The BioZEG-project

Project duration: 01.10.2011 – 31.12.2013
Budget: 19 MNOK
Funding by: Innovation Norway (Miljøteknologiordningen), Statoil ASA, ZEG Power AS
Project owner: ZEG Power AS
Main partners: Institute for energy technology (IFE), CMR Prototech

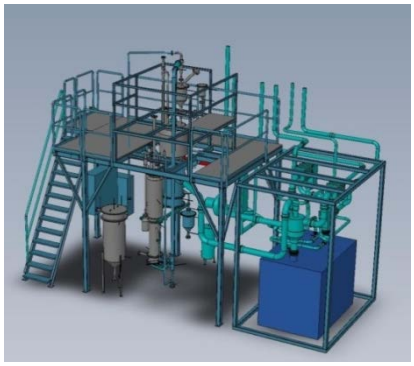
The main deliverable in the BioZEG project is the SOFC module based on SOFC stacks delivered by a European consortium led by Plansee, altogether 24 CFY-stacks i.e. with metallic interconnects made of Cr, Fe and Y_2O_3. The planar SOFC plates are electrolyte supported (ESC) where the electrolyte is made of Scandium stabilised Zirconia. The SOFC stacks have external air manifolding and internal fuel manifolding. The core of the module design is the newly developed dual-stack SOFC boxes. There are 12 stack boxes in the module with common manifold rails for the inlet and outlet gas streams.

The 20kW BioZEG SOFC module is installed and integrated with existing infrastructure at the Hynor Lillestrøm hydrogen refuelling station. The 50kW BioZEG plant is then consisting of the already existing Sorption Enhanced Reforming reactor system (SER) with a hydrogen production capacity of about 1 kg/h (30 kW) and the BioZEG SOFC system with a power production capacity of 20 kW. Fuel is received at site through a pipeline from a nearby landfill. After upgrading the biomethane (90% CH_4) is split in two parts, one to the SER reformer and the other as fuel to the SOFC module. The plant is designed to facilitate full thermal integration of the SER regenerator and SOFC module.

The SOFC module is operated at around 825^{o}C which is lower than the temperature required by the regenerator in the SER reactor system. The temperature of the working fluid for the heat transfer between the two systems is therefore boosted by an afterburner. The afterburner uses the exhaust streams from the SOFC module for heat production. The heat is, in addition to the temperature boost, used to heat the pre-reformer for incoming SOFC fuel. The total integrated BioZEG plant including SER reactor system and SOFC module is shown in Figure .

The hydrogen produced by the SER reactor system will be purified in a Pd-membrane based hydrogen purification system, before compression and sale at the hydrogen refuelling station. The produced power by the SOFC module will be delivered to the DC bus distribution network.

Obtained results in the project are important for further commercialisation of the BioZEG technology. The project provides in addition valuable experience for further technology development towards large scale energy production based on natural gas or gasified solid fuels.



3D view of the complete BioZEG plant including SER reactor system (left) and SOFC module (right)

For more information:
Managing Director: Bjørg Andresen **bjorg.andresen@zegpower.com**
Technology Manager: Arnstein Norheim **arnstein.norheim@zegpower.com**

www.zegpower.com