

# BMW at the 2013 Frankfurt International Motor Show (IAA). Contents.



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# 1. BMW at the 2013 Frankfurt International Motor Show (IAA). (Summary)



The present and future of driving pleasure converge in the new models presented by the BMW and BMW i brands at the International Motor Show (IAA) 2013 in Frankfurt am Main. One of the highlights of the world's most important car show this year is the joint premiere of the BMW i3 and BMW i8. The BMW Group's first purely electrically powered vehicle to go into series production and the world's most forward-looking sports car showcase the future focus, universal appeal and broad spread of the BMW i brand. The BMW i3 is the world's first premium car conceived from the ground up to deliver electric mobility and emission-free driving in urban areas. With its eye on maximising efficiency both within the city limits and beyond, the BMW i8 plug-in hybrid combines the dynamic capability of a high-performance sports car with fuel consumption and emissions you would normally expect from a small car. Both models feature a passenger cell made from carbon-fibre-reinforced plastic (CFRP) and BMW eDrive technology that enables them to be driven on electric power alone.

BMW Motorrad, meanwhile, is using the IAA 2013 to present an urban mobility solution already available to customers but which continues to shine a light into the future. The BMW C evolution is the brand's first all-electric motorbike. Conceived for zero-emission journeys through urban areas, the maxi-scooter celebrates its world premiere in Frankfurt. It is fitted with an electric motor and a lithium-ion high-voltage battery, whose qualities are underpinned by the BMW Group's impressive development expertise – also used for BMW i cars – in the area of sustainable drive system technology.

A new chapter in the history of elegantly sporty, two-door BMWs, meanwhile, begins with the world premiere of the BMW 4 Series Coupe at the IAA 2013. The new model embodies the ultimate in aesthetic appeal and driving pleasure in the premium mid-size segment. Likewise setting the pace in its class is the BMW X5, the third generation of which takes to the stage in Frankfurt alongside the new BMW 5 Series models and new BMW X5 M50d, BMW M550d xDrive Sedan and BMW M550d xDrive Touring M Performance Automobiles. BMW is also presenting two concept studies to underline its expertise and creativity – both in the area of drive system technology and in its push into new vehicle segments. The BMW Concept X5 eDrive combines the typical driving characteristics of a Sports Activity Vehicle with the efficiency benefits of a plug-in hybrid drive system. The BMW Concept Active Tourer

Outdoor, meanwhile, demonstrates how a premium compact model's ability to adapt to the varying requirements of sports and leisure activities can be maximised through a well-devised use of space and clever detail solutions.

Also on show at the IAA 2013 are the latest innovations developed under the Efficient Dynamics banner, attractive new Original BMW Accessories and the most recent additions to the BMW ConnectedDrive line-up. The selection of driver assistance systems and mobility services underpinned by intelligent connectivity is now even richer in variety. A number of services tailored specifically to the demands of electric mobility and urban driving have been developed for BMW i automobiles. Added to which, a restructuring of the BMW ConnectedDrive range brings even greater flexibility and convenience to the business of meeting individual customer requirements.

The new products and services can be found at the combined BMW, BMW i, MINI and Rolls-Royce stand in Hall 11, which is located next to the exhibition centre's main entrance. There will also be an opportunity to experience the cars in action, allowing IAA visitors to sample BMW's hallmark driving pleasure up close and in depth from 12 – 22 September 2013.

### **The BMW i8: a new generation sports car.**

The BMW i8 is a 2+2-seater with visionary design and intelligent lightweight construction, which opens the door to both emission-free driving on city roads and sports performance on country roads and motorways. As a new generation sports car, it embodies BMW's hallmark driving pleasure with a new premium character that is strongly defined by sustainability. Its plug-in hybrid system consists of a highly turbocharged three-cylinder BMW TwinPower Turbo petrol engine and BMW eDrive technology in the form of an electric drive system likewise developed by the BMW Group, both of which interact via intelligent energy management.

The 1.5-litre combustion engine develops 170 kW/231 hp and drives the rear wheels of the BMW i8, while the 96 kW/131 hp electric drive sends its power to the front wheels and allows an all-electric range of up to 35 kilometres (22 miles) and a top speed of 120 km/h (75 mph).

### **The BMW i3: zero-emission mobility, customary BMW driving pleasure.**

The BMW i3 is the world's first premium car conceived from the ground up to provide all-electric mobility. Its electric motor develops output of 125 kW/170 hp using power supplied by a lithium-ion battery pack mounted in a low, central position in the car's underbody. Like the extraordinarily light yet extremely rigid CFRP passenger cell, the electric drive system and battery were also developed

and produced by the BMW Group. The BMW i3 weighs just 1,195 kilograms (DIN kerb weight) and offers a range of 130 – 160 kilometres (approx. 80 – 100 miles) in everyday driving. This can be increased to a maximum 300 kilometres (approx. 180 miles) if the two-cylinder range extender combustion engine is specified.

The BMW i3 is based on a new kind of vehicle architecture. The LifeDrive concept underpins the car's visionary form, which is defined by a standalone design language and generous levels of space for all four seats. A signature theme of the BMW i brand is the thread of sustainability running throughout the value chain. For example, the carbon fibres for the passenger cell are manufactured at Moses Lake in the USA using hydro power alone, while the energy required for production of BMW i cars at BMW Plant Leipzig is generated 100 per cent by purpose-built wind turbines.

**BMW 4 Series Coupe: the perfect balance of aesthetic appeal and dynamic capability.**

Perfectly balanced proportions, a low centre of gravity and powerful engines enable the BMW 4 Series Coupe to raise the bar in its segment in terms of aesthetics and dynamics. The individual identity of the two-door model – underlined by the “4” in its nameplate – is reflected both in its design and in its top-quality equipment features. BMW 4 Series Coupe customers can choose from one six-cylinder and two four-cylinder engines at launch, and the Sport Line, Modern Line, Luxury Line and M Sport packages are also available as alternatives to standard specification.

**The new BMW X5: the quintessential Sports Activity Vehicle is more luxurious and innovative than ever.**

The BMW X5 was the world's first Sports Activity Vehicle (SAV) and remains the most successful to this day. The launch of the third-generation model sets a new agenda in its class in terms of driving pleasure, variability and luxury. Among the stand-out characteristics of the new BMW X5 are its enhanced sports performance and reduced fuel consumption, an eye-catching and aerodynamically optimised design, a weight saving of up to 90 kg over a comparably equipped corresponding model from the previous series and a wealth of innovations from BMW ConnectedDrive.

**BMW Concept X5 eDrive: intelligent all-wheel drive meets innovative hybrid technology.**

BMW is also using the IAA 2013 to present a new way of further reducing the fuel consumption and emissions of an SAV. The BMW Concept X5 eDrive combines the familiar brand of driving pleasure provided by the intelligent all-wheel-drive system xDrive and a luxurious ambience with a plug-in hybrid drive

concept that delivers familiar BMW sporting attributes, the ability to hit speeds of up to 120 km/h (75 mph) on electric power alone and average fuel consumption in the EU test cycle of 3.8 litres per 100 kilometres (74.3 mpg imp). The study car's drive system comprises a four-cylinder BMW TwinPower Turbo combustion engine and a 70 kW/95 hp electric motor, likewise developed by the BMW Group.

**BMW Concept Active Tourer Outdoor: clever solutions for driving pleasure and leisure activities.**

Compact exterior dimensions, impressive interior space and clever solutions aimed at enhancing sports and leisure-related functionality define the character of the BMW Concept Active Tourer Outdoor. BMW is using this vehicle concept to introduce the brand's hallmark driving pleasure into a new segment. A bicycle carrier fully integrated into the interior serves the cause of optimum space utilisation. And also breaking new ground is the BMW Concept Active Tourer Outdoor's plug-in hybrid drive technology.

**The new BMW 5 Series: fresh impetus on the road to global success.**

The BMW 5 Series, the world's best-selling car at the premium end of the executive segment, continues along its successful path with modifications to various design details, additional drive system variants and a host of innovations from BMW ConnectedDrive. The new BMW 518d – available in Sedan and Touring form – now marks the entry point to BMW 5 Series ownership, and the BMW 520d xDrive has been added to the line-up of all-wheel-drive models. Elsewhere, the new rear-end design of the luxurious and versatile BMW 5 Series Gran Turismo injects extra elegance into the car's lines and expands its boot capacity by 60 litres.

**BMW C evolution: premiere for zero-emission riding pleasure.**

The IAA also sees BMW Motorrad opening a new chapter in its Urban Mobility project. The BMW C evolution combines riding fun and dynamics with the benefits of a zero-emission vehicle to provide an entirely new experience on two wheels. The brand's first all-electric production model also enriches the maxi scooter segment with its inspirational design and innovative features.

The BMW C evolution is powered by a drivetrain swing arm with a liquid-cooled synchronous electric motor via a toothed belt and ring gearing. The electric vehicle has a continuous output of 11 kW/15 hp, with peak output rising to 35 kW/47.5 hp. It gives the BMW C evolution powerful acceleration and a top speed of 120 km/h (75 mph). The motor draws its energy from a lithium-ion high-voltage battery whose capacity of 8 kWh allows a range of up to 100 kilometres (62 miles) and which can be recharged at a conventional household power socket.



## 2. BMW at the 2013 Frankfurt International Motor Show (IAA). (Long version)

### 2.1 A sports car for a new generation: The BMW i8.

The BMW Group will present a new generation sports car at the 2013 Frankfurt International Motor Show (IAA): the BMW i8. The second model unveiled by the new BMW i brand combines a plug-in hybrid drive system with a passenger cell made from carbon-fibre-reinforced plastic (CFRP) and an aluminium frame for the combustion engine and electric motor, the battery pack and the suspension. With this revolutionary concept and the emotional allure exuded by its aerodynamically optimised body design, the 2+2-seater – which was conceived from the outset as a plug-in hybrid – paves the way for an engagingly dynamic and, at the same time, futuristically efficient take on hallmark BMW driving pleasure. By cementing a place in the sports car segment for the brand's new premium character – strongly defined as it is by sustainability – it also demonstrates the broad spread and universal appeal of the BMW i philosophy. You'll be able to find out more about the BMW i8 at [www.bmwi.bmwgroup.com](http://www.bmwi.bmwgroup.com) once it is unveiled at its world premiere on 10 September.

The plug-in hybrid system of the BMW i8 combines the first highly-turbocharged three-cylinder BMW TwinPower Turbo petrol engine to be fitted in a series-produced model with BMW eDrive technology in the form of an electric drive system likewise developed by the BMW Group. The 1.5-litre combustion engine develops 170 kW/231 hp and drives the rear wheels of the BMW i8. The 96 kW/131 hp electric motor sends its power to the front wheels and allows an all-electric range of up to 35 kilometres (22 miles) and a top speed of 120 km/h (75 mph). The motor draws its energy from a lithium-ion battery which can be charged from a conventional domestic power socket, a BMW i Wallbox or a public charging station. With the overall concept of a plug-in hybrid drive system, precise management of all the car's energy streams and intelligent lightweight design, the BMW i8 represents a new stage in the Efficient Dynamics development strategy.

The combined use of an electric motor and a combustion engine and the specific set-up of the BMW i8 hybrid system to accentuate the properties of the car's rear-wheel drive provide a road-biased all-wheel-drive experience headlined by powerful acceleration and dynamics-focused power distribution through keenly taken corners. In addition to impressive sportiness, the intelligent drive management of the BMW i8 also ensures outstanding efficiency.

