

Driving towards a low carbon future

Around 180,000 people are directly employed in the UK automotive industry, which is worth over £11 billion to the local economy and accounts for 10 per cent of total UK manufactured exports.

The UK is committed to reducing carbon emissions by 80 per cent by 2050. Emissions from internal combustion engines, in cars and in smaller machines and vehicles, make up 14 per cent of current levels, so it's essential to re-engineer them to be as sustainable as possible.

With the second strongest research base in the world behind only the US, the low carbon economy is proving to be a turning point for the UK's car industry. Over £1 billion is spent every year in the UK on automotive R&D, and the Technology Strategy Board alone has invested £12 million in sixteen proof of concept studies and six R&D projects. Small wonder that the UK is one of the nations leading the world into this new economy, with major advances being made in developing hybrid cars and alternative fuel technology.

Here we look at three companies from Norfolk in the East of England that are finding innovative solutions to meet this challenge.



Lotus Engineering

Style and efficiency can carry you a long way

One of the major challenges of hybrid cars is their range. Most are suitable only for short journeys, with plenty of stops, starts and periods of idling, and this is a major barrier to them breaking into Europe's markets.

Lotus Engineering has developed the Lotus Evora 414E as a demonstration model to showcase its core competencies of lightweight bodywork, efficient performance, driving dynamics and electrical and electronics integration.

The Evora 414E has a plug-in series hybrid drive system which gives an

impressive 300 mile range. The drive system comprises two electric motors driving the rear wheels independently, via a single speed geartrain. This geartrain is integrated into a common transmission housing, enabling torque vectoring for stability control. The car's electrical power is stored in a lithium polymer battery pack which is mounted in the centre of the car to improve stability.

The range of the hybrid engine can be extended further by the Lotus Range Extender engine, specially designed for hybrid cars, giving drivers great performance with low emissions. An additional safety innovation is the sound generation system which sends engine noises through speakers on the front and rear of the car, increasing pedestrian safety and counteracting the problem of low engine noise in hybrid cars.

Lotus has showcased the Evora 414E at the 2010 Geneva Motorshow, where it was well-received, and it's thought that the car will go into production in 2013.

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Scion Sprays

Precision fuel injection for smaller engines

Fuel injection technology has reduced noxious car emissions by 95 per cent since the 1970s, but smaller engines, around 100 million of which are made every year, have continued to use fuel and pump out pollutants at rates which will soon become illegal. Conventional fuel injection systems are bulky and expensive, and so haven't been used in small engines, such as those found in lawnmowers, scooters and chainsaws, especially in developing countries.

Scion Sprays has developed a low carbon, highly efficient fuel injector system for such applications. The company's innovative technology means there's no need for big, expensive high-pressure pumps, so fuel conservation and energy efficiency can now be brought to previously overlooked vehicles and machinery.

Scion Sprays has showcased its injection system at exhibitions, and has demonstrated it to potential customers. There is a clear demand for the technology. The company is now focussing on volume manufacture of its technology for its first customer, and the system should appear in the marketplace this year. The company will retain the production of the precision-engineered components in Hethel, Norfolk, and so hopes to create more jobs as its technology increases its market presence.

Active Technologies

Bringing clean travel to rural areas

People living in rural communities tend to travel too far and too fast for the capabilities of existing power packs, so electric cars are not a big hit in the countryside. Hybrid cars offer a partial solution as long as they work alongside an internal combustion engine, but the weight and expense of the two powertrains needed means excess fuel consumption and an expensive initial outlay on the car.

Active Technologies has taken on the challenge of extending the range of electric cars beyond city limits. The company has developed a range extender engine which generates electricity onboard the car, topping up the power pack and ensuring that the driver doesn't run out of energy before the journey's end. This generator can also be adapted for running power tools and building machinery.

At just 500cc, the engine is small, and it runs at an optimal speed to maintain high thermal efficiency for the fuel burnt. Active Technologies intends to use low-emission biofuels to run the engine.

The engine is also designed to keep friction to a minimum, meaning a high rate of miles per gallon, which in turn means a smaller engine, reducing the dead weight to be carried by the electric powertrain.

The company is currently looking for a development partner to bring the design to a functioning prototype so it can validate the fuel consumption figures and the charging performance of the system.

Electrical vehicles will be with us for the foreseeable future until other technologies mature and come into public use, so there's a large long-term market for a range extender powertrain. The future looks promising for this innovative technology.

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