

## NEW PROJECT: Innovative high efficient systems for energy production based on biogas

### Verification and optimisation of the ZEG-technology

ZEG Power has in the **BioZEG**-project (2011-2013) engineered, constructed and commissioned a 50kW ZEG-demonstration plant at the Hynor Lillestrøm hydrogen refuelling station. By close thermal integration of a 30kW<sub>H<sub>2</sub></sub> SER (Sorption Enhanced Reforming) reactor system and a 20kW<sub>el</sub> SOFC (Solid Oxide Fuel Cell) module running on biogas, a total efficiency of at least 70% is demonstrated. The plant is constructed with high flexibility regarding future plant operation while still using industrial products and design standards as far as possible.



The 50kW **BioZEG**-plant is a very well equipped and highly relevant platform for testing a wide range of applications of the ZEG-technology. The industrial focus of the plant ensures that the experience gained and data acquired during plant operation can be used for further industrialisation and commercialisation of the ZEG-technology.

The main objective of the new project is to establish operational knowledge of SOFC module performance, durability and thermal integration as a basis for optimisation of integrated **BioZEG**-plants and operation modes.

The project has the following sub-objectives:

- Optimisation of small-scale ZEG-plant system efficiency by optimised heat integration
- Study on SOFC module and ZEG-technology operational flexibility
- Study on long-term SOFC module operational stability

The new project represents important steps towards commercialisation of small to medium scale high efficiency **BioZEG**- plants. The results will provide important new system level knowledge and technical insight on how to handle local hydrogen and electricity demands for larger standalone ZEG-plants, with the following major innovations:

- To demonstrate the highest possible energy efficiency during operation of the **BioZEG**-plant, by optimisation of system operation and system heat integration.
- To demonstrate the flexibility of the ZEG-technology for co-production of electricity and hydrogen as well as thermal integration in larger bioenergy plants. Operational strategies will be developed to handle variations in quality and composition of the biogas as well as fluctuating demands for electricity, hydrogen and heat.
- To develop optimised procedures for operation of industrial SOFC modules in ZEG-plants, which will be of great importance for future market entry.

The project is scheduled as a 2 year program starting in January 2014.

The project is open for financial support from new industrial partners. Participation in the project will in addition to access to detailed project results also provide the opportunity to add own prioritized activities and tests into the project work. Participation in the project will in addition give industrial partners general information about the technology, challenges and opportunities.

#### For more information:

Managing Director: Bjørg Andresen [bjorg.andresen@zegpower.com](mailto:bjorg.andresen@zegpower.com)

[www.zegpower.com](http://www.zegpower.com)