Its overall concept, design and drive system technology make the BMW i8 the world's most forward-looking model in the sports car segment. It combines the performance-related attributes of a powerful sports car with fuel consumption and emissions more readily associated with a small car, an inspirationally progressive exterior and interior design, and a DIN kerb weight of less than 1,490 kilograms. The all-encompassing approach of the BMW i brand also includes the extensive use of recycled materials, renewable raw materials and naturally treated materials, alongside extremely resource-efficient production methods.

**The LifeDrive architecture of the BMW i8: greater allure, lower weight, optimised air resistance.**

The BMW i8 was purpose-designed as a plug-in hybrid sports car with agile performance attributes and exceptional efficiency, and features a bespoke version of the LifeDrive architecture developed for BMW i cars. The combustion engine and electric motor, battery pack, power electronics, chassis components and structural and crash functions are arranged together in the aluminium Drive module, while the central element of the Life module is the CFRP passenger cell. The vehicle structure and materials of the 2+2-seater allow a new dimension in weight optimisation. They also give the car an extremely low centre of gravity, at under 460 millimetres, and a virtually 50 : 50 distribution of weight between the front and rear axles, enhancing the agile handling of the BMW i8.

A length of 4,689 millimetres, width of 1,942 millimetres and height of 1,293 millimetres give the BMW i8 typical sports car proportions. Its dynamic character is also reflected in its long bonnet, clearly visible aerodynamic aids, stretched roofline, short overhangs and long, 2,800-millimetre wheelbase. The groundbreaking combination of sporting ability and efficiency is translated into the design of the 2+2-seater with intoxicating élan – and with the signature BMW i design language at the fore.

The BMW i8 boasts a drag coefficient (Cd) of 0.26 and a fine aerodynamic balance. The low-slung bonnet, almost totally blanked off kidney grille, Air Curtains in the front apron, sealed underbody, contoured side skirts, “stream flow” lines of the car's flanks, air ducts between the rear lights and roof frame and diffuser in the rear apron allow the air to be channelled extremely effectively as it hits the car. Precisely defined airflow across all areas of the body provides a balance between air resistance and lift designed to maximise driving dynamics and directional stability.

### **Exterior design: an aesthetic synthesis of dynamic appeal and pioneering technology.**

The design of the BMW i8 body is as groundbreaking as the plug-in hybrid sports car's concept as a whole. Hallmark BMW dynamics, lightweight design and efficiency are all expressed in the car's proportions, lines and surface design. The 2+2-seater is immediately recognisable as a BMW i model and a new generation sports car. The design language developed specifically for BMW i cars and the freedom in terms of body design opened up by the LifeDrive architecture produce an end result which authentically reflects the sporting characteristics of the BMW i8, its innovative premium character and its future-focused technology.

The structure of overlapping and interlocking surfaces – lent additional emphasis by the car's colour concept – also contributes to the unmistakable appearance of the BMW i8. This layering principle allows aerodynamic forms to be wrapped up in a progressively styled package, while powerfully formed wheel arches draw attention to the wide track of the BMW i8. The compact construction distinguishing both the electric motor and combustion engine allows the front and rear sections of the car to be particularly low-slung and thus accentuate the car's dynamically stretched flanks. The doors, which open forwards and upwards like wings, add extra intrigue to the sports car design of the BMW i8.

A signature feature of BMW i cars is the "black belt". On the BMW i8, it emerges in a "V" shape from the bonnet and extends back over the roof into the rear section of the car, where it frames the centre section of the rear apron. At the front end, the black belt is framed by the body-coloured front apron and side panels, while at the rear it is overlapped by the "floating" roof pillars, which extend over the rear lights. Another element of the standalone BMW i design language is the "stream flow" contour of the side window graphic. On the BMW i8, the stream flow also determines the path travelled by the air between the falling roofline and the character line rising through the rear section of the car's flanks towards the rear spoiler lip.

### **Full LED headlights as standard, globally unique laser light available as an innovative option.**

The slim headlights of the BMW i8 team up with the BMW kidney grille to form a horizontal unit emphasising the car's width. The plug-in hybrid sports car is fitted as standard with powerful and energy-efficient full-LED headlights. In their lower section, the light sources are framed by a U-shaped bar into which are integrated the daytime driving lights, sidelights and direction indicators. Meanwhile, the intricately designed rear light clusters feature the



U-shape typical of BMW i cars. All of the lights on the BMW i8 are LEDs as standard.

The BMW i8 is the world's first series-produced vehicle to be available with innovative laser headlights as an option. These lights generate a pure-white, extremely bright light that is pleasant to the eye. The light is created through the conversion of the beams emitted by tiny laser diodes within each headlight. Laser lighting is monochromatic, which means that the light waves all have the same length. They also have a constant phase difference. As a result, laser lighting can produce a near-parallel beam with impressive luminance, which gives it an intensity a thousand times greater than that of conventional LEDs. The beam can also be adjusted extremely precisely. At the same time, the further optimised inherent efficiency of laser lighting means that laser headlights have less than half the energy consumption of even LED headlights, which are already very efficient.

#### **CFRP wheels reduce weight in critical areas.**

The chassis components of the BMW i8 are defined by their weight-minimised construction. The car's standard-fit 20-inch forged aluminium wheels have an aerodynamically optimised, lightweight design. CFRP wheels developed exclusively for the BMW i8 can be specified as an option and allow a further reduction in weight in an area of the car which plays a particularly prominent role when it comes to agility. The use of three-piece wheels made from this extremely lightweight and high-strength material directly reduces unsprung masses and produces a weight saving of three kilograms per wheel.

#### **Interior design: customary BMW driver focus in a progressive ambience defined by dynamics and lightness.**

Future-focused design also dominates the interior of the BMW i8. The driver orientation typical of BMW cockpit design is complemented by progressive elements which highlight the sports car's dynamic flair and light weight. The driver, front passenger and rear passengers sit low down – in traditional sports-car style – in lightweight seats. The standard leather trim extends beyond the seat surfaces to parts of the centre console, instrument panel and interior door panels. The use of leather treated with natural substances, including olive leaf extract as a tanning agent, underlines the sustainable character of the BMW i8 alongside its exclusivity and sporting allure. Exposed CFRP sections of the passenger cell visible around the entry apertures when the doors are opened provide a reminder of the low weight of the BMW i8.

The instrument panel of the BMW i8, with its horizontal lines emphasising the width of the interior and a structure determined by the "layering" principle, creates a light yet powerful impression. The arrangement of the overlapping,

three-dimensional segments is complemented by a contrast-rich colour scheme. The layering approach also finds its way, through dynamically curving lines, into the design of the centre console, which is home to the gearshift lever, the controller for the iDrive operating system, the start/stop button, the eDrive button and the Driving Experience Control switch. The iDrive system's Control Display comes in a freestanding 8.8-inch format. A bespoke sports steering wheel with multifunction buttons and the Navigation system Professional are included as standard in the BMW i8. Also standard is the multifunction instrument display, whose content and presentation formats take their cue from the driving mode selected.

### **Intelligent lightweight design – from the overall concept down to the smallest detail.**

With its combination of the aluminium Drive module and the CFRP passenger cell (Life module), the BMW i8 is also an excellent example of intelligent lightweight design – one of the guiding principles of the Efficient Dynamics strategy. Use of the lightweight high-tech material CFRP, which also offers excellent crash performance, brings weight savings of 50 per cent over steel and around 30 per cent over aluminium. The BMW i8 an unladen weight of less than 1,490 kilograms. The LifeDrive architecture also brings benefits in terms of weight distribution. The battery pack is situated low down in the middle of the vehicle, resulting in a low and central centre of gravity, which improves safety. No other current model of a BMW Group brand has such a low centre of gravity.

The front-rear axle load distribution maximises agility with a near-perfect 50:50 axle load ratio. The compact electric motor, together with the transmission and power electronics, are situated in close proximity to the electrically powered front axle. The highly turbocharged petrol engine, which is located together with its transmission in the rear of the BMW i8, likewise sends its power to the road via the shortest possible route, i.e. through the rear wheels. As a finishing touch to this excellent weight distribution, the lithium-ion battery pack is centrally located in the vehicle, slightly forward of the mid-point. In terms of crash safety, this is an ideal location for the battery, which is integrated in an aluminium housing.

The doors comprise a CFRP inner structure and an aluminium outer skin. This reduces the weight of the door by 50 per cent compared with a conventional design. The intelligent design of the magnesium instrument panel support brings a weight saving of around 30 per cent compared with the BMW 6 Series, for example. In addition, the high structural rigidity of the magnesium support provides a strengthening effect which allows the number of components to be reduced, thereby lowering weight by a further

10 per cent. Innovative foam plastic technology used in the air conditioning ducts brings 60 per cent weight savings over conventional components, while also improving acoustics thanks to its sound-absorbing properties. Moreover, the fact that the power electronics and electric motor are directly connected reduces the amount of wiring required, while partial use of aluminium wiring brings further weight reductions.

The BMW i8 is also the world's first volume-produced vehicle to be equipped with chemically hardened glass. This innovative technology, to date used mainly in Smartphone manufacturing, results in very high strength. The partition between the passenger compartment and boot of the BMW i8 consists of two layers of chemically hardened glass, each of which is just 0.7 millimetres thick, with acoustic sheeting sandwiched between. In addition to excellent acoustic properties, a further advantage of this solution is weight savings of around 50 per cent compared with conventional laminated glass.

**For maximum driving pleasure and efficiency:  
BMW TwinPower Turbo engine and electric motor developed by the  
BMW Group.**

The plug-in hybrid system of the BMW i8, which comprises a BMW TwinPower Turbo engine combined with BMW eDrive technology, offers the best of both worlds: excellent potential for improved efficiency and exciting, sporty driving characteristics. The BMW Group has developed not only the internal combustion engine and electric motor in-house but also the power electronics and the battery. This ensures that all these components offer high product and quality standards, based on the outstanding capabilities of the BMW Group in the field of powertrain research and development.

The revolutionary character of the BMW i8 is emphasised by a further innovation: the use of a new internal combustion engine which is making its debut in this model. The BMW i8 is the first BMW production model to be powered by a three-cylinder petrol engine. This highly turbocharged unit is equipped with latest-generation BMW TwinPower Turbo technology. It is exceptionally compact and develops maximum power of 170 kW/231 hp. The resulting specific output of 113 kW/154 hp per litre of displacement is on a par with high-performance sports car engines and is the highest of any engine produced by the BMW Group.

The new three-cylinder engine derives its typical characteristics from the BMW six-cylinder in-line engines, to which it is closely related and which are noted for their eager power delivery, revving ability and refinement. The three-cylinder's BMW TwinPower Turbo technology comprises a high-performance turbocharging system and direct petrol injection with high-precision injectors

positioned between the valves, along with VALVETRONIC throttle-less load control, which improves efficiency and response thanks to seamlessly variable valve lift control. The three-cylinder unit responds instantly to the slightest touch of the accelerator pedal and soon reaches its maximum torque of 320 Newton metres. Like a six-cylinder engine, the three-cylinder unit is free of first and second order inertial forces. The low roll torque, a typical feature of a three-cylinder design, is further reduced by a balancer shaft.

