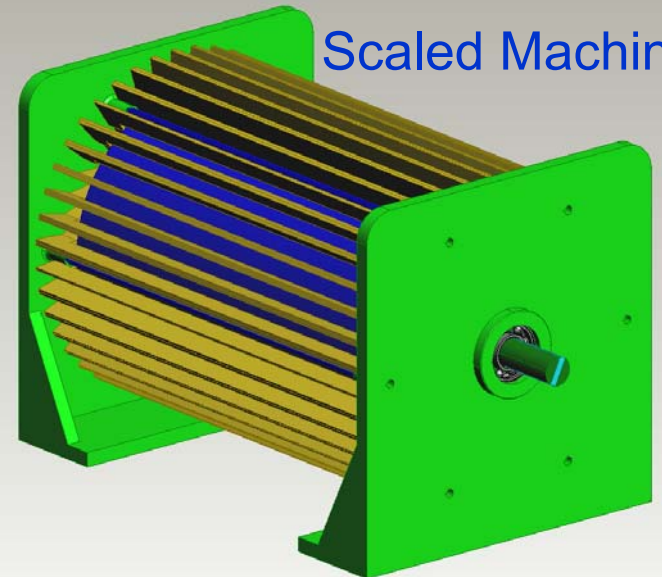


Machine Simulations



Synch.  
Reluctance  
Machine

Scaled Machine



# Results

- ◆ Completed Design of Flywheel Motor/Generator
  - Maximum Power of 2 MW
  - RPM Range of 7,500 rpm –15,000 rpm
  - Efficiency greater then 98.9%
- ◆ Completed Design of Scaled Motor/Generator
  - Maximum Power of 9.9 kW
  - RPM Range of 7,500 rpm –15,000 rpm
  - Efficiency greater then 97.8%

# Future Work

- ◆ Fabricate Scaled Machine
- ◆ Inverter Design
- ◆ Characterize Machine
- ◆ Reluctance Machine Control
- ◆ Utility Interface
- ◆ Storage Control