

Project Information



Subject: Development, Construction, System Integration and Demonstration of a 250 kWel PEM Fuel Cell Unit

Applicant: EUS GmbH
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Description of Project:

In this project it is intended to design and realise the energy supply system of the Fraunhofer Institute for Energy and Safety Technology (FhG UMSICHT) in Oberhausen. The overall energy scheme contains as a central element a PEM fuel cell from ALSTOM / BALLARD with a rated electrical capacity of 250 kW to generate electricity and heat in combination with a microturbine, which is to have an electrical output of approx. 100 kW and is to be used to follow up peak loads. These two power/heat co-generation units are to be backed up or supplemented by a conventional gas motor unit co-generation plant. It is planned to utilise the heat arising for heating purposes in the Institute and to generate low temperatures using a thermal refrigerator. The various heat sinks can be supplied by the combined use of the three power/heat co-generation units with waste heat yield on different temperature levels. Surplus heat can be fed into the district heating network and unused power into the power grid of the city of Oberhausen.

The power is needed within UMSICHT in "premium quality" because a clean separation of the network areas is not feasible for technical reasons. The desired coverage of internal needs for the Institute in the case of power requires use of the premium-quality network feed by means of the PEM fuel cell (+USV/inverter), which was developed and built by AEG SVS PSS. By integrating a super-condenser it is also intended that the whole system be capable of managing very steep load changes.

The PEM unit co-generation plant is being installed on the site of FhG UMSICHT, where Mine gas is also available. A mine gas borehole is therefore to be drilled and after about 1 year's operation with natural gas the world's first environmentally friendly use of this free fuel gas is to be tried in a PEM unit co-generation plant.

EUS GmbH is creating, in collaboration with ALSTOM, an intelligent operational management system intended to optimise locally the use of the PEM unit co-generation plant. Account must be taken here of the fact that run-down of the load requirements of power, heat, cold and steam using new power/heat co-generation unit components (PEMFC, microturbine), which are also to be supplied with mine gas, represents a challenging problem of integration, control and regulation.