Its second power source is a hybrid synchronous electric motor specially developed and produced by the BMW Group for the BMW i8. The electric motor develops maximum power of 96 kW/131 hp and produces its maximum torque of around 250 Newton metres from standstill. Typical of an electric motor, responsive power is instantly available when starting and this continues into the higher load ranges. The linear power delivery, which extends right up to the high end of the rpm range, is down to a special motor design principle exclusive to BMW i. BMW eDrive technology refines and improves on the principle of the permanently excited synchronous motor via a special arrangement and size of the torque-producing components. This results in a self-magnetising effect normally confined to reluctance motors. This additional excitation ensures that the electromechanical field generated when current is applied remains stable even at high rpm.

As well as providing a power boost to assist the petrol engine during acceleration, the electric motor can also power the vehicle by itself. Top speed is then 120 km/h (approx. 75 mph). The BMW i8 has a maximum driving range in this emission-free, virtually soundless, all-electric mode of up to 35 kilometres (approx. 22 miles). The motor derives its energy from the lithium-ion battery which is centrally mounted underneath the floor of the vehicle. The model-specific version of the high-voltage battery was developed and produced by the BMW Group. It has a liquid cooling system, delivers a maximum usable capacity of five kilowatt-hours and can be recharged at a conventional household power socket, at a BMW i Wallbox or at a public charging station. A full recharge takes less than three hours at a household power socket and less than two hours at a BMW i Wallbox.

The BMW i8's vehicle concept and powertrain control system mark it out as a progressive, revolutionary sports car. The BMW i8 always achieves the optimal balance between performance and efficiency, whatever the driving situation. Energy for the high-voltage battery can be generated via the electric motor during overrun. Furthermore, when power demands allow, the high-voltage battery is recharged by the electric motor. The high-voltage starter-generator, responsible for starting the engine, can also be used as a generator to charge the battery, the necessary power being provided by the

BMW TwinPower Turbo engine. These processes help to prevent depletion of the BMW i8's battery in order to maintain the electric drive power. The all-electric driving range is sufficient to cover most urban driving requirements. Out of town, the BMW i8 offers impressively sporty performance which is also very efficient thanks to the power-boosting support for the petrol engine from the electric motor. With such versatility, the BMW i8 belongs to a new generation of sports cars which unites exciting performance with cutting-edge efficiency – to enhance both driving pleasure and sustainability.

The rear wheels of the BMW i8 are driven by the petrol engine via a six-speed automatic transmission. The front wheels are driven by the electric motor via a two-stage automatic transmission. Combined maximum power and torque of 266 kW/362 hp and 570 Newton metres respectively provide all-wheel-drive performance which is as dynamic as it is efficient. The BMW i8's intelligent powertrain control system ensures perfect coordination of both power sources. The variable power-sharing between the internal combustion engine and the electric motor makes the driver aware of the sporty temperament of the BMW i8 at all times, while at the same time maximising the energy efficiency of the overall system. The BMW i8 has an electronically controlled top speed of 250 km/h (155 mph), which can be reached and maintained when the vehicle operates solely on the petrol engine. Variable front-rear power splitting in line with changing driving conditions makes for excitingly dynamic cornering. On entering the corner, the power split is biased towards the rear wheels to improve turning precision. For more vigorous acceleration out of the corner, the powertrain controller returns to the default split as soon as the steering angle becomes smaller again.

### **Five driving modes deliver efficiency and performance characteristics as desired – at the touch of a button.**

The BMW i8 offers the driver unusual scope to adjust the drive and suspension settings of the vehicle in order to adapt the driving experience to his or her individual preferences. As well as the electronic gear selector for the automatic transmission, the driver can also use the Driving Experience Control switch – a familiar feature of the latest BMW models – or, exclusively to the BMW i8, the eDrive button. It gives the driver five operating modes to choose from: D for automated gear selection in COMFORT and ECO PRO mode, SPORT mode and purely electric driving in eDrive mode, likewise with a choice of COMFORT and ECO PRO mode.

The Driving Experience Control switch on the centre console offers a choice of two settings. On starting, COMFORT mode is activated, which offers a balance between sporty performance and fuel efficiency, with unrestricted access to all convenience functions. Alternatively, at the touch of a button,

ECO PRO mode can be engaged, which, on the BMW i8 as on other models, supports an efficiency-optimised driving style. The powertrain controller coordinates the cooperation between the petrol engine and the electric motor for maximum fuel economy. On overrun, the intelligent energy management system automatically decides, in line with the driving situation and vehicle status, whether to recuperate braking energy or to coast with the powertrain disengaged. At the same time, ECO PRO mode also programs electrical convenience functions such as the air conditioning, seat heating and heated mirrors to operate at minimum power consumption – but without compromising safety. The maximum driving range of the BMW i8 on a full fuel tank and with a fully charged battery is over 500 kilometres (310 miles) in COMFORT mode.

SPORT mode offers sequential manual gear selection and at the same time switches to very sporty drive and suspension settings. In SPORT mode, the engine and electric motor deliver extra-sharp performance, accelerator response is faster and the power boost from the electric motor is maximised. And to keep the battery topped up, SPORT mode also activates maximum energy recuperation during overrun and braking. If the battery is recharged using kinetic energy, the electric motor's generator function switches to a more powerful setting. At the same time, gear change times are shortened and an extra-sporty setting is selected for the standard-fitted Dynamic Damper Control.

The BMW i8's ECO PRO mode can also be used during all-electric operation. The vehicle is then powered solely by the electric motor. Only if the battery charge drops below a given level, or under sudden intense throttle application (kickdown), is the internal combustion engine automatically activated.

### **High-quality chassis technology, DSC and Dynamic Damper Control as standard.**

The high-end chassis and suspension technology of the BMW i8 is based on a double-track control arm front axle and a five-link rear axle, whose aluminium components and geometry are specially configured for intelligent weight savings. The electromechanical power steering offers easy manoeuvring in town and typical sports car-style high-speed steering precision. Also standard is Dynamic Damper Control: the electronically operated dampers change their characteristics according to the selected driving mode to deliver the desired vehicle dynamics.

The DSC (Dynamic Stability Control) stability system includes the Anti-lock Braking System (ABS), Cornering Brake Control (CBC), Dynamic Brake Control (DBC), Brake Assist, Brake Standby, Start-Off Assistant, Fading

Compensation and the Brake Drying function. The push button-activated Dynamic Traction Control (DTC) system raises the DSC thresholds, allowing some controlled drive wheel slippage for easier start-off on snow or loose ground, or for extra-dynamic cornering.

### **Fully digital instrument display and proactive drive management.**

The specially adapted version of the fully digital instrument display fitted in the BMW i8 shows the car's speed and driving status information in a format and colour selected to suit the driving mode currently engaged. SPORT mode brings traditional circular instruments for speed and rpm readouts. In COMFORT mode a "powermeter" display replaces the rev counter to keep the driver up to speed on what the electric motor is up to, while ECO PRO mode adds an efficiency display, which encourages drivers to maximise fuel efficiency through their use of the accelerator.

The standard-fitted Navigation system Professional links up with a version of the proactive drive management system likewise specially developed for the BMW i8. When the route guidance function is activated, the drivetrain management is configured to ensure the electric motor is employed as extensively and wisely as possible from an efficiency point of view. The system analyses the route in full and sets up the drivetrain management, including energy recuperation strategy, to run on purely electric power over low-speed sections of the journey, in particular. In so doing, it ensures, for example, that the battery has sufficient capacity to cover the final stage of a longer journey through a built-up area in all-electric mode.

### **BMW ConnectedDrive: innovative driver assistance systems and BMW i-specific mobility services.**

The driver assistance package available as an option for the BMW i8 includes High Beam Assistant, a rear view camera, Surround View, Speed Limit Info including No Passing Info display, and Collision Warning with pedestrian recognition and braking function. The cruise control system with braking function and Park Distance Control with sensors at the front and rear of the car are all part of standard specification. The BMW i8 is also equipped as standard with an integrated SIM card, which enables the intelligent connectivity required to use the innovative mobility services from BMW ConnectedDrive, some of which have been specially developed for BMW i cars. It also introduces navigation services specially developed to enhance electric mobility alongside familiar features, including the Concierge Services information facility and the Intelligent Emergency Call function. Moreover, drivers can use the BMW i Remote app to share information with their car at any time using their Smartphone. For example, they can use their phone to control the charging process for the high-voltage battery and, while

that is happening, also oversee the advance preparation of the vehicle before a journey.

The navigation system in the BMW i8 also comes with a dynamic range display specially designed for the all-electric driving mode, which supplies drivers with exceptionally precise, up-to-date and reliable information on whether there is sufficient charge to reach their destination and, if so, how much power will remain at the end of the journey. All the factors affecting electric range are considered in the calculation process. The range readout, presented in the form of a dynamic spidergram on the navigation map in the central information display, is extremely clear.



## 2.2 A new era in electric mobility: The BMW i3.



The world, and with it the sphere of personal mobility, is in a state of ecological, economic and social upheaval. Global developments such as climate change, dwindling resources and increasing urbanisation call for fresh solutions. BMW i is finding those solutions. The brand stands for visionary vehicle concepts, inspiring design and a new understanding of premium that is strongly defined by sustainability.

In the BMW i3 – the first series-produced model by BMW i – zero-emission mobility in a premium car package proves to be a recipe for pure driving pleasure. The first BMW Group model running on electric power alone offers customers totally new and groundbreaking ways to experience driving pleasure, sustainability and connectivity on city roads. The visionary design of the BMW i3 showcases both BMW's customary sporting capability and the efficiency of a four-seater with authentic clarity. Its innovative vehicle concept, including a passenger compartment made from carbon-fibre-reinforced plastic (CFRP), combines lightness, stability and safety with extraordinary spaciousness. Meanwhile, the driver assistance systems and mobility services from BMW Connected Drive and the 360° ELECTRIC services – all developed specially for BMW i – turn zero-emission urban mobility into a compelling everyday driving experience.

The electric motor powering the BMW i3 generates a maximum output of 125 kW/170 hp and peak torque of 250 Newton metres (184 lb-ft). Its instantaneous power flows to the rear wheels via a single-speed transmission. The motor sources its energy from lithium-ion storage cells integrated into the car's underfloor section. The significantly lower centre of gravity of the i3 – the result of the low, central placement of the battery units – and even weight distribution make an additional contribution to the car's agile handling. The battery gives the car a range in everyday conditions of 130 – 160 kilometres (approx. 80 – 100 miles) when fully charged from a conventional domestic power socket, BMW i Wallbox or public charging station.

### **BMW i: a new brand, a new understanding of premium.**

Already a globally successful manufacturer of premium vehicles, the BMW Group is also set to play a leading and groundbreaking role in shaping the face of personal mobility in the future. The research and development work carried out since 2007 as part of project i has laid the foundations for

sustainable mobility solutions influenced by environmental, economic and social change around the world. The BMW Group is pursuing an integrated approach, as embodied by the new BMW i brand, in its drive to achieve the necessary balance between individual needs and the global mobility requirements of the future. BMW i is committed to creating innovative vehicles and mobility services with a premium character that is defined squarely in terms of sustainability. This vision is about to become reality: the BMW i3, the first series-produced model from the new brand, offers customers emission-free mobility in a premium car package.

The BMW i3 is the world's first premium car designed from the ground up to be powered by an electric drive system. The result is hallmark BMW driving pleasure, delivered with zero emissions and an engaging intensity unmatched by any other electrically powered vehicle. Like the i3's unique vehicle architecture – based around the LifeDrive structure, with its CFRP passenger cell and aluminium module encompassing the powertrain, battery and chassis – the electric motor, power electronics and high-voltage lithium-ion battery have been developed independently by the BMW Group under its BMW eDrive programme. This ensures that BMW's time-honoured Sheer Driving Pleasure is also a central feature of the BMW i3.

