
WARRINGTON, UK, FEBRUARY 11, 2011

New power storage method uses ABB motor

A revolutionary new way of storing electric power is using ABB motors as a generator. Developed by Highview Power Storage, the Highview CryoEnergy System uses a cryogenic process to store energy.

The system works by taking in cheap rate electricity and using it to operate an air liquefaction plant, storing the liquefied air in an insulated tank at minus 196 °C.

When the stored energy is needed, the liquefied air or liquid nitrogen is released from the tank, pumped while still liquid to a high pressure and allowed to warm and expand to its gaseous state. This high pressure air is then used to drive an expansion turbine, which then turns an ABB motor acting as a generator.

Gareth Brett, CEO, Highview Power Storage says: “With the drive for a low carbon economy, there is increasing emphasis on wind and solar sources. However, by their nature, these forms of generation are intermittent and there is thus a need for a viable energy storage method to act as a buffer to store electricity when it is being produced but perhaps not needed, and release it to the grid at peak times.”

The generation stage is accomplished by an ABB motor, which, in a pilot plant currently being hosted by SSE (Scottish and Southern Energy), is a 500 kW induction motor. This is large enough to supply electricity to several hundred homes.

Says Brett: “The application required the use of an induction motor as a generator, so a simple robust machine was required with no special starting or cooling requirements. The ABB range offered us exactly what we needed.

“ABB were initially selected as the preferred supplier, as the range of standard machines available from the company was very broad and when our team had questions about issues such as performance, ABB were very responsive. Also, the price was right and delivery was in an acceptable timeframe.”

ABB supported the development of the application with advice about the motor’s operation: “Our prime mover is very sensitive to torque transients as well as speed excursions,” says Brett. “ABB were able to provide transient torque plots under fault conditions, as well as the torque speed relationship at a part of the curve which would not normally be looked at for a motor application.”

Highview has plans to scale up the system to the 3 to 5 MW range: “We will probably need to change to a synchronous generator. Based on past performance we will certainly be talking to ABB about that scope of supply,” adds Brett.

ABB (ABBN: SIX Swiss Ex) is a pioneering technology leader in power grids, electrification products, industrial automation and robotics and motion, serving customers in utilities, industry and transport & infrastructure globally. Continuing a history of innovation spanning more than 130 years, ABB today is writing the future of industrial digitalization with two clear value propositions: bringing electricity from any power plant to any plug and automating industries from natural resources to finished products. As title partner in ABB Formula E, the fully electric international FIA motorsport class, ABB is

pushing the boundaries of e-mobility to contribute to a sustainable future. ABB operates in more than 100 countries with about 147,000 employees. www.abb.com



Caption: A revolutionary new way of storing electric power is using ABB motors as a generator.

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