

High temperature fuel cell development in Germany (extended Abstract)

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In 1990 the German Federal Ministry for Research and Technology, together with relevant industrial partners who are currently engaged in energy conversion technologies, decided to define a programme for high temperature fuel cells and fuel cell power plant development. The programme was to begin in 1991 and would involve a financing equal to approximately 80 million DM. Both of the two high temperature fuel cell technologies (MCFC and SOFC) are included in the programme. Industry contributes 60% of the costs of MCFC and 50% of SOFC development. Additionally Forschungszentrum Jülich (Research Centre Jülich), a state entity, contributes to the SOFC programme.

Molten carbonate fuel cells are being developed by MBB. The company decided to take licenses of the ERC technology and cooperates closely with Energy Research Corporation. Construction of a common pilot-plant production line in the US is planned with a capacity of 2 MW/year. Installation of several 100 kW power plants for demonstration of methane and coal-gas based electricity generation is planned at different sites in Germany. Work on the development of internally reforming MCFCs is part of the project. Three non-profit organisations which have electrochemical departments with some experience in the field of experimental molten carbonate fuel cells, Fraunhofer-Institut für solare Energiesysteme (FhI-ISE), Technische Hochschule Darmstadt (THD), and Zentrum für Sonnenenergie-und-Wasserstoff Forschung (ZSW) are cooperating with MBB and are contributing R&D efforts to the MCFC project.

SOFC technology will be developed independently by three different companies.

Dornier, having 15 years of experience on tubular stacks, recently started to work on the development of an all-ceramic flat plate concept.

ABB, who twenty years ago created the tubular concept, is developing a new type of thin layer cells arranged and connected in series on support plates with a kind of tubular gas channel.

Siemens is working on a flat plate stack-concept, which incorporates metallic bipolar plates.

All three companies aim at developing in an initial, three-year period kW stacks.

It is hoped that in the future this high temperature fuel cell programme will also be supported by German utilities.