The use of lightweight, durable and crash-safe CFRP on this scale is unique in volume car production. And thanks to its weight-reducing properties, the BMW i3 is no heavier than a comparable vehicle with a conventional drive system and full fuel tank. Its DIN kerb weight stands at 1,195 kilograms – including a high-voltage battery that allows the driver to enjoy both sporting performance attributes and an operating range sufficient for everyday use.

### **Visionary design as an expression of agility, innovation and sustainability.**

The LifeDrive architecture and BMW eDrive drive technology allow an exceptional degree of freedom in terms of design. Indeed, the appearance of the BMW i3 is as memorable as the feeling of space and driving experience on board. A body measuring 3,999 millimetres in length, 1,775 mm wide and 1,578 mm in height gives the BMW i3 distinctive proportions whose dynamism and compactness underline the car's agility in urban use. The short overhangs of the BMW i3 are also a clear pointer to its nimble driving characteristics. Large glass surfaces imbue the i3 with a compelling lightness and, together with its visible carbon structures, provide a window into the car's low-weight design.

The use of the light yet extremely rigid material CFRP in the construction of the passenger compartment allows it to dispense with B-pillars, making access

to the two rows of seats extremely easy. One of the signature features of BMW i models is their “black belt”, which extends from the bonnet over the roof and into the rear of the car. Another product of the stand-alone BMW i design language is the “stream flow” sweep of the side contours, which allows larger side window surfaces at the rear and thereby magnifies the generous feeling of space inside the car.

The front-end design of the BMW i3 is defined by a powerfully contoured apron, by the distinctive interpretation of the BMW kidney grille as an enclosed element, and by headlights bordered with U-shaped LED light units. The likewise U-shaped LED rear lights are integrated as “floating” elements into the large, fully glazed tailgate.

Opposing “coach” doors, coupled with the absence of B-pillars and the centre tunnel normally found in conventional vehicles, form the basis for the unusually high degree of spaciousness and freedom of movement inside the BMW i3 (given its compact exterior dimensions). The lines and surface sculpting of the cockpit and door trim accentuate the impression of lightness and contemporary functionality. The mixture of naturally treated leather, wood, wool and other renewable and recycled raw materials ensures that the premium character of the BMW i3 – complemented by the extra allure of impressive sustainability – is something you can both see and feel.

The BMW i3 is fitted with lightweight seats featuring extremely slim backrests. A slightly raised seating position optimises the driver’s view over city traffic. The gear selector and start/stop switch share a control element projecting from the steering column. Both the instrument cluster and the iDrive operating system’s 10.2-inch Control Display come in freestanding display form.

The BMW i3 can be ordered with exterior paintwork in a choice of two non-metallic and four metallic colours, all of which present an eye-catching contrast to the black belt. The interior can be tailored to the customer’s personal style with the Loft, Lodge and Suite equipment lines available as alternatives to the standard Atelier trim. Standard equipment for the BMW i3 includes the iDrive system and Radio Professional, telephone hands-free facility, air conditioning, Park Distance Control with rear-mounted sensors, stationary climate control and a variable luggage compartment. Also standard are onboard connectivity via an integrated SIM card and extensive Smartphone integration via USB and Bluetooth, including the BMW i Remote App. Additional options include a choice of navigation systems, Adaptive LED Headlights, an electrically operated glass roof, automatic climate control, heated seats, Comfort Access and a host of BMW ConnectedDrive features. Also available as options are a

range extender and driver assistance systems such as Driving Assistant Plus, Parking Assistant, a rear view camera and Speed Limit Info.

### **LifeDrive architecture and BMW eDrive: a commitment to electric driving pleasure.**

The familiar sense of driving pleasure embodied by the BMW i3 is the result of a rigorously implemented overall concept, part of which has involved creating the optimum balance of weight, performance and range for urban mobility. The key elements here are the LifeDrive architecture and BMW eDrive technology.

The use of lightweight CFRP for the passenger cell cancels out the extra weight contributed by the lithium-ion battery, while the low, central positioning of the battery pack enhances the car's agility thanks to perfectly balanced 50 : 50 weight distribution. Additionally, the electric motor mounted in close proximity to the driven rear axle offers unique performance characteristics for this type of drive system as well as providing unbeatable traction. The standard 19-inch forged light-alloy wheels of the BMW i3 are ultra-lightweight yet also boast outstanding torsional stiffness. The wheels are fitted with low rolling resistance tyres in 155/70 R19 format, their bespoke, relatively narrow dimensions providing an ideal combination of lower drag and a contact area designed for dynamic cornering. Customers can order 20-inch light-alloy wheels as an option.

The driving characteristics of the BMW i3 are dominated by its manoeuvrability – a direct response to the demands of city driving. The instantaneous power delivery of the electric motor, allied to the car's stiff suspension set-up, precise steering and impressively small turning circle (9.86 metres), produces a typically BMW take on electric mobility. The electric motor generates output of 125 kW/170 hp and peak torque of 250 Newton metres (184 lb-ft), which is on tap from the word go. The motor weighs just 50 kilograms and boasts power density and responsiveness unprecedented in the world of electric mobility. The specific construction of the hybrid synchronous electric motor, developed exclusively for the BMW i3, maintains a linear flow of power into the higher reaches of the rev range. The BMW i3 sprints from 0 to 60 km/h (37 mph) in a mere 3.7 seconds and 0 to 100 km/h (62 mph) in 7.2 seconds.

The single-pedal control concept in the BMW i3 – configured by the BMW Group's drive system development engineers – also contributes to the engaging driving experience. Recuperation mode is activated the moment the driver takes his foot off the accelerator. The electric motor switches from drive to generator mode, feeding power into the lithium-ion battery. At the same time, it generates a precisely controllable braking effect. This recuperation is speed-sensitive, which means the car "coasts" with maximum efficiency at high speeds and generates a strong braking effect at low speeds.

The lithium-ion battery enables the BMW i3 to achieve a range of 130 to 160 kilometres (approx. 80 – 100 miles) in everyday driving. This rises by around 20 kilometres (12 miles) in ECO PRO mode and by the same distance again in ECO PRO+ mode. If desired, the BMW i3 is also available with a range-extender engine, which maintains the charge of the lithium-ion battery at a constant level while on the move as soon as it dips below a specified value. This role is performed by a 650 cc two-cylinder petrol engine developing 25 kW/34 hp and mounted immediately adjacent to the electric motor above the rear axle. The range extender increases the car's maximum range in day-to-day driving to around 300 kilometres (approx. 180 miles).

### **Optimal safety: protection in all situations.**

The horizontally split LifeDrive architecture, consisting of two separate, independent modules, is similar in principle to a body-on-frame design. While the aluminium Drive module – the chassis – provides the vehicle's sturdy foundation, and incorporates the battery, the drive system and the basic structural and crash functions, the Life module consists mainly of a high-strength, ultra-lightweight CFRP passenger cell.

The high-strength passenger cell, in conjunction with intelligent distribution and absorption of impact forces, provide optimal standards of occupant protection. Even in a 64 km/h (40 mph) offset frontal impact, the extremely rigid material of the passenger cell ensures that the occupant survival space is not compromised, while aluminium crash structures in the front and rear of the Drive module provide additional protection. As a result, deformation of the body in an impact is actually less than for a comparable sheet-steel body. In a pole impact and side impact, the CFRP body demonstrates exceptional energy-absorbing capabilities. Despite the high impact forces and the fact that they are concentrated in relatively small areas, the material suffers only minor deformation. These outstanding qualities provide optimal protection not only for passengers but also for the high-voltage battery. In the side impact test, pole penetration does not extend as far as the battery.

### **The world's first fully networked electrically powered car, courtesy of BMW ConnectedDrive.**

The BMW i3 is the world's first fully networked electrically powered car. No other model boasts such far-reaching exchange of information between the vehicle, its driver and the outside world. A SIM card fitted as standard in the BMW i3 is the key that unlocks the BMW ConnectedDrive services – in their recalibrated 2013 guise – available to the new electric model. For example, it introduces navigation services specially developed to enhance electric mobility alongside familiar features including the Concierge Services information facility and the Intelligent Emergency Call function. Moreover, drivers can use the

BMW i Remote app to share information with their car at any time using their smartphone. The pedestrian navigation function guides the driver from parking place to final destination and back, while BMW ConnectedDrive also offers unique intermodal route guidance as a world first, which incorporates local public transport connections into journey planning. The aim of this intelligent networking is to enable maximum driving pleasure in a car emitting zero local emissions.

The BMW ConnectedDrive services specifically designed for BMW i focus on the areas of navigation and energy management. The Range Assistant is engaged both for route planning and during journeys already under way. If the destination programmed into the navigation system is beyond the car's range, the system suggests switching to ECO PRO or ECO PRO+ mode and calculates a more efficient route. If the driver needs to charge the battery at a public charging station, a list of available stations in the area is displayed. The navigation system of the BMW i3 also comes with a dynamic range display, which supplies drivers with exceptionally precise, up-to-date and reliable information on whether there is sufficient charge to reach their destination and, if so, how much power will remain at the end of the journey. All the factors affecting range are considered in the calculation process, which is carried out on a BMW server and sent to the navigation system via the SIM card installed in the car. The range readout, presented in the form of a spidergram on the navigation map in the central information display, is extremely clear.

The link-up between driver and car also enters a new dimension in the BMW i3. The BMW ConnectedDrive Remote app for BMW i enables smartphone access to useful vehicle data for journey planning. If the BMW i3 is hooked up to a charging station or the BMW i Wallbox, the supply of energy can be controlled via smartphone, while the air conditioning and heating function for the high-voltage battery pack can also be activated remotely. In addition, customers can use their smartphone to send destinations to their car's navigation system. The app also shows the driver charging stations (both available and in use) and can establish if the car has sufficient power remaining to reach them. The car's range limit display on the smartphone screen replicates that provided by the car's navigation system. The BMW i3 is also available with an array of other innovative BMW ConnectedDrive driver assistance systems developed specifically to enhance convenience and safety in urban conditions.

The Driving Assistant Plus option comprises Collision Warning with braking function (which responds to both moving and stationary vehicles ahead as well as to pedestrians) and Active Cruise Control with Stop & Go function. In addition to giving visual and audible warnings, the system is also able to brake

the vehicle automatically if required, with up to maximum stopping power. The Parking Assistant – a further option – performs steering manoeuvres at the same time as controlling the accelerator, brake and gear selection, enabling fully automatic parking of the BMW i3 in a space parallel to the road. To supplement the standard Park Distance Control (PDC) with rear-mounted sensors, a rear view camera is also available for the BMW i3. Further driver assistance systems are the Traffic Jam Assistant and Speed Limit Info.

**Integrated approach: 360° ELECTRIC provides an all-encompassing energy supply and mobility solution.**

The aim in determining the range of the BMW i3 was to ensure that customers could cover their typical energy needs by charging the car twice or three times per week. The studies carried out as part of project i – involving more than 1,000 participants and conducted over some 20 million kilometres (approx. 12.5 million miles) – revealed that the average daily distance covered was around 45 kilometres (28 miles). Customers can charge their cars using either the wallbox supplied by BMW i or a conventional domestic power socket. BMW i offers an extensive range of products and services in its 360° ELECTRIC package designed to meet all individual customer needs for energy supply and journey planning. The spectrum of services ranges from the installation of the BMW i Wallbox in the customer's garage and special renewable energy supply offers, to the charging card for user-friendly access to the public charging infrastructure and additional assistance services from BMW ConnectedDrive. If the BMW i3 concept fails to meet mobility requirements in a specific situation, 360° ELECTRIC provides flexible mobility solutions including alternative vehicles from the BMW and DriveNow ranges.

