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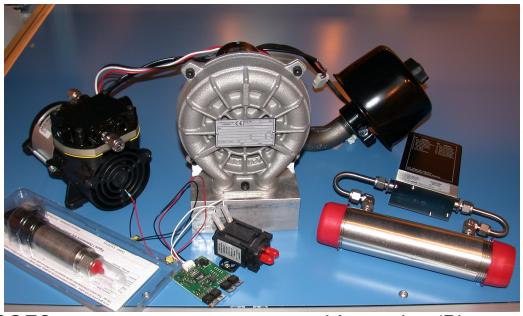
PROJECT PROFILE NO PP237

Component Evaluation for the Ceres Power SOFC system



SOFC system components sourced for testing (Photo copyright Ceres Power Ltd. 2005)

OBJECTIVES

- To evaluate commercially available components suitable for integration into a solid oxide fuel cell (SOFC) system based on Ceres Power's unique metal supported technology
- To develop and test components not readily commercially available such as a compact steam reformer
- To undertake cost analysis of the system
- To demonstrate an SOFC system operating on bottled liquid petroleum gas (LPG) or natural gas (NG)

SUMMARY

Fuel cells offer an attractive route to decrease the environmental impact of power generation, by reducing both pollution and greenhouse-gas emissions. Fuel cells also offer a highly efficient means of utilising hydrogen as a fuel, and are potentially a means to achieving a low-carbon economy. However, significant technological and commercial barriers exist to the widespread adoption of fuel cell technology, mostly related to the cost and durability of system components. Ceres Power has made major advances in the production of a low-cost, durable SOFC stack by the application of novel metal-supported cell technology operating at lower temperatures than conventional SOFCs. This has largely eliminated many of the materials degradation and sealing problems which have proved a major barrier to the commercialisation of SOFC technology. However, to achieve a commercial solution, not only the stack but also the rest of the components which go to make up a complete fuel cell system (the Balance of Plant, BOP) need to be low-cost and durable. In particular, a number of components, for example the reformer required to convert a hydrocarbon fuel such as LPG or NG to a hydrogen-rich synthesis gas suitable for use in the fuel

cell, are not commercially available and require development. The aim of this project is to evaluate a range of components, with the help of various suppliers, which will allow a cost-effective system to be produced. This work will form the basis for a second generation prototype. Commercially available components will be tested, the component count will be reduced where possible, and prototype components will be evaluated. The performance of components under real-life operating conditions, such as thermal cycling, will be evaluated and the resulting complete system will be tested.

CONTRACTOR

Ceres Power Ltd.
Unit 18, Denvale Trade Park
Haslett Avenue East
Crawley
West Sussex
RH10 1SS
Tel: +44(0)1293 400404
Fax: +44(0)1293 400482
info@cerespower.com
www.cerespower.com

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COST

The total cost of this project is £923,000, with the Department of Trade and Industry (DTI) contributing £248,000 and Ceres Power Ltd. the balance.

DURATION

18 months – June 2005 to December 2006.