

SUNFIRE SUPPLIES BOEING WITH WORLD'S LARGEST COMMERCIAL REVERSIBLE ELECTROLYSIS (RSOC) SYSTEM

- U.S. Navy tests RSOC system developed by sunfire and Boeing as an energy conversion and storage option
- Highly efficient RSOC system delivers renewable energy on demand / use of hydrogen as storage medium facilitates long-term storage of large volumes of energy
- sunfire reaches milestone on path to industrialization of reversible electrolysis / variety of applications in industrial sectors and within the context of the energy transition



Dresden/USA, 29.02.2016. sunfire has developed the world's largest commercial reversible electrolysis (RSOC) module and delivered it to U.S. partner Boeing. The energy system uses hydrogen as its storage medium and ensures the reliable supply of electricity originally generated using wind power or photovoltaic arrays. It is now in operation at a U.S. Navy microgrid test facility in California. The solution enables the efficient, long-term

storage of large volumes of energy and is based on sunfire's own RSOC technology. The fully integrated system converts surplus renewable energy into hydrogen which can then be stored in a highly compressed form. When electric power is required it is generated in a highly environmentally friendly way using hydrogen taken back out of storage (fuel cell mode). It only takes a few minutes to switch the system from energy input to energy output mode.

“sunfire is proud to have developed the world's largest reversible electrolysis system – another important milestone as we move towards industrialization” explains Nils Aldag, CFO at the Dresden-based cleantech firm. “The cooperation with Boeing has been fantastic and they've made a huge contribution in terms of finalizing the systems integration concept.”

When in electrolysis mode the system yields 42 cubic metres of hydrogen per hour at up to 85 percent efficiency. When switched to fuel cell mode it delivers 50 kilowatts of electricity at up to 60 percent efficiency. These values provide a basis for the realization of other customer applications in the fields of industrial-scale hydrogen production and energy storage. In addition to hydrogen the system can also be operated in fuel cell mode in combination with cheap natural gas or biogas taken from the grid.

The RSOC system represents an important milestone in the German-American partnership between sunfire and Boeing. The two firms began working together in November 2014, with the RSOC system developed by sunfire at its headquarters in Dresden in cooperation with engineers from Boeing. The high-performance RSOC module was delivered to Boeing in California in September 2015 and consists of a hot box, cold box, control unit and steam generator. Having successfully passed multiple tests when connected to the power grid operated by Southern California Edison, the system has now been integrated into a U.S. Navy microgrid test facility for the purpose of further testing.

Highly compressed hydrogen can be stored in almost unlimited volumes and therefore offers significant advantages over battery-based or pumped-storage hydroelectricity options characterized by restricted capacity. It also solves the issue of long-term storage, which is a problem in the case of batteries due to the fact that they naturally self-discharge over time. The use of electrolysis to convert renewable energies delivers high-purity, green hydrogen which can also be sold as a stand-alone product to consumers such as industrial companies and refineries. Their storage function also enables RSOC systems to make a significant contribution to grid stabilization, generate environmentally friendly power and heat and improve power station efficiency by enhancing capacity utilization.

ABOUT BOEING

Boeing is the world's largest aerospace company and leading manufacturer of commercial jetliners and defense, space and security systems. A top U.S. exporter, the company supports airlines and U.S. and allied government customers in 150 countries. Boeing products and tailored services include commercial and military aircraft, satellites, weapons, electronic and defense systems, launch systems, advanced information and communication systems, and performance-based logistics and training.

ABOUT SUNFIRE

Founded in 2010, sunfire GmbH develops and produces high-temperature electrolysis cells (SOECs) and high-temperature solid oxide fuel cells (SOFCs).

The firm's high-temperature fuel cells facilitate the highly efficient generation of electric power and heat according to the principle of cogeneration. This sees electric power and heat generated on-demand at the point of consumption, with local cogeneration at the lower end of the output scale therefore regarded as the energy concept of the future.

High-temperature electrolysis is used to split steam into hydrogen and oxygen. It is characterized by a particularly high level of efficiency and powered by renewable energy. The hydrogen produced can either be efficiently converted into fuels using the sunfire Power-to-Liquids process or used without further processing in the H₂ mobility or industrial sectors.

sunfire was founded by Carl Berninghausen, Christian von Olshausen and Nils Aldag. The firm is supported by business angels (the sunfire Entrepreneurs' Club), INVEN Capital, the ERP Startfonds at KfW, TOTAL Energy Ventures and Electranova Capital (a venture capital fund financed by EDF and Allianz).

For further information please visit www.sunfire.de.

sunfire press contact:

Martin Jendrischik – +49 (0) 341 52 57 60 50 – presse@sunfire.de