**New sales models in the personal mobility sector.**

BMW i stands for a new approach to personal mobility. In selected markets, sales of BMW i products and services will be handled via an innovative multi-channel sales model. In addition to dealerships, this model will also comprise a mobile sales team, a Customer Interaction Centre (CIC) and Internet sales. All the new platforms are fully interlinked. Whichever sales channel a customer chooses, and regardless of whether they buy or lease the vehicle, their contract is always with BMW AG and not with the dealer, as would normally be the case. At launch, it is expected that more than 10 per cent of European BMW dealers will also be handling sales of BMW i models.

**Sustainability throughout the value chain.**

The revolutionary character of the BMW i3 is based on an overall concept which has been systematically designed from the ground up to provide sustainable mobility, and incorporates an unusually large number of technical features geared towards maximum efficiency. The new concept in premium

mobility embodied by BMW i – “next premium” – is, however, not just focused on the vehicle itself. When it comes to the choice of materials, the production process, the supply chain and recycling, the BMW i3 likewise sets unrivalled standards for sustainability in the automotive industry.

The BMW Group production network also builds the BMW i3's electric motor and battery. At its Dingolfing and Landshut plants in Lower Bavaria, the BMW Group has created a “competence network” for electric mobility. The BMW plant in Dingolfing produces the battery, the transmission and the aluminium Drive module structure, while the BMW Landshut plant produces CFRP components for the Life module, plastic exterior parts, castings and the cockpit of the BMW i3.

The lightweight design strategy specially developed for BMW i models makes extensive use of the lightweight, corrosion-proof and crash-resistant high-tech material CFRP. CFRP components are around 50 per cent lighter than corresponding steel components with comparable properties. In this field, too, the BMW Group is breaking new ground – both in the use of this innovative material and in its manufacture and processing.

### **Sustainability at every stage – including production.**

The production of the BMW i3 sets new standards in environmental protection and consumes around 50 per cent less energy and around 70 per cent less water in comparison with the current average figures for production in the BMW Group, which are already extremely efficient. All the electricity used to produce the BMW i models at the Leipzig plant is wind-generated and therefore 100 per cent renewable. This is the first time an automobile manufacturing plant in Germany has installed wind turbines on site to directly power production. Likewise, all of the energy used in carbon fibre production in Moses Lake is entirely derived from renewable, locally generated hydroelectric power and is therefore completely carbon-free. BMW i is thus achieving the goal it envisaged at the outset: compared to the World Green Car of the Year 2008 – the BMW 118d – the BMW i3's carbon footprint is around a third smaller. And if the customer runs the BMW i3 on power generated from renewable sources, its performance is 50 per cent better again.



## 2.3 Aesthetics in motion: The BMW 4 Series Coupe.



The new BMW 4 Series Coupe heralds the dawn of a new coupe era at BMW. Launched as the fourth generation of BMW's sporty mid-size Coupe, the new BMW 4 Series Coupe embodies the very essence of aesthetic appeal and dynamics in the premium segment. Its stylistic features carry the promise of a powerful presence on the road, stand-out dynamic ability and driving pleasure in abundance. Indeed, the new BMW 4 Series Coupe represents a paragon of balanced proportions and the final chapter in a story of development. The "4" in its title headlines this new era for the Coupe and emphasises not only its stand-alone design, but equally an even greater technical differentiation from its BMW 3 Series cousins, something that can also be seen in new premium features such as the optional full LED headlights.

The new BMW 4 Series Coupe is visibly larger in width and wheelbase than the outgoing BMW 3 Series Coupe, and its dynamically stretched coupe silhouette sits considerably lower to the road. This, together with its BMW-typical short overhangs, long bonnet and set-back passenger compartment with flowing roofline, lends the BMW 4 Series Coupe impeccable balance. The car's striking front end – with its characteristic BMW design features, such as the double-kidney grille, twin circular headlights and a large air intake in the front apron – is keen to display its family ties with the BMW 3 Series. However, the more sporting interpretation of the BMW 4 Series Coupe also underlines its dynamic convictions. A new element of the BMW 4 Series Coupe are the Air Breathers, positioned rearwards of the front wheel arches to reduce drag in this area. The Coupe's muscular wheel arches and wide track make a particularly prominent contribution to the hunkered-down design of the rear, with its prominent horizontal lines.

### **Individual equipment lines for the interior and exterior.**

The interior of the BMW 4 Series Coupe presents a stylish fusion of sporting allure and exclusivity. All the controls central to driving are arranged ergonomically around the driver and give him or her optimum access to all functions. The doors are designed so that all the lines converge towards the rear, pulling the focus of the interior clearly towards the front. In the rear compartment, contoured seats underline the sporting credentials of the BMW 4 Series Coupe. Recessed head restraints and broad, continuously moulded side supports give the rear bench the appearance of two individual seats. High-grade material combinations and unbeatable finish quality accentuate the

premium ambience of the new BMW 4 Series Coupe. Customers can choose from three equipment combinations and an M Sport package as alternatives to standard specification. The Sport Line, Modern Line and Luxury Line packages allow visible individualisation of the car's exterior and interior appearance.

### **Driving dynamics from the top drawer.**

The defining ingredients in the involving driving experience laid on by the new BMW 4 Series Coupe are its impressive driving dynamics and assured handling properties. The BMW engineers have succeeded in making key improvements in areas such as steering accuracy, precision and agility, as well as honing, further still, the instincts of the new BMW 4 Series Coupe as an unadulterated driving machine. Sophisticated chassis technology, torque steer-free Electric Power Steering, 50:50 weight distribution, a programme of fine-tuning in the wind tunnel and an innovative lightweight construction concept gave them the tools to achieve their aims.

The new BMW 4 Series Coupe has a longer wheelbase, wider track and lower ride height than the BMW 3 Series Coupe it replaces. Its lower suspension brings the car's centre of gravity down to below 500 millimetres, giving it the lowest centre of gravity of any car in the current BMW model line-up. As a result, the new BMW 4 Series Coupe is one of the sportiest series-produced cars in the BMW range and sets new dynamic standards in the segment.

### **One six-cylinder and two four-cylinder engines available from launch.**

The sporting two-door model will be available from launch powered by the following engines: the six-cylinder in-line petrol engine in the BMW 435i Coupe, the four-cylinder petrol unit for the BMW 428i Coupe and the four-cylinder diesel for the BMW 420d Coupe. All the engines work using the latest BMW TwinPower Turbo technology and cover an output spectrum stretching from 135 kW/184 hp to 225 kW/306 hp. These state-of-the-art engines not only imbue the BMW 4 Series Coupe with outstanding acceleration and elasticity, they also join forces with the car's intelligent lightweight construction concept to deliver further improvements in driving dynamics and lower fuel consumption.

### **Six-speed manual gearbox or eight-speed Sports automatic.**

The power from the engines is sent to the rear wheels via a six-speed manual gearbox as standard. BMW will also fit all the engine variants – as an option – with an eight-speed Sports automatic gearbox, which allows the driver to change gear manually as well using shift paddles on the steering wheel. The two petrol-engine model variants can be specified from launch, as an option, with the BMW xDrive intelligent all-wheel-drive system.

### **BMW EfficientDynamics.**

The driving pleasure available on board the new BMW 4 Series Coupe is a product of outstanding economy as well as sporting dynamics. The force behind this talent for fuel saving is the BMW EfficientDynamics development strategy, whose fruits can be found in almost every area of the new model. In addition to the petrol and diesel engines, with their optimised fuel economy, the car's intelligent lightweight construction concept and honed aerodynamics – headlined by the Air Curtains and Air Breathers – also help to maximise efficiency. The BMW 4 Series Coupe may be set up to specialise in dynamic excellence, but other technological features, such as the Auto Start Stop function, Brake Energy Regeneration, Optimum Shift Indicator and on-demand operation of ancillary units, do their bit to ensure it impresses with low fuel consumption and emissions, too. Indeed, ECO PRO mode gives the car the potential to cut fuel use by as much as 20 per cent. In conjunction with the optional automatic transmission, the BMW 4 Series Coupe now also features a coasting mode for the first time. Another innovation is the Proactive Driving Assistant.

### **BMW ConnectedDrive.**

The new BMW 4 Series Coupe deploys a unique combination of driver assistance systems and mobility services (available as standard or as an option under the BMW ConnectedDrive banner) to set the benchmark in terms of safety, comfort and infotainment. Among the highlights are a new generation of the Navigation System Professional, which offers extra capability, sharper graphics and 3D elements for the map display, the full-colour BMW Head-Up Display, Driving Assistant Plus, which warns the driver of a potential collision with a pedestrian, the intelligent, glare-free LED High Beam Assistant, Active Protection with Attention Assistant and the latest development stage of the Active Cruise Control with Stop & Go function. As far as infotainment is concerned, extremely efficient interface technology enables the integration of smartphones and numerous Bluetooth office functions. The latter now also offer the driver the services of a dictation function with full speech recognition.



## 2.4 The world's most successful Sports Activity Vehicle sets new standards for driving pleasure, luxury and innovation: The new BMW X5.

The BMW X5 – founder of the Sports Activity Vehicle segment and, with more than 1.3 million units sold since the launch of the first model generation, the best-selling vehicle in its class worldwide – is entering a new chapter in its successful history. The third-generation X5 sees BMW once again setting the benchmark for powerful design, spaciousness and luxury in the interior, versatility, driving pleasure, efficiency and innovative equipment features. The new BMW X5 offers customers an assured all-round package equipped to meet the most exacting and varied demands. Owners keen to make the configuration of the exterior and interior a little more individual can vary the car's basic equipment with the M Sport package and Pure Experience and Pure Excellence “design worlds”. The defining features of the new BMW X5's onboard experience are an exclusive interior ambience with luxurious design, high-quality materials and innovative comfort-enhancing functions.

The car's intelligent all-wheel-drive system, BMW xDrive (standard on all model variants except the BMW X5 sDrive25d), can be complemented by Dynamic Performance Control as part of the optional Dynamic and Professional adaptive suspension packages. The Dynamic adaptive suspension package also includes Dynamic Drive active roll stabilisation for a targeted improvement of the car's sporty handling attributes. There is also the option of the Comfort active suspension package, which provides further enhanced ride comfort thanks to air suspension at the rear axle and Dynamic Damper Control. Adaptive M suspension, available as part of the M Sport package, also includes Dynamic Damper Control and rear-axle air suspension as well as specifically sports-oriented suspension tuning. The Professional adaptive suspension package, meanwhile, combines the features of Comfort and Dynamic. This choice allows drivers to select noticeably enhanced comfort or hallmark BMW sporting capability as desired.

