MINI
United Kingdom
Corporate Communications

MINI E UK Media Press launch

12-13 October 2009

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Overview

Over its 50 year history, MINI has always represented engineering innovation and design ingenuity at it best. That tradition is set to continue with the MINI E – a zero emissions, electric MINI that combines striking design with high performance and a state-of-the-art electric drivetrain.

The MINI E is the first product of BMW's *project i* – a programme designed to research and develop transport strategies and new types of vehicles for sustainable mobility. Trials are already underway in the US and Germany and as of Winter 2009, the first cars will be handed over to British pioneers for a 12 month trial. The MINI E will be tested on British roads by a mixture of private, corporate and public sector drivers – all of whom will give valuable feedback to the project consortium and UK Government. These findings will ultimately be used in the engineering and infrastructure support of mass-produced electric vehicles and establish the social and economic issues and aspects of running an electric car.

During everyday usage, the MINI E can travel around 100-120 miles (up to 156 miles in ideal conditions*) on a single charge, depending on driving style and conditions, and of course, has the all the characteristic performance for which the MINI is famous. It can sprint from 0-62mph in just 8.5 seconds and has an electronically-limited top speed of 95mph.

Power is produced by a front-mounted 150-kilowatt electric motor which generates the equivalent of 201 hp. The motor's energy supply comes from a high-performance rechargeable lithium-ion battery which is installed in the rear of the car in place of the back seats. The battery unit – which uses the same technology already widely used in mobile phones and laptops – combines ample storage capacity with remarkable power output.

The MINI E can be recharged from empty in around four and a half hours via the dedicated 32 Amp charging point installed by Southern Electric at the MINI E drivers' homes. The MINI E's drivetrain features regenerative braking – which claws back the energy lost when the driver releases the accelerator – to extend the range by up to 20 percent.

Driving fun remains an integral of the MINI E's DNA. It features the same acclaimed suspension design as the standard car, albeit slightly modified to reflect the MINI E's slightly different weight distribution.

The first UK trials of the MINI start later this year with a second phase due to start in 2010.

* vehicles were tested according to California Test Procedures for 2005 and Zero-Emission vehicles amended 19 Dec 2003.

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MINI E - the project

Background

The MINI E research project supports the BMW Group goal of achieving emission-free driving and underlines its commitment to reducing CO_2 emissions without compromising the driving experience. The passion to provide sustainable mobility for its customers is at the heart of BMW's long-term strategy – and has been for many years. Since 1995, the average CO_2 emissions from its cars has reduced by more than 25 per cent – the largest reduction of any automotive manufacturer in the world - through a variety of technological innovations, most recently encompassed by the Efficient Dynamics strategy (BMW) and MINIMALISM (MINI) programmes.

The MINI E made its world premiere at the Los Angeles Auto Show on November 19, 2008. The car was initially available under lease to selected private and corporate customers as part of a trial project in the US states of California, New York and New Jersey. The overwhelmingly positive feedback from these first trials led to similar large-scale tests being introduced in Germany (early 2009) and now the UK – the three largest markets for MINI.

The findings of the trials will help BMW Group engineers get a clearer picture of our customers' needs and aspirations as they develop an electric vehicle for series production. The research data will also help organisations charged with creating the political, technical and commercial framework necessary to enable sustainable mobility in a low carbon future.

Electric mobility is just one of the low carbon technology options being investigated by BMW Group. The company aims to begin series production of all-electric vehicles before the middle of the next decade.

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The BMW Group is the most sustainable car company in the world – as the latest Dow Jones Sustainability Index (DJSI) recently confirmed for the fifth year in succession. The company already offers the most efficient cars in the premium segment, thanks to Efficient Dynamics and MINIMALISM technologies. The BMW 118d was named World Green Car of the Year 2008 and the Hydrogen7 has already made CO_2-free driving a reality.

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The UK MINI E trials

Starting in Winter, MINI E models will be on UK roads for a twelve-month trial that will evaluate the technical, behavioural and social aspects of living with an all-electric vehicle in the current environment.

Setting up the UK MINI E field trial has been a complex operation that has required the co-ordination and co-operation of a number of large organisations.

The MINI E Research Consortium was created to pull together experts from various fields: an energy infrastructure provider, an academic partner, a regional development agency and two local authorities. All of these partners are needed to make the MINI E research project a reality in the UK.

