



THE STORY OF SYNERGY INNOVATIONS... SO FAR

THE COMPANY

Synergy Innovations is a small privately-held company based in London. Initiated in 2005, the company has devoted the last four years to developing innovative green technologies to make a viable addition to the planet's energy solution and to make human operations cleaner and more sustainable. Their attention has increasingly centred upon creating a feasible, economic and environmental alternative to the combustion engine.

Synergy Innovations is now ready to launch its flagship creation: an inspiring and exciting, prototype electric vehicle with the capability of altering commonly-held consumer and industry perceptions about electric vehicles and paving the way for the large-scale implementation of urban electric driving – the Synergy E-drive.

It is believed that the Synergy E-drive sets a new benchmark standard for urban electric vehicles. Unlike many of the existing electric alternatives, it is fun to drive, aspirational, effective and fast. This prototype shows for the first time, that urban drivers should expect, and be presented with, the opportunity to own fully functional cars on a full electric format.

THE PEOPLE

Steve Brooks and James Westcott, the founder members of Synergy Innovations, first met in 2002 in Antarctica.

At the time Steve had taken time out from Boulton, the property investment company he co-founded in 1987, and was in the process of becoming the first person to fly a helicopter from the North Pole to the South Pole. A born adventurer and enthusiast, Steve had already made it into the record books once for having been the first to drive from America to Russia across the frozen Bering Straits in a modified overland vehicle which he designed and drove himself. He believes that "exploration is the first step to wisdom; it is only when ones grasp extends ones reach that we really start to learn our true abilities."

At the time of their meeting in 2002, Steve was becoming increasingly interested in the environment and sustainability in general, and on clean technologies in particular.

James was in Antarctica on the last leg of a trip from Ushuaia in Southern Argentina when he met Steve and the first seeds of Synergy Innovations were sown. He holds a First Class degree in Mechanical Engineering from the University of Western Australia and an MBA from INSEAD in France. He is a UK Chartered Engineer and member of the Institute of Marine Engineering, Science and Technology (MIMarEST). Prior to Synergy Innovations, he had worked in the offshore oil and gas industry in Australia, UK, Norway, Denmark and The Netherlands; later working for Pratt & Whitney jet engines and on fuel cells and microturbines for United Technologies Corporation.

James is passionate about working towards a more sustainable energy economy and developing innovative technologies to help create a better world for future generations.

Inspired by their first meeting in Antarctica and their shared environmental ambitions, the pair met up again in May 2004 and set about establishing Synergy Innovations.



THE JOURNEY

Synergy Innovations initially began working on a vehicle powered by water, using immersed carbon electrodes and a high current to produce a mixture of hydrogen and carbon monoxide to power a car with a standard combustion engine. Although successful they soon realised that the efficiency of an internal combustion engine (approx 25%) was working heavily against them, so they turned their attention to finding more efficient ways to propel a normal vehicle.

They quickly established that electricity is the most efficient energy medium for this purpose, allowing efficiencies above 90% whereas normal engines rarely achieve more than 30%. The team began to design a prototype advanced electric vehicle based on a normal everyday car.

Synergy Innovations then started working with a UK partner company, PML Flightlink, in developing a new electric wheel motor design in which four wheel motors are driven by advanced electronics from a battery pack and a small engine on board acts as a range extender once the battery is depleted.

During this time, independently, Synergy Innovations experimented with several alternative fuels for the small range-extending engine, including bio ethanol, biodiesel and, most successfully, straight vegetable oil (SVO) which is carbon-neutral, affordable, grown locally and has a small production footprint. James now drives a VW Golf powered entirely by SVO.

Synergy Innovations worked with PML for 18 months before stopping the joint endeavour to concentrate on developing their own unique advanced electric vehicle using a more conventional single electric motor.

Work began on the red electric Synergy E-drive in September 2007. The engineering brief was to develop a prototype electric vehicle that people could relate to and get excited by, and that could help to change the perception about electric cars as sub-standard alternatives to something that is ready or even overdue in a modern city such as London. To this end a lot of work has gone into ensuring that the driver interface is straightforward, fun and highly interactive, as well as into the seamless integration of all the various components and subsystems, without compromising the space, safety and handling of the original vehicle.





THE PROTOTYPE

The Synergy E-drive is based on a standard BMW Mini and retains its host's general appearance, boot, rear seats and full safety spec. It is DVLA-certified and fully road legal as an electric car.

The Synergy E-drive is not associated with the BMW Group nor is it related to the BMW electric Mini. It is not available for consumer sale, but is intended as a prototype to demonstrate the efficacy of the technology; to inspire manufacturers to work with Synergy Innovations on the development of their own electric vehicle fleets; and to encourage policy makers to build an effective urban infrastructure for electric cars.

Uniquely for an electric car, the Synergy E-drive is fast (top speed 95 mph), comfortable, exciting to drive and great fun. 'You can't help but smile as you're driving!' It at least meets, and often supersedes, the driving experience of a standard petrol-driven car.

The Synergy E-drive is perfectly suited to urban driving and with a battery range of between 70-90 miles, is easily able to withstand an average day's mid-range driving in the city which is typically no more than 15 – 20 miles per day with an average journey distance of 7 miles.

The Synergy E-drive has 'Regenerative Braking' whereby the slowing wheels of the car act against the motor and turn it into a generator, creating electricity to go back into the battery. The battery therefore gets topped up whilst braking, giving it a further range. Uniquely, in the Synergy E-drive up to 30% of used energy can be recovered in normal city driving.

