

## **OPERATING 2020 RESPONSE BY FUEL CELL POWER**

The projections for electricity generating capacity in *Operating 2020* include a tenfold increase in generation from wind farms, but embedded generation only increases from the present 8 GW to 15 GW, approximately half of which is gas fired CHP generation and half electricity from micro wind, solar and hydro.

It is good that there will be support for more gas fired CHP, which could include fuel cells, but there is no acknowledgement of the role for hydrogen fuel cell systems which could balance the load from future intermittent supplies of renewable energy. More backing is needed for the local generation of energy from a variety of renewable sources. The Government's publication entitled *The UK Low Carbon Industrial Strategy* recognizes that there are often market failures associated with innovation investment, especially in the low carbon sector, where key innovations may involve entirely new technological approaches, such as vehicle propulsion or energy generation. Given initial support, there is huge potential for CHP systems powered by wind energy collectors, solar power or waste, with hydrogen fuel cell systems acting as load levellers.

The use of hydrogen and fuel cells would increase off-peak demand and help to contain future increases in peak demand. This could be a cost effective means of reducing STORR, which would otherwise have to be increased from 4GW to about 10GW in 2020 at a cost of about £418 million per year. The Government's Foresight Committee has recommended more local, distributed energy and the high electricity to heat ratio of fuel cells will make them eminently suitable for use in future well insulated buildings.

Given initial 'pump priming' a variety of small and medium scale energy saving and renewable technologies could be brought to market and systems could be rapidly deployed. It is estimated that micro-generation could save up to £1bn by 2020 in network investment. On the other hand, *Operating 2020* indicates that due to high demand, the cost of large wind turbines is going up.

### **Wider spread of technologies**

Indigenous, renewable energy sources will contribute heat as well as electricity, and surpluses may be stored as fuel for transport. Energy from municipal, agricultural and forestry waste has great potential. At present about 8% of the UK's domestic waste provides electricity for 250,000 homes. Burning is an inefficient means of generating energy from waste, but fuel cell systems could provide double the energy from the same primary energy source. This technology would also be more widely accepted, as the gasification process and electrochemical conversion of energy significantly reduce harmful emissions. The organic residues can be used as fertilizer.

Apart from the new sources of waste being produced every year, there is a tremendous energy store locked up in existing landfill sites. New technology is being developed which will simplify the gasification of agricultural and forestry waste.

Several different designs of micro wind energy collectors are under development, which could operate in the turbulent air conditions experienced in urban areas. The cost of solar photovoltaic systems is coming down, particularly when incorporated in new buildings. There is also great potential for low head hydro systems. The availability of hydrogen storage would encourage the deployment of all types of intermittent renewable energy technologies. *Operating 2020* envisages 1.5 million battery powered vehicles, which will be recharged outside peak hours and reduce the cost of balancing the load on the grid. There will equally be a role for hydrogen fuel cell powered vehicles, both for personal mobility and to power a clean, efficient public transport system. As fuel cells are significantly lighter than batteries, they are more energy efficient for longer journeys than batteries. They also have the potential to contribute to balancing services when vehicles are not in operation, by generating electricity at times of peak demand.

### **Funding small scale energy technologies**

The National Grid and electricity supply companies should work with local communities to invest in renewable energy systems. Every year up to £1 billion will be provided by electricity consumers under the Renewable Obligation (RO), mainly for wind farms. There will also be increasing costs for balancing the system. If 20% of this funding were allocated to the development and implementation of local energy generation and storage this would help to smooth peak generation and ensure better utilization of capital. It would enable communities, businesses and individuals to purchase their own tried and tested generators of heat and power, thereby increasing investment in energy saving and renewable technologies. An independent team of engineers and scientists and representatives of communities and potential users would be required. Such assistance for innovative technologies would ensure a more flexible energy infrastructure, which could adapt to future changing requirements. It would engage the public, stimulate competition and encourage the renewal of the UK energy industry.

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