The selection of engines available from launch comprises a V8 unit producing 330 kW/450 hp for the BMW X5 xDrive50i and the 190 kW/258 hp six-cylinder in-line diesel earmarked for the BMW X5 xDrive30d. They are joined by an M Performance Automobile in the shape of the BMW X5 M50d. Output boosted by 10 per cent over its predecessor allows the new BMW X5 xDrive50i to sprint from 0 – 100 km/h (62 mph) in just 5.0 seconds. At the same time, its average fuel consumption in the EU test cycle has been cut by 16 per cent to 10.4 – 10.5 litres per 100 kilometres / 27.2 – 26.9 mpg imp (CO<sub>2</sub> emissions:

242 – 244 g/km). The new BMW X5 xDrive30d accelerates from 0 to 100 km/h (62 mph) in 6.9 seconds yet posts EU average fuel consumption of 6.2 litres per 100 kilometres (45.6 mpg imp) and CO<sub>2</sub> emissions of 162 – 164 g/km (fuel consumption and CO<sub>2</sub> emissions depending on the tyre format specified). A tri-turbo six-cylinder in-line diesel engine developing 280 kW/381 hp powers the new BMW X5 M50d from 0 to 100 km/h (62 mph) in 5.3 seconds. Its average fuel consumption in the EU test cycle stands at 6.7 litres per 100 kilometres (42.2 mpg imp), to go with CO<sub>2</sub> emissions of 177 g/km. All the engines available for the new BMW X5 link up as standard with an eight-speed automatic gearbox. The BMW X5 M50d is equipped with an extremely fast-shifting eight-speed sports automatic and steering wheel shift paddles. The BMW X5 xDrive35i (225 kW/306 hp) and BMW X5 xDrive40d (230 kW/313 hp) will be added to the range in December 2013. They will be joined at the same time by the 160 kW/218 hp BMW X5 xDrive25d (fuel consumption: 5.9 l/100 km / 47.9 mpg imp, CO<sub>2</sub> emissions: 155 g/km) and the BMW X5 sDrive25d, which records average fuel consumption of just 5.6 litres per 100 kilometres (50.4 mpg imp) and CO<sub>2</sub> emissions of 149 g/km (provisional figures, according to the EU test cycle).

BMW EfficientDynamics allows all variants of the Sports Activity Vehicle to combine enhanced performance with reduced fuel consumption and CO<sub>2</sub> emissions. The increases in efficiency over the predecessor model have been achieved through measures including intelligent lightweight design – which generates a weight saving of as much as 90 kg over a comparably equipped corresponding model from the previous X5 generation – and optimised aerodynamic properties, which give the new BMW X5 xDrive30d, for example, a class-leading drag coefficient (Cd) of 0.31. All models fulfil the EU6 exhaust stipulations as standard.

The range of BMW ConnectedDrive features is now also larger than ever and includes innovative driver assistance systems (such as Driving Assistant Plus), some of which are unique among the competition. The Sports Activity Vehicle also impresses with its outstanding practicality, provided by a standard 40:20:40 split/folding rear seat backrest, load capacity rising from 650 to a maximum 1,870 litres and an optional third row of two additional seats. The luxurious interior ambience is headlined by high-quality and beautifully finished materials and options such as rear comfort seats and the lighting package. The latter includes the innovative ambient lighting design feature, whose LED units illuminate the interior to particularly atmospheric effect in a choice of colours: blue, white or orange.

## **2.5 BMW eDrive meets BMW xDrive – an innovative combination designed to deliver efficient driving pleasure: The BMW Concept X5 eDrive.**



The new BMW X5 raises efficiency to another new level in the world of the luxurious Sports Activity Vehicle (SAV). BMW is using the 2013 Frankfurt International Motor Show (IAA) to present the logical next step towards landmark efficiency in the SAV segment. The BMW Concept X5 eDrive combines the brand of driving pleasure for which the xDrive intelligent all-wheel-drive system is renowned and a luxurious ambience within the variable-use interior with a plug-in hybrid drive concept. Its innovative BMW eDrive technology guarantees the hallmark sporting ability of a BMW, while at the same time opening the door to speeds of up to 120 km/h (75 mph), a maximum range of 30 kilometres (19 miles) on electric power alone and average fuel consumption in the EU test cycle of 3.8 litres per 100 kilometres (74.3 mpg imp).

The concept study's BMW eDrive system consists of a four-cylinder combustion engine with BMW TwinPower Turbo technology and an electric motor which is also the work of the BMW Group. The 70 kW/95 hp motor sources its energy from a high-voltage lithium-ion battery. It can be charged from any domestic power socket and has sufficient capacity to enable the car to travel up to 30 kilometres (19 miles) solely on electric power, generating zero local emissions in the process. The high-voltage battery developed for the BMW Concept X5 eDrive is mounted in a particularly crash-safe position underneath the load area, whose capacity remains virtually unchanged as a result. There is a choice of three driving modes, depending on requirements and situation – the intelligent hybrid drive option for an optimum balance between sportiness and efficiency; pure electric and therefore emission-free driving; or Save Battery mode to maintain the current battery charge.

The groundbreaking character of the BMW Concept X5 eDrive is highlighted by understated but precisely arranged design accents. For example, the kidney grille slats, air intake bars and the inlay in the rear bumper – all in the BMW i Blue colour developed for the BMW i brand – present an appealing contrast to the Silverflake metallic exterior paintwork. The BMW Concept X5 eDrive also comes with specially designed roof rails, a connector for the charging cable that lights up during charging, and 21-inch light-alloy wheels in an exclusive, aerodynamically optimised design.

**BMW eDrive in a Sports Activity Vehicle: intelligent hybrid technology delivers outstanding efficiency and characteristic driving pleasure.**

Electrification of the powertrain allows BMW to unlock impressive potential for reducing fuel consumption and emissions. The BMW eDrive technology developed by the BMW Group to this end comes in various forms, each tailored precisely to the vehicle concept at hand. The BMW Group's first purely electrically powered vehicle to go into series production – the BMW i3 – celebrates its world premiere at the IAA 2013. And taking to the stage alongside the i3 will be the BMW Concept X5 eDrive, which follows in the tyre tracks of the BMW Concept Active Tourer unveiled in 2012 as the second plug-in hybrid vehicle to feature BMW eDrive.

BMW eDrive technology hooks up with the intelligent all-wheel-drive system BMW xDrive for the first time in the BMW Concept X5 eDrive. The new study vehicle offers superior driving characteristics underpinned by the electronically controlled and fully variable distribution of drive between its front and rear wheels. Regardless of the driving mode selected, the power generated by the electric motor, combustion engine or the two units together is channelled quickly and precisely to the wheels where it can be converted most effectively into propulsion. This allows the BMW Concept X5 eDrive to demonstrate the typical qualities of an SAV – assured traction and optimised stability in all weather and road conditions, coupled with increased agility through dynamically taken corners – in outstandingly efficient fashion. The versatile and sporty driving attributes of the BMW Concept X5 eDrive are complemented by average fuel consumption in the EU test cycle of 3.8 litres per 100 kilometres (74.3 mpg imp) and CO<sub>2</sub> emissions of under 90 grams per kilometre.

The electric motor in the BMW Concept X5 eDrive generates maximum output of 70 kW/95 hp and – thanks to impressive torque available from the word go – demonstrates the instantaneous power delivery that has become a hallmark of electric drive systems. All of which elevates driving pleasure and efficiency to another level. The synchronous electric motor developed by the BMW Group also maintains a steady flow of power into the upper reaches of its load range and keeps weight low. The motor alone can propel the BMW Concept X5 eDrive to a top speed of 120 km/h (75 mph). As part of the boost function, it can also be used to give the combustion engine a noticeable hit of extra energy during acceleration and during dynamic mid-range sprints. The BMW Concept X5 eDrive can complete the sprint from rest to 100 km/h (62 mph) in under 7.0 seconds.

### **ECO PRO mode and all-electric driving: efficiency on demand.**

Like members of the current series-produced BMW line-up, the BMW Concept X5 eDrive also offers ECO PRO mode, which is activated using the Driving Experience Control switch and encourages a particularly efficient driving style. This default mode is engaged when the car is started and offers intelligent hybrid functionality, whereby the energy management system tailors the interplay of combustion engine and electric drive system to most efficient effect. Drivers can also enjoy the services of the hybrid-specific Proactive Driving Assistant, which teams up with the navigation system to incorporate factors such as route profile, speed restrictions and the traffic situation into the driving mode selection.

Drivers can also switch to the all-electric driving mode. With the battery fully charged, the car can cover up to 30 kilometres (19 miles) on electric power alone and therefore with zero local emissions. Another option is the Save Battery mode, which allows the battery's energy capacity to be maintained – for example, if the driver wants to cover the final stretch of a longer journey through town on purely electric power.

### **Everyday usability: flexible charging scenarios and viability.**

In order to allow the extra efficiency of its electric powertrain to be utilised as widely as possible, the BMW Concept X5 eDrive is designed as a plug-in hybrid vehicle. Its high-voltage battery can be recharged from any domestic power socket, a Wallbox designed to offer stronger currents or a public charging station. The impressive degree of flexibility drivers can look forward to when choosing a charging point is enhanced by the charging cable stored in the load area below the flat storage compartment. The battery unit is located a level lower still, which means the car's overall load-carrying capacity is only slightly reduced. The boot offers space for two large suitcases or four 46-inch golf bags, and the SAV's high level of variability – thanks in part to its 40:20:40 split/folding rear seat backrest – is retained, as are the generous levels of space and comfort over long journeys that it offers in all five seats.

### **Intelligent connectivity for greater efficiency.**

Innovative functions from BMW ConnectedDrive help drivers to maximise the number of journeys they complete on electric power alone. For example, in the BMW Concept X5 eDrive, the electric range available is shown as a numerical value. The car's dynamic range display uses intelligent connectivity to keep a constant eye on all the factors affecting range, such as traffic conditions, route profile and driving style.



When the route guidance function is activated, the location of public charging stations is added to the points of interest shown on the navigation map. Drivers can call up stations located along their route or at their destination, and the system also tells them how much charging time is required to fully top up the battery once again.

All information concerning battery charge and electric range can also be viewed on the driver's Smartphone. A Remote app from BMW ConnectedDrive developed specially to meet the requirements of electric mobility enables owners to control the charging process from their phone. It also allows the vehicle to be pre-programmed while it is connected to an electricity source. For example, the heating and climate control system can be activated remotely to ensure a pleasant temperature inside the car before the driver sets off.

## 2.6 Clever use of space for sports and leisure activities: The BMW Concept Active Tourer Outdoor.



The BMW Concept Active Tourer Outdoor will take to the stage at the IAA show in Frankfurt, treating the premium compact segment to a taste of how interior space can be cleverly utilised for sport and leisure purposes. It combines compact dimensions with sporty design and generous levels of interior space. A carrier system for two bicycles (integrated into the vehicle) and other clever details make the BMW Concept Active Tourer Outdoor the ideal companion for active recreational sports enthusiasts. In contrast to conventional solutions, this carrier is not mounted on the outside of the vehicle, but instead integrated into the interior. This has the advantage of keeping bicycles clean and dry while also protecting them from theft and damage. And when not in use, the carrier system disappears away into the side structure of the car or the load compartment floor without restricting interior space. Easy-care interior materials likewise represent a perfect match for the requirements of the BMW Concept Active Tourer Outdoor.

The BMW Concept Active Tourer Outdoor's new plug-in hybrid (PHEV) drive concept combines the benefits of an electric motor and the attributes of the vehicle's conventional 1.5-litre petrol engine. The BMW eDrive concept familiar from the BMW i8 enables the car to run on electric power alone (and therefore produce zero local emissions) and the lithium-ion high-performance batteries can be recharged from a standard 220V domestic socket. Plug-in hybrid vehicles generally have a range of over 30 kilometres (approx. 20 miles) in all-electric mode. The BMW Concept Active Tourer Outdoor's total system output of 140 kW/190 hp gives it sporty performance credentials while returning average fuel consumption figures of around 2.5 litres per 100 kilometres (113 mpg imp) and CO<sub>2</sub> emissions below 60 g/km.

