

## **INPUT TO THE ENVIRONMENTAL INDUSTRIES ADVISORY GROUP – LESSONS FROM AND ISSUES FOR THE UK FUEL CELL INDUSTRY**

### **Benefits - why fuel cells?**

Fuel cells are a technology that can:

- Contribute substantially to a global low carbon dioxide economy
- Improve urban air quality and the health of urban populations
- Form the basis of a 21<sup>st</sup> Century industrial sector that allows sustainable growth of the world economy
- Make an important contribution to energy security concerns by allowing a wider choice of fuels and hence enhance the prospects for international stability
- Provide essential intermediate and final components of any future hydrogen economy.

These issues have a high priority in the UK and a sustained national debate has been taking place on how they can be addressed. As a new and innovative technology, fuel cells can change the rules of this debate and provide attractive solutions to otherwise intractable and complex problems.

Fuel cell and hydrogen businesses already support over 800 jobs in the UK. Forecasts of commercial sales give a global market size of above £20 billion in 2011. There is an opportunity for the UK to build a sizeable industry centered on fuel cells and the hydrogen economy, covering all stages of the value and supply chain.

### **Examples from elsewhere of regulations and related instruments which have supported innovation and commercialisation in the fuel cells sector**

#### Facilitating the development of concepts and prototypes through sustained public support

Compared to Canada and the USA, the UK fuel cell industry has had a very low level of public sector investment, and, as a result, has not developed sufficient concepts or prototype (and ultimately product) technologies that would enable it to compete effectively in the emerging world market for these technologies. UK companies have had difficulty raising capital and, as a consequence, have limited scope to invest their own resources in R&D. Significant and sustained public investment is necessary in order for the UK to be a “player” in this emerging market.

#### Achieving economies of scale through financial support

A major challenge for the fuel cell industry is to reduce the cost of the systems; economies of scale are expected to play a significant role. Various US States and other public bodies (see below) have introduced grants or other financial incentives to offset the current high capital cost and help to stimulate cost reductions as manufacturing scales up. Alternative possibilities in the UK are for fuel cell installations to receive partial exemption from the Climate Change Levy and to meet a proportion of the supplier’s Renewables Obligation (where appropriate). Another option might be to link a domestic dwelling Council Tax Banding to its energy rating.

The US DOD provides subsidies of \$700/kW for installation of US manufactured fuel cells, and this has led to many more demonstrations and trials than in the UK. (Note also that this funding helped to make the Woking demonstrator happen.)

### **Examples of where regulation is or has hindered innovation / commercialisation of fuel cells for stationary applications and how this was or could be overcome**

*Note: Many of the following points relate particularly to the application of fuel cells in domestic dwellings.*

#### Standards for fuel cell systems

There is a lack of standards for fuel cell systems in the UK; Fuel Cells UK and key UK experts are working with the British Standards Institute and, through them, international standards bodies, to progress standards in this area.

#### Testing and accreditation facilities

In the UK there is an absence of testing facilities to evaluate fuel cells against emerging standards in the UK. These, together with incubator support services, have proved vital in helping the development of the Canadian fuel cell industry. Note that several UK regions have plans in this area - notably the West Midlands and the North East (Teesside). Furthermore, two existing UK organisations (EA Technology and GASTEC at CRE) have the capability to work in this area.

#### CE marking

There is a requirement for CE marking for gas fired appliances (which include fuel cells). This is an extremely complex and time consuming process represents a major hurdle for companies wishing to install stationary fuel cell systems in the UK. The process through which a company seeking CE marking for a fuel cell system would need to go is not clear, and there are currently no examples for reference.

#### Compliance with Building Regulations

Fuel cells in domestic applications are expected to be covered by the requirements under the Building Regulations to achieve efficiencies greater than specified 'Seasonal Efficiency of Domestic Boilers in the UK' (SEDBUK) levels, or to undertake a carbon index calculation of their impact based on the Standard Assessment Process (SAP). However, neither SEDBUK nor SAP applies to CHP units, and there is a need for revision of the regulations if fuel cell manufacturers and installers are to be able to satisfy themselves of compliance, and if the benefits of fuel cells are to be fully taken into account.

#### Installation of fuel cells

Current legislation requires that those carrying out gas installation works (which would include fuel cells) must be competent. In domestic situations, all paid work of this nature must be carried out by a person registered with Council for Registered Gas Installers (CORGI). For registration, operatives must be trained to CORGI standards; there are compulsory core training modules and a series of optional modules. Subject to

completion of training and assessment, an operative can be certified as competent to carry out safe gas work across various areas. At present, there are no modules relating to hydrogen or fuel cells. Thus, there are no trained and certified installers of fuel cell systems based on natural gas, and, as a consequence, it would not be possible for natural gas fed commercially available fuel cells to be installed in the UK. Without the development of an appropriate training regime by CORGI, this remains a significant barrier to fuel cell commercialisation in stationary applications. Similar considerations apply to electrical installation.

### Fuel costs

Ensuring access to appropriately priced fuel will be key to building economic business cases for fuel cells. Where duty/tax is currently levied, reductions or rebates in this area would stimulate project developers.

### The role of demonstrators

At present, the lack of experience of fuel cell systems in small scale CHP applications is hampering progress to develop procedures and methodologies amongst key stakeholders such as the Council for Registered Gas Installers (CORGI). Field trials and demonstrations have a key role to play here, and will also help to educate a wider group including local authorities, insurers, architects, engineers etc. The current Carbon Trust funded small scale CHP demonstration programme could be of value here, but is 'technology blind' so has no focus on the specific issues associated with fuel cells.

### Grid Connectivity

There is the potential for surplus power from small scale and domestic fuel cell CHP units to be consolidated and fed into the national grid. It would be beneficial if the British Trading and Transmission Arrangements (BETTA) could accommodate this. (Note that there are a range of issues and challenges associated with grid connection, two-way metering etc., many of which are being addressed by the Distributed Generation Coordinating Group. We can provide further details.)

### Purchasing considerations

If domestic customers had the option to lease, rather than purchase a fuel cell CHP system this could help to overcome barriers relating to the high capital cost. However, under current regulations, domestic customers are at liberty to change their electricity and gas suppliers with only 28 days notice. For a leasing approach to be viable a longer time frame would be necessary, requiring some alteration to the existing legislation.

### Planning permission

If fuel cells are to be installed in domestic dwellings, planning permission may be required. The development of appropriate planning guidance would facilitate this.

### Local Authorities as purchasers of fuel cells

The fuel cell at Woking forms just one of a package of innovative energy solutions. To take this forward, the local authority established Thamesway Energy as a public / private company. This allowed it to source finance in ways which the local authority is not able to do.