Press release

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Evonik developing the world's largest lithium ceramic battery

- New battery will make universal storage of wind and solar energy easier in the future
- Pilot project aims at a one megawatt energy storage device
- High potential and strong, patented technology offer good prospects in a future billion-euro market

Essen/Marl. It will likely be possible in the future to store wind and solar energy efficiently even on a large scale. In Germany, Evonik Industries and its partners are developing for this purpose the world's largest lithium ceramic battery. This has been made possible by CERIO® technology, a special combination of ceramic materials and high-molecular ionic conductors, which ensures greatly increased safety combined with a small footprint and long cycle lifetime. As a first step, an energy storage device with an output of one megawatt (MW) and a storage capacity of about 700 kWh is being developed at the Völklingen power plant site in the Saarland. An example gives an idea of the performance of such a device: If it were charged and discharged every 15 minutes, the energy supplied would meet the needs of 4,000 households a year. Following the development of the 1-megawatt storage device, an expansion to 10 MW is planned. "We're using our unique lithium ion expertise, which is already revolutionizing the electrification of the car, to enter an entirely new market," says Dr. Klaus Engel, chairman of the Executive Board of Evonik Industries AG. "Using lithium ceramic technology, we've achieved, for the first time ever, cost effective decoupling of the generation and consumption of power. We can stabilize grid fluctuations arising from solar and wind power generation, and can therefore organize power generation with far greater overall efficiency. As in the automotive sector, this will be a billion-euro market," predicts Engel. Experts estimate market volume for advanced energy storage devices at more than €10 billion in the long term. Future power requirements for advanced storage systems in Germany alone lie in the high three-digit megawatt range.

The three-year project, funded by the BMBF (the German Federal Ministry of Education and Research) under its LIB 2015 research initiative, aims at making such mega batteries technically and commercially feasible for stationary applications. "Energy storage devices of this kind have enormous advantages for the flexible integration of renewable energies," says Carsten Kolligs, manager of the project in the Eco² Science-to-Business Center of Creavis Technologies & Innovation at Evonik.

Ecologically and economically sustainable development of renewable energies is a central goal of German climate protection and energy

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policy. The share of renewable energies in Germany will be increased stepwise to 50 percent by the year 2050. “In addition the European power market, following its deregulation, has seen major changes. As a result of deregulation, varying amounts of energy from wind and photovoltaic power plants, and increasingly also energies from combined heat and power plants, are being fed unregulated into national grids. This puts increasingly heavy demands on the transmission capacity and operation of the grids. And that's where highly efficient and flexible battery banks based on lithium ceramic technology come into the picture; they could make a valuable contribution to grid regulation and to the ability of renewable energies to meet baseload requirements,” says Kolligs.

Lithium ion batteries are currently being intensively developed worldwide for the drive systems of the future. This unique patented technology from Evonik is also at the core of our partnership with Daimler AG, which aims at mass producing electric vehicles from 2012 onward. In addition to the anode and cathode material, the SEPARION® ceramic membrane serving as a separator is at the core of the innovation.

The technology also offers extraordinary potential for stationary applications. Under the name LESSY (lithium-ion electricity storage system), Evonik is promoting an ambitious project on this theme from the Energy Efficiency Science-to-Business (Eco² S2B) Center. The Center is home to nearly two dozen projects on resource conservation and climate protection. The Science-to-Business Center concept of Creavis Technologies & Innovation, Evonik's strategic research unit, aims to bring together partners from different disciplines to reduce as far as possible the time interval from idea to marketable product.

Evonik has obtained two business partners for LESSY in its own subsidiary Li-Tec Battery GmbH, a joint venture with Daimler, and Digatron Industrie-Elektronik GmbH. The technical collaborators on the project are the University of Münster, the EWE Research Center for Energy Technology (Next Energy), and the Institute of Electrical Power Engineering of HTW Saarland. The development of large-volume batteries is focusing initially on the application area of grid regulation, specifically on the provision of primary regulation energy, which has so far been generated by conventional large-scale power plants.

In the LESSY project the components of the lithium ceramic battery are being developed specifically with primary regulation energy provision in view. This will be followed by the construction and operation of a storage device with a regulation energy wattage of about 1 MW. The required battery will have a storage capacity of about 700 kWh, 40 to 50 times higher than in batteries for electric or hybrid vehicles. The energy storage device will be located at Evonik's Fenne power plant in

Völklingen, which is contributing by providing free services for provision of regulation energy for the German power grid.

“The major challenges of the project arise from the sheer scale of the storage device. Requirements on safety, battery management, grid connection, energy quantity, and services, and, not least, the number of cycles necessary go far beyond those for conventional lithium-ion battery storage devices,” says Kolligs. In accompanying studies, the results obtained from the project will be used to identify other application areas of large-scale lithium ceramic batteries in stationary applications, over and above the provision of primary regulating energy.

About Evonik
Evonik Industries is the creative industrial group from Germany which operates in three business areas: Chemicals, Energy and Real Estate. Evonik is a global leader in specialty chemicals, an expert in power generation from hard coal and renewable energies, and one of the largest private residential real estate companies in Germany. Our strengths are creativity, specialization, continuous self-renewal, and reliability.

Evonik is active in over 100 countries around the world. In its fiscal year 2008 about 41,000 employees generated sales of about €15.9 billion and an operating profit (EBITDA) of about €2.2 billion.

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