THE SPECIFICATION

Power:	Maximum 85 kW at 5000 rpm
Torque:	Constant 190 Nm from 0 to 4000 rpm
Weight:	Approximately 1200 kg
Motor RPM:	Up to 10,000 rpm
Battery:	288V nominal using 78 lithium polymer cells
Charging Time:	4 – 6 hours (1 hour charges 20% of battery)
Consumption:	4.5 to 5.0 miles / kWh (Petrol equivalent 160 – 200 miles per gallon)
Fuel cost per mile:	circa. 1.8p / mile (compared to 10 – 15p / mile for standard cars)
Cost per charge:	circa. £1.50 (approx one tenth of the cost of a standard petrol car)
Gearbox	Single gear, direct drive.

THE PERFORMANCE

The Synergy E-drive is a high performance electric car that's clean, quiet and easy to drive.

Acceleration:	0 – 60 mph in 10 seconds
Top speed:	95 mph
Range:	70 – 90 miles



THE EQUIPMENT

The Synergy E-drive features a three-phase AC induction motor, single ratio gearbox, inverter, lithium polymer batteries with battery management system, onboard charger, regenerative and ABS braking plus airbags.

The Synergy E-drive's advanced onboard computer, with wireless keyboard and user interface, enables a range of display, configuration and diagnostic capabilities. The driver and passengers can monitor the real-time performance of the vehicle via a number of different screen displays, all controlled by buttons on the steering wheel.

The car also features full wireless broadband internet access and Bluetooth audio capability for mobile phones and MP3 players via the user friendly "ioPlay" application.

THE LOOK

High resolution images of the Synergy E-drive and the directors of Synergy Innovations are available at www.synergyinnovations.eu



THE FUTURE

Synergy Innovations are not motivated primarily by commercial interests, but by the desire to introduce a viable, environmentally-friendly and long-term alternative to the petrol engine. Even if you do not acknowledge the impact of climate change, it is still madness to take a rare and depleting commodity as valuable as oil; from which we can produce essential plastics etc; and waste it in a car engine. It is a bit like burning your sofa on the fire because you are cold.

Synergy Innovations would like to see urbanites throughout the world driving electric cars – so their primary aim is to use the Synergy E-drive to drive the development of the infrastructure in all urban areas. Alongside that, Synergy Innovations is busy working on developing the technology to take the Synergy E-drive beyond its current 70-90 mile range and into the realm of standard motoring.



THE ANSWERS

Can I drive the Synergy E-drive?

Yes, the Synergy E-drive is available to be test-driven by key opinion-leaders and journalists. Contact details are below.

Do you need specialist training to drive the Synergy E-drive?

No, the interface is extremely user-friendly. The E-drive is easier to drive than a standard automatic car.

How do you charge the car, do you require any special equipment?

The car is charged from a standard 13amp domestic socket – the lead simply plugs into a socket mounted in the fuel cap. The charger will automatically turn off once fully charged. The car can be locked and made completely secure as it is being charged, so can be left unsupervised.

Can I buy a Synergy E-drive?

Not at the moment. Synergy Innovations are working with several potential car manufacturers to put the concept into production.

How long does it take to fully charge battery?

It takes between 4 and 6 hours to fully recharge the battery, but it can also be recharged bit by bit throughout the day.

What is the Regenerative Braking System?

When you take your foot off the accelerator, the car will slow down – obviously. But instead of this energy being wasted (by heating up the brake disks), some of it is recaptured. This is termed 'Regenerative Braking'. Up to 30% (measurable on the onboard computer!) of the used energy can be recovered in normal city driving.

How do the running costs compare to a standard petrol or diesel car?

The cost per charge amounts to approximately £1.50, so running costs are around 1.8p/mile once regenerative braking is taken into account. This amounts to almost one tenth of the cost of a standard petrol car which runs at around 10-15p/mile.

The car produces hardly any noise when moving – does this present a danger to pedestrians?

The tyres make a certain amount of noise on the road so the car is audible. There is no evidence that electric cars are any more of a danger to pedestrians than standard vehicles. However, they do have a very calming impact on the street as the noise and general pollution is greatly reduced.

There are other electric cars around – what makes this one special?

Unlike many electric cars, the Synergy E-drive provides a fabulously positive driver experience. It is nippy, fast, responsive and comfortable. It is not a quadricycle, nor an expensive sports car – but a 'normal' car. In addition the Synergy E-drive has full wireless broadband internet access and Bluetooth audio capability for phone and music. It's fun!

I live in London in an apartment on the 5th floor – how would I charge my electric car?

The car can be charged from any standard 13amp plug socket. Encouraging the implementation of a sound infrastructure is one of Synergy Innovations' ambitions. We hope that electric charging points will shortly become available on every street, garage forecourt and car park. It is the Mayor of London's declared aim to make London the first city in the world with a full infrastructure for electric vehicles.

Are the mechanics of the car able to be mass-produced and then offered at a reasonable price to consumers?

Yes

When was the Synergy E-drive officially launched?

The Synergy E-drive is being showed off for the first time at the Amsterdam Electric event on 25th March



FOR FURTHER INFORMATION

Synergy Innovations www.synergyinnovations.eu
Boultonbee www.boultonbee.co.uk
Baring Straight Expedition www.icechallenger.com
'Pole to Pole': the story of Steve Boultonbee-Brooks' journey www.poletopole.tv

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