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# Warm welcome for house powered by hydrogen fuel cell

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From the outside, the house at the bottom of Stocking Street looks no different from any other in the cul-de-sac. But step around the back and a purpose-built shed hums with the latest in green technology - a state of the art hydrogen fuel cell.

Today the house in Lye, near Stourbridge in the West Midlands, will be opened as the first permanent hydrogen-powered home connected to the national grid. The refrigerator-sized fuel cell unit will produce 1.5kW of electricity and 3kW of heat for the occupants of the house, with any excess power being fed into the national grid.

"You shouldn't notice any difference in the house," said Waldemar Bujalski from the University of Birmingham's fuel cells group, which will monitor its performance and reliability.

"For the typical house, the unit is capable of providing 65% of the power on average and about 75% of total energy demand, both electricity and heat."

There is no way yet to pipe hydrogen directly into homes, so the demonstration house will use natural gas that comes in via the existing mains supply. This is first passed through a steam reformer that generates hydrogen. The hydrogen is then combined with oxygen in a fuel cell unit, made by German company Baxi Innotech, that produces both electricity and heat and without producing carbon dioxide. Although creating the hydrogen from gas does produce some carbon dioxide, using the fuel cell cuts overall household emissions by 40% compared with running on gas alone.

The electricity is fed directly into the house, while the heat warms water for the taps and conventional radiators. Bujalski said the demonstration house would be monitored by his team to see how well the fuel cell works, with the aim of ironing out problems before the devices reach the mass market. Initially they would cost about £2,000 each, he said. In Germany, there are plans to install 800 hydrogen fuel cell units by 2010 as part of a large-scale demonstration of the technology.

The UK's hydrogen-powered house is part of a broader £2m programme of research led by the University of Birmingham to look at the full supply chain for producing, storing and using hydrogen in homes or cars. Hydrogen, a component of water and one of the earth's most abundant elements, is seen by many experts as one of the best clean alternatives to fossil fuels, if it can be created using carbon-free renewable energy and the infrastructure for transporting is established.

The proton exchange membrane technology in use at Stocking Street is just one of the ways hydrogen could be harnessed in homes. The Birmingham team will examine other fuel cell technologies and ways of delivering the gas to the home, including using algae to create hydrogen, as they assess how hydrogen will work best in domestic use.

