

Fuel cells, a neglected clean source of energy

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In a situation where the UK is crying out for reliable sources of energy that do not threaten the environment, one option, the hydrogen fuel cell has been relatively neglected through insufficient support from industry and government.

This emerges from a new study funded by the Economic and Social Research Council (ESRC).

"Fuel cells are a genuine 'clean' technology," says one of the study's investigators, Professor Chris Hendry of the Cass Business School, London. "But re-investment in nuclear technology is likely to squeeze out the investment necessary to make fuel cells competitive with existing energy sources and with other non-nuclear alternative energy options."

The study, co-written by Prof. Hendry, Dr. Paul Harborne, James Brown and Prof. Dinos Arcoumanis, gives a strong clue to one of the major obstacles to development by referring to fuel cell technology as a disruptive innovation. A disruptive innovation, if successful, eventually overturns the existing product on the market. Recent examples include the digital camera and the compact disc. Disruptive innovations are radically different from the existing dominant technology and to begin with they are often not as good. The result is two-fold. First the proponents of existing technology are likely to fear and so resist the new development. Second, because profits are unlikely to be immediate, funding can be problematic.

The automotive industry and stationary power provide examples of fuel

cells as a disruptive innovation. However, while their potential is being pursued in the UK, Germany, North America and Japan, interviews with seventy companies in these countries show the UK fuel cell industry is lagging behind.

The UK is comparatively strong in developing hydrogen as a fuel source, reflecting the interests of the oil and gas companies, and in fuel cell components. Indeed, university research has led to the establishment of a number of new firms. Nevertheless the industry supply chain for fuel cells is generally underdeveloped and there have been few efforts by government to support the creation of a market.

In stark contrast, the study finds, Germany has more medium and large firms along the supply chain as well as technological excellence in engineering and electronics to support the overall design of fuel cell systems. It has energy supply companies committed to testing fuel cells, and there are active government incentives. As a result, Germany has 75 per cent of the installations in Europe. Germany and Japan offer the most favourable conditions for fuel cells in residential combined heat and power and, the authors say, may well become 'lead countries' in technology and market development.

Buses seem a promising test-bed for fuel cells but, as Hendry and his co-authors point out, large technical systems like transport and power generation are embedded in institutional and economic commitments which fuel cells will have to overcome. Bus manufacturers and operators are lukewarm and, with the exception of Iceland, there is little evidence of coherent government transport and taxation strategies anywhere in the world to encourage the transition to low emission buses. As a result, the bus market is failing to provide a viable niche for fuel cells, let alone a foothold for wider automotive applications.

This shows the limitations imposed by framing demonstration projects

as 'technological' rather than 'social' experiments and the need for continuing public procurement to provide a bridge beyond demonstrations. "The role of a clear guiding vision and political will," the authors say, "is illustrated by Japan, which has bypassed bus demonstrations in favour of building a fuel infrastructure that can be used by the automotive industry to support the development of cars."

Source: Economic & Social Research Council

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