Inventions & Innovation Project Abstract

Third Generation Flywheels for Electricity Storage

Electricity is critical to our economy, but growth in demand has saturated the power grid, causing instability and blackouts. The economic penalty due to lost productivity in the US exceeds $100 billion per year. Opposition to new transmission lines and power plants, environmental restrictions, and an expected $100 billion grid upgrade cost have slowed system improvements. Flywheel electricity storage could provide a more economical, environmentally benign alternative and slash economic losses if units could be scaled up in a cost effective manner to much larger power and capacity than the present maximum of a few hundred kW and a few kWh per flywheel. LaunchPoint's goal is to design, construct, and demonstrate a small-scale third generation electricity storage flywheel using a revolutionary architecture scalable to megawatt-hours per unit.

First generation flywheels are built from bulk materials such as steel and provide inertia to smooth the motion of mechanical devices such as engines. They can be scaled up to tens of tons or more, but have relatively low energy storage density. Second generation flywheels use similar designs but are fabricated with composite materials such as carbon fiber and epoxy. They are capable of much higher energy storage density but cannot economically be built larger than a few kWh of storage capacity due to structural and stability limitations. LaunchPoint is developing a third generation flywheel — the "Power Ring" — with energy densities as high or higher than second generation flywheels and a totally new architecture scalable to enormous sizes. Electricity storage capacities exceeding 5 megawatt-hours per unit appear both technically feasible and economically attractive. The design uses a new class of magnetic bearing – a radial gap "shear-force levitator" – that LaunchPoint discovered and patented, and a thin-walled composite hoop rotated at high speed to store kinetic energy.

One immediate application is power grid frequency regulation, where Power Rings could cut costs, reduce fuel consumption, eliminate emissions, and reduce the need for new power plants. Other applications include hybrid diesel-electric locomotives, grid power quality, support for renewable energy, spinning reserve, energy management, and facility deferral.

Contact

LaunchPoint Technologies, LLC
5735 Hollister Ave., Suite B
Goleta, CA 93117
www.launchpnt.com

Contact: James Fiske
Telephone: 805-683-9659
Email: jfiske@launchpnt.com