On June 23, 2009, the Government-backed Technology Strategy Board announced that the MINI E Research Consortium would be supported by a proportion of a £25m fund, which was made available to eight consortia from across the UK to accelerate the development of desirable ultra-low carbon vehicles.

BMW Group's successful application to the Technology Strategy Board followed an invitation for proposals outlining innovative, industry-led collaborative research projects involving ultra-low carbon vehicles.

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The MINI E UK Research Consortium

The MINI E UK Research Consortium, of which BMW Group is the lead partner, comprises several organisations which are based around Oxford and the South-East of England. All will play important roles in the collaborative field trial.

In addition to the BMW Group, the consortium includes Southern Electric (part of the Scottish and Southern Electric Energy Group) which will supply both the electricity and the electrical infrastructure, an academic partner (Oxford Brookes University's Sustainable Vehicle Engineering Centre) and the South East England Development Agency (SEEDA) as well as Oxford City Council and Oxfordshire County Council.

Southern Electric
Southern Electric will be responsible for the domestic and public electric charging infrastructure in the research area which will be installed by its contracting division – Southern Electric Contracting. Green energy will be provided by Southern Electric by matching the electricity supplied to the MINI E through home recharging with electricity from its own hydro electric stations and wind farms.

The MINI E test area is determined by the region in which Southern Electric Power Distribution owns the electricity distribution network so that the load, time and duration of car charging can be monitored throughout the network.

Oxford Brookes University

Under the direction of Professor Allan Hutchinson – who leads the Sustainable Vehicle Engineering Centre – Oxford Brookes University will be responsible for undertaking scientific data analysis and conducting customer surveys to capture the subjective feedback from users of the MINI E test vehicles.

All of the vehicles in the MINI E project are supplied with data loggers, allowing real-time vehicle performance and driving styles to be constantly tracked and compared.

Behavioural scientists from the School of Social Sciences and Law will select MINI E drivers through an online application process.

Public sector members

The consortium is strengthened by public sector organisations from the South East England Development Agency (SEEDA), Oxford City Council and Oxfordshire County Council.

These organisations are working to generate and sustain economic growth in their regions through innovation. The MINI E is an excellent example of how national and local government are focusing on high tech projects to deliver high value job opportunities.

Twenty MINI E vehicles will be distributed among the MINI E consortium members for testing in a fleet environment. A charging infrastructure will be installed in each organisation's region to support a common objective: to be at the forefront of sustainable transport initiatives.

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How the UK MINI E field trials will work

Drivers wanting to take part in the MINI E field trial were invited to apply online in September. From over 500 qualifying applicants, just 20 lucky pioneers will be selected to take part.

Each MINI E will be leased for six months from Winter this year. A second round of applications will then be invited mid 2010, allowing a further twenty drivers to lease a car for six months.

Accounting for current development and manufacturing costs, the monthly lease fee for a MINI E would normally be priced at £550 per month. However, thanks to part funding from the Government Technology Strategy Board, the monthly lease fee will be reduced to £330 per month. This figure includes VAT, insurance and maintenance.

In addition, the MINI E driver will only pay for the electricity used. Fully re-charging the battery using off-peak electricity at current prices will cost around £1.50. Using higher-rate daytime electricity, the cost will still be less than £4.00.

All drivers taking part in the trial will live in South East England, within a triangular geographical area joining Andover, Oxford and West London.

MINI E test drivers are required to have a private garage, car port or parking space at their home. Not only for safety and security, but primarily to ensure that a high power, dedicated charging point can be installed by Southern Electric.

The dedicated charging point will be installed with every MINI E and also includes a 6.5m charging cable. The 240V/32 Amp supply provided through the charging point can fully charge the MINI E's lithium-ion battery pack from empty in just 4.5 hours. An adaptor for use with an ordinary 13 Amp socket is also supplied to drivers, but the lower capacity means it will take around 10 hours to provide a full charge.

Maintenance, servicing and technical assistance will be provided by dedicated BMW Group UK 'flying doctors'. These technicians are supported by selected MINI E Dealers within the MINI E research area and the 'service hub' at Plant Oxford, England where all MINIs are manufactured.

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MINI E – Q & A

This section of the MINI E press pack is based on a brief interview between a journalist and Emma Lowndes, Project Leader for MINI E in the UK. The aim of the section is to provide you with answers to pointed questions that can be used in your articles.

HOW ARE UK RESEARCH PARTICIPANTS CHOSEN?

