

## EMB Development and Demonstration at Rocky Mountain Power

PacifiCorp is an electric utility serving customers in six western states. It has been working with a company called EMB Energy to demonstrate a breakthrough in energy storage for electric power systems. This storage system was pioneered at Lawrence Livermore National Laboratories by Dr. Richard Post who named it the *electromechanical battery* (EMB).

While there are various sizes and technologies being pursued by EMB Energy and its business partners, the energy storage system of greatest interest to PacifiCorp comprises (1) a high tech fiber composite flywheel, (2) a unique passive magnetic bearing system, and (3) an electrostatic motor generator. These three technologies will all operate in a vacuum with electrical feeds to power electronics that interact with the utility's ac power system. While specific design details are proprietary, it can be stated that the combination of these three technologies has the potential to greatly drive down the unit price of flywheel-based electrical energy storage.

Originally Rocky Mountain Power (RMP), a division of PacifiCorp, had a demonstration site picked that would connect a 25 MW / 25 MWh EMB plant to the utility at transmission voltage, envisioning an array of 100 flywheels, each sized at 250 kW / 250 kWh. However, recent changes in the development and planned manufacturing schedule of the flywheels dictated that the plant size be reduced by a factor of ten to 2.5 MW / 2.5 MWh. If the development by EMB Energy proves successful the present plan is that a demonstration site in Utah will be chosen. Currently RMP's level of support is to closely follow the EMB development.

With utilities around the world integrating significant amounts of intermittent non-dispatchable renewable energy into their power systems, the development of more cost effective electrical energy storage is increasing in importance. Once development of a cost effective EMB plant is clearly proven and demonstrated it is PacifiCorp's hope that this combination of technologies will become a valuable tool in serving its customers and meeting the needs of society.