CERAMIC FUEL CELLS LIMITED

Clean power for your home

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Ceramic Fuel Cells develops more powerful fuel cells

A more powerful fuel cell and a lower cost 1 kW fuel cell electricity generator, suitable for large scale manufacturing to meet commercial targets for cost and performance.

CFCL, a world leading manufacturer of solid oxide fuel cells and provider of enabling technology for micro-combined heat and power (m-CHP) units, announces a further major step towards commercialisation with the development of its next generation of fuel cells. These cells have demonstrated significant performance improvements, particularly in power density, and will be incorporated into m-CHP units to provide clean power for homes.

This development builds on CFCL's extensive fuel cell experience, and has been assisted by the company's in-depth field trials and its work with power company customers. The new fuel cell and re-designed system components are designed to optimize the efficiency of the fuel cell stack and reduce the system cost in preparation for volume manufacture. The new stack is also more easily integrated into distributed generation appliances.

These new cells are more than twice as powerful as CFCL's current cells, and match or exceed other solid oxide fuel cell figures in terms of power density, which is measured by how many milli-watts of electricity are generated by each square centimetre of fuel cell. Early versions of CFCL's new cells achieved a power density of more than 200 mW/cm^2. Current versions of the new cells have doubled that again, bringing the power density to more than 400 mW/cm^2, and further improvements are expected.

Higher power density means that CFCL can produce the same amount of electricity from a much smaller fuel cell stack. A smaller stack is cheaper and much easier to integrate into commercial appliances like m-CHP units.

The new cell technology is designed to be highly efficient, with electric efficiency of 50% and significantly better fuel utilisation of up to 85%. The total efficiency of the integrated m-CHP unit will be higher still, as 'waste' heat is captured and re-used.

The new fuel cell stacks are designed to produce 1kW of electricity and significantly less than 1kW of heat. Reducing the amount of heat produced by the fuel cell stack means the m-CHP unit can generate efficient baseload electricity all year round. Other types of m-CHP units that produce more heat may have to be left idle – or else waste the heat - for several months each year.

The new technology comprises square ceramic fuel cells, arranged in a window-frame display, supported by ceramic anodes and separated by metal interconnect plates. The cells use 'thin film' technology, comprising extremely thin electrolytes, which are better at conducting oxygen ions. This increases the amount of electricity that each cell can generate. The new metal-ceramic fuel cell stack combines important technical features and intellectual property drawn from CFCL's achievements in developing both all-ceramic and metal-ceramic stacks since 1992.

CFCL has also significantly improved several key components that integrate the fuel cell stack into a m-CHP unit. Significant breakthroughs include a 50% smaller steam generator, a 40% smaller heat exchanger, and a 75% reduction in the airflow through the system. These achievements will make the m-CHP unit simpler, smaller and more efficient.

Brendan Dow, Chief Executive of Ceramic Fuel Cells, commented:

"This is another major step towards the commercialisation of our solid oxide fuel cell for power companies seeking distributed generation solutions. The developments will deliver significantly higher power density and system efficiency, both of which are key factors in enabling us to meet commercial targets for performance and cost. Our broad experience of developing different types of fuel cell stacks, and our work with customers, have been essential in the evolution of this technology.

"We look forward to the next stage of integrating our new fuel cell stacks into micro-CHP units, working closely with our power company customers and appliance manufacturers. We are also ramping up production of these new cells, initially in our Melbourne pilot plant and then in our planned large scale manufacturing plant in Europe."

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NOTES TO EDITORS

Glossary:

'balance of plant' - the support system to the fuel cell stack which manages the supply of fuel and air, controls the total fuel cell system and provides an interface with electrical loads.

CHP – combined heat and power. Domestic CHP systems produce electricity and heat for the home, and will be the first application powered by CFCL's fuel cells.

Distributed Generation - a form of power generation that produces electricity at or close to the point of consumption, in contrast to large centralised power stations.

Electrolyte - a substance that carries electrical current by the migration of ions. Together with the external connections of a fuel cell, this allows the creation of an electrical circuit.

Stack – multiple fuel cells combined one on top of the other to form a fuel cell stack which provides higher voltage and higher power than a single cell.

About Ceramic Fuel Cells Limited

Ceramic Fuel Cells Limited (CFCL, www.cfcl.com.au) is a world leader in developing solid oxide fuel cell (SOFC) technology which can provide reliable, energy efficient, high-quality, and low-emission electricity from widely available natural gas and renewable fuels. CFCL is developing SOFC products for small-scale on-site micro combined heat and power (m-CHP) and distributed generation units that co-generate electricity and heat for domestic use.

CFCL was formed in 1992 and is publicly listed on both the London Stock Exchange AIM market and the Australian Stock Exchange (code CFU).