

World premiere in Dresden

## SUNFIRE PRESENTS POWER-TO-LIQUIDS

- **PtL rig uses renewable electricity to convert water and CO<sub>2</sub> to high-purity alternative fuels (petrol, diesel, kerosene)**
- **Federal Minister of Education and Research Johanna Wanka and Bilfinger Board Member Pieter Koolen present at rig inauguration in Dresden-Reick**

*Dresden, 14.11.2014.*

A Power-to-Liquids (PtL) demonstration rig which is the first of its kind in the world was today officially inaugurated by Dresden-based [sunfire GmbH](#) in the presence of Federal Minister of Education and Research Johanna Wanka, Bilfinger Board Member Pieter Koolen and a number of other high-ranking representatives from the worlds of politics, industry and research. The rig uses sunfire's PtL technology to transform water and CO<sub>2</sub> to high-purity synthetic fuels (petrol, diesel, kerosene) with the aid of renewable electricity. So-called PtL fuels – also known as “e-fuels” – can be used in pure form or as an admixture in combination with conventional fuels, and are recognized as an environmentally friendly, resource-saving alternative which contributes to the fulfilment of greenhouse gas quotas. Preparations for the commissioning of the PtL rig are currently in fully swing at sunfire's Gasanstaltstraße premises.

### **High-temperature steam electrolysis**

The PtL technology is built around the solid oxide electrolysis cells (SOECs) developed by the cleantech firm as part of the eponymous [BMBF research project SUNFIRE](#). Step 1 of the PtL process sees the SOECs used to convert electrical energy to chemical energy. Hydrogen is generated using steam rather than liquid water.

Step 2 – the reverse water-gas shift reaction – is again innovative, and involves the use of the hydrogen (H<sub>2</sub>) yielded by the steam electrolysis step to reduce carbon dioxide (CO<sub>2</sub>) to carbon monoxide (CO) for the third and final step: Fischer-Tropsch Synthesis. This step sees the carbon monoxide and additional hydrogen (in the form of renewable synthesis gas) converted to petrol, diesel, kerosene and other base products for the chemicals industry (e.g. waxes). The feeding of the heat released during synthesis back into the process ensures a high degree of system efficiency (70 per cent).

### **Proof of technical feasibility at industrial scale**

The cost of building the PtL demonstration rig was within the seven-digit range, with development costs also incurred at the various consortium members. Half of the overall sum invested corresponds with the public funding received from the Federal Ministry of Education and Research. The rig's capacity for CO<sub>2</sub> recycling stands at 3.2 tonnes per day, and once brought into commission it will produce up to a barrel of fuel per day. Commercialization is dependent on further technological development and regulatory factors and scheduled for 2016.

## SUNFIRE DIGITAL PRESS KIT

The sunfire digital press kit features additional background information, photos and a video. It is available to download from <http://bit.ly/sunfire-presse>.

## STATEMENTS ON POWER-TO-LIQUIDS TECHNOLOGY

**Federal Minister of Education and Research Johanna Wanka** (at the inauguration of the rig): “The sunfire process reduces CO<sub>2</sub> emissions and reduces our dependency on oil. It therefore represents an opportunity to protect our climate, save resources and at the same time promote a new technology which promises to deliver economic growth. Over and above that, one huge benefit of PtL fuels is that existing infrastructure such as filling stations, pipelines and motors can continue to be used without modification. This paves the way for sustainable mobility based on renewable energies.”

**sunfire CTO Christian von Olshausen:** “This rig enables us to prove technical feasibility on an industrial scale. It is now a matter of regulatory factors falling into place in a way which gives investors a sufficient level of planning reliability. Once that has occurred it will be possible to commence the step-by-step substitution of fossil fuels. If we want to achieve fuel autonomy in the long term, we need to get started today.”

**Dr. Karl Ludwig Kley, Managing Director of Bilfinger Venture Capital:** “In the case of sunfire – a start-up in an unconventional industrial sector – it is interesting to note that the technology moves in tandem with the market. As a strategic investor, Bilfinger is able to offer not only technical know-how which feeds into the planning and construction of industrial facilities, but also access to potential customers. In particular, a cooperation has been set up between Bilfinger EMS and sunfire. Both partners have already begun to jointly bring PtL technology to the market.”

## ABOUT SUNFIRE

Founded in 2010, sunfire GmbH is a pioneer in the fields of Power-to-Liquids, Power-to-Gas and Gas-to-Power. The Dresden-based cleantech firm develops new technologies for the efficient, closed-carbon-cycle energy supply of the future. sunfire focuses both on high-temperature electrolysis which enables the efficient conversion of regenerative electricity to liquid fuels or gas, and the further development of high-temperature fuel cells.

sunfire was founded by Carl Berninghausen, Christian von Olshausen and Nils Aldag. The firm is supported by business angels, Bilfinger Venture Capital, ERP Startfonds at KfW, Total Energy Ventures and Electranova Capital - a cleantech venture capital fund managed by Idinvest Partners and sponsored by EDF Group and Allianz. For further information, please visit [www.sunfire.de](http://www.sunfire.de)

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