In addition to the geographical and project requirements, MINI is looking for enthusiastic pioneers who have a clear desire to help make the MINI E UK Research project a success. These pioneers also need to accept that the car is a prototype so things may not always go smoothly as with a production car. Previous/current ownership of a MINI or a BMW isn't a requirement.

WHY ISN'T THE MINI E AVAILABLE FOR PURCHASE?

The test cars are all prototypes from a one-off production run of 600 cars for all the tests around the world. MINI will need the cars back after the test for a full technical evaluation of their performance.

WHY ISN'T THERE AN ELECTRIC MINI CLUBMAN?

The design of the MINI Clubman does not lend itself to electric conversion just now. Firstly, it's heavier than a MINI hatchback (an additional 75 kg in the case of the Cooper S version). What's more, the MINI E's battery takes up a good portion of the rear seat, so the Clubdoor of the MINI Clubman would be nowhere near as practical without a back seat.

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WHY IS THE MINI E ONLY AVAILABLE IN LEFT HAND DRIVE?

Because it is a 'one-off' car that will be tested worldwide. The business case doesn't support a left hand drive and right hand drive option in extremely low volume scenarios.

ASSUMING MINI E DRIVERS CHARGE THEIR VEHICLE EVERY DAY, WHAT WILL IT COST THEM VERSUS PETROL?

Here's an example:
Assume a MINI E driver travels about 40 miles every day to work and 40 miles over a weekend, it will cost about 50p to charge the MINI E every day, or roughly £14 per month.

If you drive a car that gives you, say, 35 mpg, you're using roughly 155 litres of petrol per month to go the same distance. At £1.10 a litre, that's £170 a month. The bottom line: it's about 90% cheaper to use the MINI E.

CAN THE MINI E DRIVER USE PUBLIC CHARGING STATIONS?

To charge in the shortest amount of time, drivers need to use the dedicated point installed in their garage. Southern Electric will be installing 32 Amp capacity public charging stations to support MINI E drivers from Winter 2009. An 13 Amp lead will allow slower charging from existing public charging stations.

HOW MUCH WEIGHT CAN THE MINI E DRIVERS PUT IN THE MINI E?

The total additional weight which can be added to the empty MINI E is 195 kg.

DOES THE PERFORMANCE OF THE MINI E CHANGE DEPENDING ON THE BATTERY CHARGE LEVEL?

Yes. In order to protect the battery, when the charge level drops below 10%, the performance of the MINI E becomes slightly weaker (with the intention of helping you reach your destination!).

ARE THERE ANY RESTRICTIONS ON WHAT CAN BE CARRIED IN THE BACK OF THE MINI E?

Drivers can carry anything in the boot - as long as they make sure not to put anything on top of the battery box for driver and passenger safety, or block the 'domes' behind each front seat that help maintain air flow and cool the batteries.

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MINI E – the product

Finding innovative ways to use less while delivering more performance and fun has always been a MINI priority. Every element of the MINI E was designed with this in mind and, as a result, it delivers a driving experience that will be familiar to all MINI owners.

Exterior Design

The MINI E is based on the standard left-hand drive MINI hatchback and incorporates a number of unique features.

Although the standard MINI is well known for its wide range of personalisation options, every MINI E is identical in terms of design and colour. The body is finished in metallic Dark Silver while the roof is painted in metallic Pure Silver. Every car taking part in the UK field trial displays its serial number on a special badge mounted just ahead of the side-indicator.

The roof edges and mirror housings are finished in Interchange Yellow, a colour that's repeated in the MINI E logo. Depicting a stylized power plug in the shape of an "E" set against a silver background, the MINI E logo has been applied to the roof, bonnet, tailgate and the charger port flap on the rear panel.

In every other respect, the MINI E is identical to the standard MINI Hatchback. The short overhangs and 'wheel-at-each-corner' design is, of course, retained, and gives the E the same dynamic, sporty appearance as its internal-combustion powered stablemates.

The wheels are 16-inch, five spoke alloy rims fitted with run-flat tyres.

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Interior Design

Inside, the most obvious difference between the MINI E and the standard car is the installation of the lithium-ion battery stack in the space which the back seats usually occupy. The battery's casing incorporates two ribbed plastic humps which house the cooling units. These draw warm air away from the battery and vent to the vehicle's exterior. The boot has a capacity 60 litres.

In terms of dashboard design, the car features a central gauge and battery level indicator mounted behind the steering wheel. These replace the traditional rev counter and features yellow lettering against a dark grey background. The battery level is displayed in percentage figures, giving the driver a constant indication of how much charge remains in the battery. As a further visual aid, the central gauge includes an LED display indicating power consumption in red and power recuperation in green.