### **Sporty and functional design, impressive variability, clever details.**

With an exterior length of 4,350 millimetres, width of 1,833 millimetres and height of 1,576 millimetres, the BMW Concept Active Tourer Outdoor blends compact dimensions with hallmark BMW aesthetics and sportiness. The long wheelbase (2,670 millimetres), a higher roofline, a compact, transversely mounted engine sending its power to the front wheels, and the hybrid drive system's batteries fitted underneath the load compartment floor all combine to deliver generous interior space.

A dominant element of the characteristic BMW front view is the striking, slightly forward-leaning BMW kidney grille. The twin headlights with LED accent lights positioned like eyebrows above them extend far into the front wings and, together with the multifaceted front apron and two large air intakes below the main headlights, strengthen the presence of the BMW Concept Active Tourer Outdoor. When seen in profile, even at a standstill, the elongated silhouette with its suggestion of a wedge shape lends the BMW Concept Active Tourer Outdoor a dynamic aura that is unmatched in this class. Defined horizontal body lines headline the rear-end view of the compact BMW. The large rear lights, extending well into the car's flanks, accentuate the broad face of the wheels. And the exclusive Gold Race Orange exterior paintwork and partly painted 20-inch wheels reinforce the vehicle's sporting appearance. The large tailgate offers convenient access to the load compartment thanks to its wide aperture and low loading sill.

**New bicycle carrier: bike wheels transported inside the vehicle.**

The BMW Concept Active Tourer Outdoor marks the debut appearance of a new bicycle carrier system. In a departure from the conventional approach, this system allows up to two bicycles to be carried inside the vehicle. The carrier system is mounted against the left side of the boot area and consists of a rail system with a pivoting bracket. The rail is fitted with two mounts which hold the top tube of each bicycle in place. The bikes' saddles and front wheels need to be detached before they are secured in place. But, given the quick-release mechanisms of modern sports bikes, this should take only a few seconds. The wheels are stowed in a folding holder which is integrated into the right-hand rear backrest. Securing the bicycles themselves is simple and convenient. The pivot bracket opens out and slides out from the interior on the rail. The bicycles are then placed on the carrier transversely to the direction of travel and fixed in place. Assembly and maintenance work can also be carried out effortlessly on the bikes when they are in this position. Once the bracket has been closed again, the bicycles can be pushed back into the interior with little ado. Another clever detail is the storage compartment recessed into the centre of the load area floor, which offers space for the bike saddles, tools and small parts. And the brightly perforated leather seat inlays and door armrests, which are durable and easy to clean, also make a perfect choice for a leisure-oriented vehicle. The MoonRock Grey covering for the load compartment floor, meanwhile, comes in a robust, easy-to-clean, studded plastic material, allowing it to meet the challenges presented by leisure activities – in any weather.

### **Cutting-edge display experience with extended black panel technology.**

The multifunction instrument display, complete with extended black panel technology, offers totally new functionality. The four-dial view will be familiar, but the COMFORT, SPORT and ECO PRO driving experience modes, for example, are all given their own display sections and colour schemes. Indeed, the driver benefits from a display showing information tailored optimally to the situation at hand.

The large 8-inch display in the centre of the instrument panel is used to access the suite of BMW ConnectedDrive services and the new navigation system's route planning functions. The central Control Display also shows the current operating status of the hybrid system. The hybrid drive system's power electronics are linked up to the intelligent Navigation system Plus, allowing it to work as efficiently as possible. The data gained as a result, such as the route profile, speed limits and traffic situation, prepare the vehicle for imminent requirements and therefore allow the available energy to be used with maximum efficiency.

### **Wide selection of BMW EfficientDynamics measures.**

In order to maximise the vehicle's range in all-electric mode (and therefore overall), the energy consumption of the ancillary units is minimised. To this end, ECO PRO mode reduces the output of the air conditioning and other electrically operated comfort-enhancing functions when appropriate and adapts the operation of all drive components to maximise efficiency. The Proactive Driving Assistant works with the Navigation system Professional to anticipate local conditions and send the driver tips to prepare for the situation ahead. And ECO PRO Route sets out the most efficient route based on volume of traffic, personal driving style and local conditions.

### **BMW ConnectedDrive – connectivity on an impressive scale.**

The BMW Concept Active Tourer Outdoor boasts optimum connectivity thanks to BMW ConnectedDrive. For example, tours with special route profiles and stop-off points can be planned via the BMW homepage, while stages for drivers can be combined with those for cyclists and hikers as desired. The route plan can be sent from the driver's home computer to the BMW Concept Active Tourer Outdoor's navigation system and the driver's Smartphone so that it can be called up at any time. As with all vehicles fitted with an integrated SIM card, BMW ConnectedDrive services such as the Concierge Service and RTTI (Real Time Traffic Information) can also be accessed. Added to which, powerful interface technology allows extensive use of external mobile phones and many Bluetooth office functions for Internet-based services.

## 2.7 A stand-out performer – and more innovative than ever: The new BMW 5 Series.



Dynamic ability, comfort, efficiency, aesthetic allure and a profusion of innovations designed to enhance driving pleasure – the BMW 5 Series contains all the signature ingredients of a best-selling model at the premium end of the executive segment. Indeed, consistently rising sales figures have sealed its position as the global leader in its class. Over one million units of the BMW 5 Series Sedan, BMW 5 Series Touring and BMW 5 Series Gran Turismo – whose luxurious character has earned it a unique status in the segment – have been sold worldwide since the launch of the current generation. And now another new chapter in this impressive success story is poised to begin. Precise modifications to the cars' design, new engine variants and innovative additions to the range of available equipment as well as BMW ConnectedDrive technology all raise the appeal of the BMW 5 Series model family a notch higher still.

### **Design: precise modifications bring out its sporting character.**

Additional contour lines for the surround of the BMW kidney grille and newly structured lower air intakes reinforce the sporting appearance of the new BMW 5 Series Sedan and new BMW 5 Series Touring. On both variants, the accentuated width of the rear end is underlined by an extra crease in the apron, as well as slim, sharply contoured and therefore even more striking rear lights.

The new BMW 5 Series Gran Turismo boasts a modified front apron exuding presence and solidity. Its redesigned rear end creates a longer and lower-to-the-ground impression. A three-dimensional surface design for the area around the licence plate holder and a chrome strip in the rear apron add further depth to its dynamic character.

Xenon headlights are fitted as standard on all models, while Adaptive LED Headlights take their place on the options list for the first time alongside LED fog lamps. Elsewhere, the side indicator lights are integrated into the exterior mirrors. Also new in the BMW 5 Series are the BMW Luxury Line and BMW Modern Line packages containing exclusive design and equipment features. And an M Sport package tailored to each model variant can also be specified.

### **Functionality and premium allure taken to a new level.**

New details lend further refinement to the premium impression of the new

BMW 5 Series' interior as well as another layer to its functionality. The Control Display of the standard-fitted iDrive operating system is now bordered in the Sedan and Touring by chrome trim. Added to which, the storage compartments and cup holders in the centre console of these models have increased in capacity.

A revised rear section increases the boot capacity of the new BMW 5 Series Gran Turismo by 60 litres to 500 litres. New exterior paint colours, light-alloy wheels, upholstery colours and interior trim elements for all the BMW 5 Series models enhance their appeal and increase the scope for individualisation.

### **Engines: setting the benchmark for driving pleasure, introducing fresh new routes to efficiency.**

Faster, more economical, cleaner: all the variants of the BMW 5 Series come with a raft of optimised details. The result is reduced fuel consumption (in some cases significantly), yet with no drop-off in sporting ability. Indeed, some models actually offer improved performance. Plus, all the engine variants already meet the stipulations of the EU6 exhaust gas standard not due to come into force until September 2014. To this end, the diesel models come with nitrogen oxide-reducing BMW BluePerformance technology as standard.

In addition to Brake Energy Regeneration, the Auto Start-Stop function (also fitted in conjunction with the eight-speed automatic gearbox), Optimum Shift Indicator and ECO PRO mode, the suite of standard-fitted BMW EfficientDynamics technology now also includes a coasting mode (which disengages the powertrain), Proactive Driving Assistant to adjust the car's speed ahead of a change in speed limit, and the ECO PRO Route function, which can be selected via the optional Navigation system Professional. Meanwhile, extensive optimisation of the cars' aerodynamics – the drag coefficient (Cd factor) of the BMW 520d Sedan, for example, has been reduced to 0.25 – is one of the key factors in the latest advances made by the engineers in the area of efficiency.

The market launch of the new BMW 5 Series model family also heralds an expansion of its engine range. For instance, the BMW 518d has been added to the line-up as a new entry-level diesel variant. Its four-cylinder diesel with BMW TwinPower Turbo technology and 105 kW/143 hp can be ordered for both the new BMW 5 Series Sedan and the new BMW 5 Series Touring. Like the BMW 520d Sedan, the BMW 518d Sedan records impressive average fuel economy in the EU test cycle of 4.5 litres per 100 kilometres (62.8 mpg imp) and CO<sub>2</sub> emissions of 119 grams per kilometre. And the model range now also includes the BMW 520d xDrive in both Sedan and Touring guises. This increases the number of models equipped with the intelligent all-wheel-drive

system to seven (in the case of the BMW 5 Series Touring) and eight (for the BMW 5 Series Sedan). Four engine variants of the new BMW 5 Series Gran Turismo can likewise be combined with xDrive.

The top-of-the-line engine available for all members of the new BMW 5 Series model family is a new V8 unit with BMW TwinPower Turbo technology developing 330 kW/450 hp. The range of power plants available for the new BMW 5 Series Sedan and new BMW 5 Series Touring now comprises four petrol and six diesel units, and also encompasses two BMW M Performance Automobiles – the BMW M550d xDrive Sedan and BMW M550d xDrive Touring. Customers opting for the new BMW 5 Series Gran Turismo can choose from two petrol power plants and three diesels.

Further improvements have also been made to the intelligent energy management of the BMW ActiveHybrid 5. The full-hybrid Sedan now comes with a specially tweaked version of the Proactive Driving Assistant, whose talents include adapting the interplay between the combustion engine and electric motor to the route ahead.

The cars' chassis technology – which includes a double-wishbone front axle, integral rear axle and Electric Power Steering with standard Servotronic function – has been further honed to deliver an unrivalled balance between sporting performance and ride comfort. The BMW 5 Series Touring and BMW 5 Series Gran Turismo come as standard with air suspension, including automatic self-levelling at the rear axle. The Driving Experience Control switch on the centre console is standard on all models. Dynamic Damper Control, M Sport suspension and the Adaptive Drive and Integral Active Steering systems unmatched by any rivals can be specified as options.

### **More innovative than ever: optional equipment and BMW ConnectedDrive.**

The host of innovations included on the options list and in the range of BMW ConnectedDrive technology allow the new BMW 5 Series model family to underline its standout position in the areas of connectivity, infotainment, convenience and safety. For example, the function of the optional Comfort Access system, which allows the tailgate to be opened hands-free, has been extended to include a closing mechanism, which means that a movement of the foot under the rear apron can now be used to prompt the tailgate to close as well as open. In addition, the new BMW 5 Series offers customers a new rear-seat entertainment system with tablet-style displays, a Harman Kardon Surround Sound system and a new version of the ambient light option with a facility which allows the interior lighting to be alternated in tone between orange and white.

