

EnBW, Siemens plan first ever megawatt-class fuel-cell power plant

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EnBW Energie Baden-Württemberg and Siemens Power Generation are joining forces to build a highly-efficient fuel cell hybrid power plant. Plans call for the construction of a megawatt-class demonstration plant. The goal of this research project is to convert up to 70 percent of the fuel energy into electricity. The necessary groundwork is scheduled to be completed by 2008. This will provide the basis for construction of an initial, small pilot plant, to be followed beginning in 2012 by the planned fuel cell hybrid plant with an installed capacity of one megawatt.

The efficiency of the hybrid process is significantly greater than that of modern gas- and steam-turbine power plants that reach an efficiency of approximately 60 percent. This high efficiency is to be achieved by combining a high-temperature fuel cell with a gas turbine in the planned hybrid plant in order to make more efficient use of the fuel and minimize emissions.

The project is scheduled to run for an extended period, and involves intensive background research to optimize operation of stationary fuel cells in conjunction with gas turbines making hybrid SOFC's a viable alternative for commercial plants. After successful completion of the project, this hybrid technology will become available roughly a decade sooner than expected by experts today.

On the way toward realization of the first megawatt demonstration plant using hybrid technology, Siemens will initially supply a high-temperature SOFC fuel cell with a capacity of five kilowatts. "We look forward to

laying the groundwork for broad application of hybrid fuel cell technology in distributed and centralized power generation in a long-term”, said Norbert König, member of the group executive management of the Siemens Power Generation Group. The DLR institute will operate and analyze the SOFC.

“We are pleased to have found in Siemens a competent partner for this maximum-efficiency future technology,” said Dr. Thomas Hartkopf, EnBW Vice President in Charge of Engineering. “This technology will bring us a big step forward in our effort to extract more electricity from less and less fuel, and to bring emissions down to lower and lower levels.” Since 2001 EnBW has operated a state-wide program to provide funding for a wide variety of fuel cells. These fuel cells are being used directly by customers and partners in real-world power applications, which has allowed EnBW to draw corresponding technical experience from the operation of more than 20 plants. Initial experience with biogas-powered fuel cells has also been gained since 2006.

During the initial phase of the project, which is scheduled to run for three years, the individual components will serve as the basis for development of an operating concept and a corresponding simulation model. The associated control concept will be developed by the Institute for Aviation Engineering. The test components themselves will be coupled together in the next phase of the project starting in 2009, and the configuration will be optimized beginning in 2012.

To serve the aim of this project a special research working group was established at the University of Stuttgart. With the continued support of the Helmholtz Association of German Research Centers it bundles the resources of the German Aerospace Center in Stuttgart and the University of Stuttgart. Spokesman of the research group is Prof. Aigner of the Institute for Combustion Engineering of the DLR which will make available the gas microturbine and laboratory facilities

operated by the institute.

In solid oxide fuel cells (SOFC), an electrochemical reaction converts fuel energy directly and very efficiently into electricity and heat. In a hybrid power plant, the hot exhaust gases exiting the fuel cell are fed into the gas turbine, thereby reducing or totally eliminating the fuel consumption of the turbine. The gas turbine makes it possible to operate the fuel cell at increased gas pressure, which makes it more efficient.

The “Stationary Fuel Cells” division of Siemens PG located in Pittsburgh, Pennsylvania in the U.S. is a world leader in the field of solid oxide fuel cells.

Source: Siemens AG

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