

## SUNFIRE PRODUCES SUSTAINABLE CRUDE OIL ALTERNATIVE

- **Revolutionary Blue Crude made from green energy, air and water can replace crude in the chemicals industry and mobility sector**
- **Key milestone for international decarbonisation and industry coupling**
- **Continuous operation of plant yields three tons of oil in BMWi project**
- **Audi tests confirm premium properties when used as synthetic fuel**

*Dresden, May 29th, 2017.* **Sustainable alternative to crude oil: Sunfire has produced more than three tons of the synthetic crude oil substitute 'Blue Crude' using green energy, CO<sub>2</sub> and water. In order to do this, Sunfire's power-to-liquid plant in Dresden was operated continuously for more than 1,500 hours. The industrial-scale endurance test was part of a project funded by Germany's Federal Ministry for Economic Affairs and Energy (BMWi). "Our amazing team has achieved another milestone on the journey towards industrial commercialisation," said Nils Aldag, Chief Commercial Officer at Sunfire. Almost ten tons of CO<sub>2</sub> was used to generate the energy-rich crude oil substitute.**

"Many areas in our economy are dominated by crude oil. Everyday products from sports shoes to cosmetics would be unthinkable without crude," emphasizes Nils Aldag. "Our Blue Crude is a CO<sub>2</sub>-neutral alternative to crude oil that can be manufactured anywhere in the world using our technology. It has huge potential for the world's decarbonisation efforts and the fight against climate change."

Car manufacturer AUDI AG received some of the product produced by Sunfire and their tests confirmed the presence of premium properties typically found in Fischer-Tropsch products – the synthetic fuel (Audi e-diesel) has a high cetane value and therefore features excellent combustion properties. Importantly it does not contain sulphur or aromatic compounds and produces almost no soot particles during combustion.

### **Blue Crude for mobility and everyday products**

The product has comparable properties with racing fuel, even without additional processing. "Blue Crude can be used with the existing refinery, fuelling stations and transportation infrastructure," said Christian von Olshausen, Chief Technology Officer at Sunfire. "As such, it is the most efficient way of electrifying transport routes, long-haul traffic and air traffic and transitioning these sectors to renewable systems in the medium term."

It remains to be seen how much of the crude oil substitute can be manufactured over the coming years. Aircraft manufactures, airlines, truck manufacturers and manufacturers of speciality chemicals have all shown commercial interest in Sunfire's technology in recent months. Even existing rail networks that would otherwise be extremely expensive to electrify can become

100-percent renewable and CO<sub>2</sub>-neutral through a combination of reliable diesel-hybrid railcars and e-fuel.

### **Sector coupling with Sunfire electrolysis**

In the run-up to the market launch, the green hydrogen produced by Sunfire's electrolysis process (SOEC) currently has to be supplied to the chemicals and mobility sectors through refineries. This will start to bring these industries together with the energy sector and allow Blue Crude production facilities to be established in collaboration with industry partners.

### **ABOUT SUNFIRE**

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

High-temperature 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<sub>2</sub> 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.

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