The MINI E features sports seats finished in cloth/leather Ray upholstery in Carbon Black with Interchange Yellow stitching. The MINI E has manual air conditioning, radio MINI Boost CD, on-board computer and a sports leather steering wheel.

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The zero-emissions powertrain

The MINI E's electric drivetrain has an output of 150Kw (201hp), with power delivered to the front wheels via a single-stage helical gearbox. This unique engine and transmission arrangement powers the MINI E seamlessly to 62 mph in 8.5 seconds and on to an electronically-limited top speed of 95 mph.

MINI has chosen lithium-ion technology because of its combined qualities of ample energy storage and high output. Lithium-ion batteries are already commonplace in the consumer electronics market and provide rechargeable power for mobile phones and laptop computers.

The MINI E's lithium-ion storage unit has a maximum capacity of 35 kilowatt hours (kWh) and transmits energy to the electric motor as direct current DC at 380 volts. The rechargeable battery is made up of 5,088 cells grouped into 48 modules. These modules are packaged into three battery elements. The temperature of the battery is regulated and controlled by two load and speed-sensitive fans. The total weight of the battery is 260kg.

The battery can be plugged into all standard power outlets. Its charge time is dependent on the voltage and amperage of the electricity available.

Drivers can recharge a battery that has been completely drained within a very short period of time – around 4.5 hours – using the 32 Amp wallbox supplied as standard with every MINI E.

A full recharge draws a maximum of 28 kilowatt hours of electricity from the grid. Based on the car's range, a kilowatt hour translates into 5.4 miles. Besides the benefit of zero-emissions driving, the MINI E also offers significant economic advantages over a vehicle powered by a conventional internal combustion engine.

The battery delivers its power to an AC Induction motor, which is mounted transversely under the bonnet. This drives through a single-stage helical gearbox derived from the standard Cooper S transmission. The power output is 150kW (201hp), while torque is rated at 220Nm.

To ensure that no energy is wasted, the drivetrain features a regenerative braking system. As soon as the driver releases the accelerator pedal, the electric motor acts as a generator. This results in braking force, and the power recovered from the kinetic energy is fed back to the battery.

In urban conditions, most of the deceleration can be done without the brakes. Making substantial use of this energy regeneration feature extends the car's range by up to 20 percent.

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Chassis, brakes and steering

The MINI E's chassis and suspension set-up has been engineered to deliver the same agility that makes every MINI a pleasure to drive.

Modified suspension settings have been introduced to compensate for the car's greater curbweight (at 1,465kg, it is 260kg heavier than a Cooper S) and different weight distribution. All the other key elements of the MINI chassis remain unchanged.

Like the standard MINI, the MINI E is fitted with electronic power steering (EPS). This saves weight over a traditional hydraulic system and monitors driving conditions, only inputting steering assistance when required.

The front wheels feature inner-vented Cooper S disc brakes measuring 294 millimetres in diameter while the rears measure 259mm. The brake system comes with an electric pump designed specifically for the car.

Anti-lock braking (ABS), Electronic Brake Force Distribution (EBD), and Cornering Brake Control (CBC) are standard on the MINI E, along with a specially calibrated Dynamic Stability Control (DSC) system.

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Safety

The MINI E has already gone through the major phases of product development for mass-produced vehicles and passed numerous crash tests on the way. The MINI E's energy storage unit emerged completely unscathed from all of the crash tests required by US standards, which are especially high.

The lithium-ion batteries are securely sealed and all the high power circuits have been marked, colour-coded and posted with warnings of their presence.

In terms of driving safety, the MINI E features the same comprehensive protection systems as the standard car. These include curtain head airbags, 'intelligent' front airbags, twin side airbags along with electronic safety systems such as Dynamic Stability Control.

Maintenance

The electric drive's high-voltage technology requires that maintenance work be done by qualified personnel using special tools. In the unlikely event of a breakdown, all the cars taking part in the trial are covered by a special recovery service, provided by trained personnel. Technical inspections will take place after 3,000 miles or three months, which is the sooner.

Production in Oxford and Munich

MINI's Plant Oxford builds the entire MINI E vehicle on the standard production line, with the exception of the drive components and the lithium-ion battery. The body units are transferred to a specially equipped manufacturing facility situated on BMW Munich plant premises where the electric motor, battery units, performance electronics and transmission are integrated.