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Green Growth

Green Growth: The power whose time has finally come

Fuel cells may be a radical way forward, but investors including the Carbon Trust are putting more than £10m into the start-up to make sure that it succeeds.



Future fuel: Dr. B. B. Cha says car firms know the era of the internal combustion engine is ending.

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Despite their promise of efficient, pollution-free power for all, fuel cells remain a niche technology used in exotic applications in the industrial and space sectors.

Reliability, durability and crudally, price, have prevented widespread commercial success and led in the 1980s and 1990s to investors getting badly burnt by technology that was overhyped and which underdelivered.

While their long-promised mass deployment in homes, cars and industry is unfulfilled, start-ups all over the world are working on the next generation of fuel cells. There are promising signs that this could be the decade of the fuel cell, led by UK innovators.

West Sussex-based Ceres Power is completing field trials of its ceramic fuel cell technology, which provides highly efficient combined heat and power (CHP) units in domestic homes that promise to cut household energy bills by converting natural gas into electricity as well as providing heating and hot water. Generating electricity where it is needed means almost no loss of energy compared to centrally generated power, two-thirds of which can be wasted by the time it reaches households.

The signs are good a decade after the firm was spun out from Imperial College London. British Gas is confident enough in the technology to have pre-ordered 37,500 units and the technology has global potential in a market of 30 million units a year, according to figures from Goldman Sachs.

At a time of fresh doubts about replacing UK nuclear power stations after the nuclear disaster in Japan, CHP technologies could help plug future electricity generation gaps. According to government estimates, CHP units could supply 30 per cent of the UK's electricity if they were deployed.

The Runcom-based fuel cell maker ACAL Energy has hopes for an even more dramatic power transformation. The company has developed a new way of reacting the oxygen in air with hydrogen by using a low-cost liquid catalyst.

Minimising the use of expensive catalysts, a key component of fuel cells, is a key to successful mass fuel cell deployment. ACAL's platinum-free cathode technology, which removes the need for 90 per cent of the platinum used in conventional fuel cells and simplifies the overall system, should cut unit costs by 40 per cent.

It is confident its radical design will find its way into stationary power generators in the next two to three years. But the big prize is getting its fuel cell technology in hydrogen-powered cars. If successful, it could take a large slice of the market for engines predicted to be worth at least £180bn by 2050.

Investors have put more than £10m into the start-up, including the Carbon Trust, which has invested £1m. Dr Robert Trezona, research accelerator director at the Carbon Trust, which backed the firm after staging a competition in 2009 to find the most promising fuel cell contenders, says the technology holds great promise. "I've been working in fuel cells for 10 years and this is the best thing I've seen, it is a genuine, novel, breakthrough approach. It changes a number of the costly system considerations in the fuel cell."

"Car makers including Ford, GM, Honda, Toyota and Daimler have committed to launching vehicles for sale in 2015. People will say this happened fast time around too but companies were naive about fuel cell technology and there's been 15 years of R&D since. I think it's very possible that we will see ACAL's technology in the second generation of fuel cell cars."

ACAL's first field trial unit, a stationary power generator, will be tested this summer. The first commercial applications will be in small mobile power generators that provide backup in remote locations. It is part of a global annual market worth \$10bn, says ACAL's chief executive officer, Dr B B Cha. "Our path in the static power market is well laid out and as the technology matures we will start to see it go into automotive. About 100 million engines are produced every year, so even taking 10 per cent of that would make a \$10bn business."

Dr Cha admits that the process will take time. He adds: "It's a long game, a 10-year cycle. Putting the technology in a car means meeting challenging cost, performance and packaging targets but we are seeing increasing interest from automotive companies. They know the era of the internal combustion engine is ending."

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