SUNFIRE DELIVERS THE WORLD'S MOST EFFICIENT STEAM ELECTROLYSIS MODULE TO SALZGITTER FLACHSTAHL GMBH

- **Steam electrolysis with an input power of 150 kW produces 40 Nm³ of hydrogen per hour / High electrical efficiency > 80 percent by using waste heat (steam)**
- **Fuel cell mode with up to 30 kW_{el} using hydrogen or natural gas**
- **Demo operation in the context of the GrInHy project in the integrated smelting plant at Salzgitter Flachstahl GmbH / Trial operation for energy balancing and load management**

Dresden / Salzgitter, June 29th 2017. **Sunfire GmbH has delivered the world's most efficient steam electrolysis module (SOEC) in the context of the Horizon 2020 project 'Green Industrial Hydrogen via reversible high-temperature electrolysis' (GrInHy) at Salzgitter Flachstahl GmbH. With an input power of 150 kW_{el} the module produces 40 Nm³ per hour of hydrogen. It can also be reversed into fuel cell mode with an output power of 30 kW_{el}.**

A particular feature of Sunfire technology is the high electrical efficiency of more than 80 percent with reference to the lower calorific value of hydrogen as it is not liquid water but gaseous water – i.e. steam – which undergoes the splitting process. The steam required is provided in the form of waste heat from the processes of the smelting plant at Salzgitter Flachstahl GmbH and supplied to the steam electrolysis unit. This is housed in a 20-foot container on the production site. After purification, the crude hydrogen is fed directly into the local H_2 pipeline and recycled. The delivery from Dresden to Salzgitter took place in June 2017. Two smaller modules were put into operation at Boeing back in 2015.

In fuel cell mode, the module can be operated with both hydrogen and natural gas. In demo operation, one of the points being investigated is the extent to which the plant can contribute to the provision of grid services (energy balancing, load management). Hydrogen is used in the integrated smelting plant in order to produce a protective gas atmosphere, i.e. one which excludes oxygen, and prevent the oxidation of steel during the annealing process. The use of green hydrogen improves the environmental balance of the end product (the carbon footprint).

The GrInHy project has received support in the context of the European Union "Horizon 2020" programme (no. 700300). In addition to Salzgitter Flachstahl, BR&T-E and Sunfire, the following partners are also involved: Salzgitter Mannesmann Forschung GmbH, VTT Technical Research Centre of Finland, EIFER - European Institute for Energy Research, Institute of Physics of Materials, Academy of Sciences of the Czech Republic and Politecnico di Torino.

For further information: http://www.green-industrial-hydrogen.com

ABOUT SUNFIRE

Founded in 2010, Sunfire GmbH develops and manufactures steam electrolysers (SOEC) and high-temperature fuel cells (SOFC).

The steam electrolysis splits steam into hydrogen and oxygen. It is a particularly efficient method powered by renewable energy. The resulting hydrogen can be efficiently converted to a crude oil substitute using Sunfire's power-to-liquids process. Alternatively, it can be used for H_2 mobility and in industrial applications without any further processing. The economic value chains of these processes are based on the open-grid concept.

High-temperature fuel cells from Sunfire can be used to produce power and heat particularly efficiently based on cogeneration. Decentral cogeneration at the lower end of the power output range is seen as an energy concept of the future as it allows power and heat to be generated on demand exactly where it is needed. Sunfire collaborates with the most appropriate partners for individual markets here.

Sunfire was founded by Carl Berninghausen, Christian von Olshausen and Nils Aldag. The company is supported by business angels ('Sunfire Entrepreneurs Club'), INVEN Capital, the ERP Startfonds at the KfW bank, Total Energy Ventures and Electranova Capital, which is financed, in turn, by the EDF Group and Allianz.

For further information, visit http://www.sunfire.de/en

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