Flywheel power storage

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Sometimes battery storage power stations are built with flywheel storage power systems in order to conserve battery power. Flywheels can handle rapid fluctuations better.[3][4]

In vehicles small storage of power flywheels are used as an additional mechanism with batteries, to store the braking energy by regeneration. Power can be stored in the short term and then released back into the acceleration phase of a vehicle with very large electrical currents. This conserves battery power.[3]

Flywheel storage has proven to be useful in trams. During braking (such as when arriving at a station), high energy peaks are found which can not be always fed back into the power grid due to the potential danger of overloading the system. The flywheel energy storage power plants are in containers on side of the tracks and take the excess electrical energy. For example, up to 200 MWh energy per brake system is annually recovered in Zwickau.[5]

In Stephentown, New York, Beacon Power operates in a flywheel storage power plant with 200 flywheels of 25 kWh capacity and 100 kW of power. Ganged together this gives 5 MWh capacity and 20 MW of power. The units operate at a peak speed at 15,000 rpm. The rotor flywheel consists of wound CFRP fibers which are filled with resin. The installation is intended primarily for frequency control. This service is sold to the New York power grid.[6]

Stadtwerke M?nchen (SWM, Munich, Germany) uses a flywheel storage power system to stabilize the power grid, as well as control energy and to compensate for deviations from renewable energy sources. The plant originates from the J?lich Stornetic GmbH. The system consists of 28 flywheels and has a capacity of 100 kWh and a capacity of 600 kilovolt-amperes (kVA). The flywheels rotate at a peak speed of 45,000 rpm.[7]

In Ontario, Canada, Temporal Power Ltd. has operated a flywheel storage power plant since 2014. It consists of 10 flywheels made of steel. Each flywheel weighs four tons and is 2.5 meters high. The maximum rotational speed is 11,500 rpm. The maximum power is 2 MW. The system is used for frequency regulation. After a successful three-year trial period, the system is to be expanded to 20 MW and then 100 MW.[8]

The city of Fresno in California is running flywheel storage power plants built by Amber Kinetics to store solar energy, which is produced in excess quantity in the daytime, for consumption at night.[9]

On the island of Aruba is currently a 5 MWh flywheel storage power plant built by Temporal Power Ltd.[10][11] The island intends to convert its energy supply to 100 percent renewables by 2020.[12]

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It is now (since 2013) possible to build a flywheel storage system that loses just 5 percent of the energy stored in it, per day (i.e. the self-discharge rate).[13]

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