The range of BMW ConnectedDrive business solutions and driver assistance systems is more advanced and richer in variety than ever. The BMW 5 Series enables a scope of intelligent connectivity unique in the marketplace, allowing it to set the benchmark for in-car use of office applications.

Alongside the globally unrivalled Concierge Service for hotel reservations and a selection of other services, BMW ConnectedDrive also offers an unusually extensive suite of office functions, including internet-based services. The dictation function, for example, provides a convenient way of entering text for SMS messages and emails during a journey. The array of search, travel, office and social media services can be accessed via the car's integrated SIM card or the customer's smartphone. And Online Entertainment sees BMW bringing internet-based flat rate music services directly into the car.

The optional Navigation system Professional makes use of an optimised menu display and allows access to Real Time Traffic Information. A new controller with a touch-sensitive surface now allows the use of characters to program in a destination or access other functions of the iDrive operating system. BMW offers Intelligent Emergency Call as standard in a large number of markets.

The BMW 5 Series builds on its leading position in the field of driver assistance systems with the introduction of the glare-free High Beam Assistant and the BMW Night Vision system, which includes human and animal detection and the Dynamic Light Spot function. From November 2013, the optional Traffic Jam Assistant will also be on hand to make life easier for the driver, significantly increasing the scope for relaxation in monotonous motorway tailbacks. This system automatically keeps the car in the same lane, even when the road bends around a corner. It is part of the Driving Assistant Plus option, which also includes Active Cruise Control with Stop & Go function and Collision Warning with braking function. The cruise control function, underpinned by radar sensors and a camera, reacts with even greater precision to the driving situation at hand and also to stationary objects. Another feature available for the Sedan and Touring from November 2013 is the fully automatic Parking Assistant.





## 2.8 Exclusive sporting allure: The new BMW X5 M50d, BMW M550d xDrive Sedan and BMW M550d xDrive Touring M Performance Automobiles.

The new BMW M Performance Automobiles product category enriches the premium segment with a fascinating blend of sports performance, exclusivity and everyday usability. Impressively powerful engines with M Performance TwinPower Turbo technology, chassis technology tuned – with familiar M precision – to the performance characteristics of the new models and an aerodynamically optimised exterior mark out the status of BMW M Performance Automobiles within the BMW M line-up. The market launch of the new BMW X5 and new BMW 5 Series also heralds the arrival of the latest-generation BMW M Performance Automobiles based on these model series. Offering a driving experience defined by their M genealogy, the new BMW X5 M50d, new BMW M550d xDrive Sedan and new BMW M550d xDrive Touring represent a more exciting proposition than ever.

The most important link between the new BMW M Performance Automobiles is their tri-turbo six-cylinder in-line diesel engine with common rail direct injection and upgrades to various details. The world's most powerful six-cylinder diesel unit develops 280 kW/381 hp and maximum torque of 740 Newton metres (546 lb-ft) from its 3.0-litre displacement. BMW BluePerformance technology allows the new models to meet EU6 stipulations as standard. The diesel engine's power is channelled to the road through an eight-speed sports automatic gearbox – which now offers a Launch Control function – and BMW xDrive intelligent all-wheel drive. With their M-specific tuning, the all-wheel-drive system and chassis technology of each model both play their part in delivering precisely controlled dynamics.

Large side air intakes with horizontal slats in Ferric Grey, exterior mirror caps in the same colour, BMW Individual High-gloss Shadow Line trim and trapezoidal exhaust tailpipe embellishers in black chrome lend distinctive flourishes to the exterior design of the BMW M Performance Automobiles. An M leather steering wheel with gearshift paddles, M sports seats, Aluminium Hexagon interior trim strips and an anthracite-coloured BMW Individual roof liner bathe the interior in a sporting ambience.

### **BMW X5 M50d: optimised dynamics, enhanced efficiency.**

The third generation of the BMW X5 Sports Activity Vehicle provides the ideal basis for a BMW M Performance Automobile combining superior dynamics on the road with sure-footed traction off the beaten track. The new BMW X5 M50d

comes as standard with Adaptive M suspension – which includes Dynamic Damper Control and air suspension at the rear axle – and Electric Power Steering. The Dynamic adaptive suspension package, complete with Dynamic Performance Control and Dynamic Drive active roll stabilisation, can be specified as an option. The standard 19-inch M light-alloy wheels in double-spoke design are fitted with mixed tyres.

Noticeably enhanced agility and a quicker time (5.3 seconds) for the sprint from 0 to 100 km/h (62 mph) headline the dynamic driving characteristics of the new BMW X5 M50d. Yet its average fuel consumption in the EU test cycle is more than 10 per cent lower than its predecessor's, at 6.7 litres per 100 kilometres / 42.2 mpg imp (CO<sub>2</sub> emissions: 177 g/km). The list of options includes a significantly expanded selection of driver assistance and mobility systems from BMW ConnectedDrive, such as Driving Assistant and Driving Assistant Plus, Lane Change Warning, Surround View with 360-degree display and BMW Parking Assistant.

### **BMW M550d xDrive: supreme power, innovative options.**

Sports performance and efficiency are among the fundamental characteristics of the BMW 5 Series range. Indeed, the BMW M550d xDrive Sedan and BMW M550d xDrive Touring M Performance Automobiles push the combination of these two attributes to a level unmatched by any rival. The latest version of the two models sees the imposing torque of their six-cylinder in-line diesel engine accompanied by further reductions in fuel consumption and emissions on the back of additional BMW EfficientDynamics technology. The average consumption of the BMW M550d xDrive Sedan in the EU test cycle is now just 6.2 litres per 100 kilometres (45.6 mpg imp) and its CO<sub>2</sub> emissions come in at 162 grams per kilometre. The corresponding values for the BMW M550d Touring have been improved to 6.3 l/100 km (44.8 mpg imp) and 166 g/km. At the same time, the two models' acceleration figures from 0 to 100 km/h (62 mph) again set the benchmark in their segments, at 4.7 seconds for the Sedan and 4.9 seconds for the Touring.

The chassis technology of both models – with its M-specific tuning – can be complemented by the optional Adaptive Drive system with electronically controlled dampers and roll stabilisation. The BMW M550d xDrive Touring is equipped as standard with air suspension at the rear axle. 19-inch M light-alloy wheels, fitted with mixed tyres on the BMW M550d xDrive Sedan, are also part of standard specification. And both models now feature xenon headlights, larger cupholders and storage compartments, and Intelligent Emergency Call as standard. The BMW ConnectedDrive range includes the new Driving Assistant and Driving Assistant Plus systems, as well as BMW Night Vision with human and animal detection, and Dynamic Light Spot.

## 2.9 Motor sport expertise included: The BMW M Performance Parts for the BMW 4 Series.



The introduction of a range of bespoke BMW M Performance Parts in early 2014 will provide extra tools for customers keen to turn up the fanfare for the BMW 4 Series Coupe's sporting ability. The BMW M Performance Power Kit, for example, will provide a noticeable increase in performance for the BMW 420d (+12 kW, +20 Nm / 15 lb-ft), BMW 430d (+20 kW, +40 Nm / 30 lb-ft) and BMW 435i (+25 kW, +50 Nm / 37 lb-ft) models without increasing their fuel consumption and emissions. A BMW M Performance silencer system can also be specified for the BMW 420i, BMW 428i and BMW 435i. This includes BMW M Performance exhaust tailpipe embellishers in chrome or carbon which can also be ordered as an individual option for all other model variants. The BMW M Performance limited-slip differential, meanwhile, ensures the transfer of the engine's power to the road translates into maximum traction through corners. And the undeniably sporting set-up of the BMW M Performance suspension, BMW M Performance brakes with red, yellow or orange-coloured brake callipers and BMW M Performance light-alloy wheels all help to raise the Coupe's dynamic potential to even greater heights. The weight-optimised 20-inch forged wheels are available in two design variants and with a signature BMW M Performance bi-colour finish in Ferric Grey with polished spoke fronts. Also new in the BMW M Performance range are 18-inch winter complete wheel sets in double-spoke design.

The dynamic aura of the BMW 4 Series can be highlighted by the addition of BMW M Performance exterior components. Black decorative trim for the BMW kidney grille, a carbon front splitter and exterior mirror caps, as well as a rear spoiler in carbon, a diffuser for the rear apron, side skirt decal strips with M Performance lettering and BMW M Performance side stripes, all optimise the sporting appearance and aerodynamic attributes of the Coupe. The BMW M Performance sports steering wheel with red centre marker or Race Display in the 12 o'clock position teams up with a carbon gearshift lever and handbrake lever grip (including Alcantara gaiter) to provide a race-inspired cockpit ambience. The selector lever for the automatic gearbox can also be specified with a carbon surface. Also available for the BMW 4 Series are interior trim strips in carbon and Alcantara, stainless steel pedals and a matching driver's footrest, and BMW M Performance floor mats.

## 2.10 Clear, flexible, individual: The current BMW ConnectedDrive range.



BMW is further consolidating its standing as the world's leading provider of online-based in-car services by introducing some major enhancements while also making its BMW ConnectedDrive Services easily accessible. The new mobility products represent a further milestone in the ongoing success story of BMW ConnectedDrive and take automotive infotainment into a whole new dimension.

### **Refocusing: complete connectivity, a whole new level of flexibility and a remarkably wide array of mobility services.**

The reorientation of the services now turns comprehensive, intelligent connectivity between passengers, vehicle and the outside world into a reality. From July 2013, many new models will have a SIM card integrated into the vehicle as standard.

The freedom of choice that comes with the mobility services ensures maximum flexibility and heralds individual, tailor-made solutions that are of unprecedented benefit to the customer. Over the course of 2013, the BMW ConnectedDrive service portfolio will be extended to a further 14 markets in addition to the 11 where it is already available. The objective is to have around five million BMW cars worldwide linked up via ConnectedDrive with the help of the built-in SIM card by the year 2017. This shift in strategy makes BMW the first carmaker to firmly commit itself to the goal of achieving blanket connectivity.

### **Clearly structure, flexible and personalised.**

To ensure that customers have a clear picture of what's on offer, BMW ConnectedDrive will in future be based on just two mainstays: besides the driving assistance systems with their convenience and safety functions, the optimised BMW ConnectedDrive Services comprising the entire infotainment and mobility portfolio will now be more clearly structured, more readily understood and also individually bookable via various channels. Meanwhile, there is a dedicated customer section for the ConnectedDrive Services offered by the BMW i sub-brand.

As part of the concept's reorientation, BMW has dispensed with the previous package solutions. In future, customers will be able to decide for themselves which of the available mobility services they would like to take advantage of.

Individual services can furthermore be activated for a limited period, such as one month, one quarter or one year. For the first time, it is also possible to customise services for the second owner and/or in a used BMW. For BMW and BMW i customers, this all adds up to unrivalled product diversity, the utmost individuality and flexibility, as well as considerably lower starting prices.

### **Customer portal and new BMW ConnectedDrive Store.**

The new networked world of BMW can be entered via the online customer portal ("My BMW ConnectedDrive"), which has a far more up-to-date, attractive and clearly presented design following the revamp. Services can be selected and booked with the greatest of ease at the newly created BMW ConnectedDrive Store, which is unique among the competition. Supreme user friendliness is ensured by the multi-channel approach. Apart from internet access, BMW customers are also able to pay a visit to the new BMW ConnectedDrive Store from the comfort of their BMW, which means they can select and book individual options and use them in a matter of minutes even while away on business trips or on holiday.

### **BMW ConnectedDrive Services with new services and apps.**

Customers are now able to further improve their mobile internet experience with the help of browser-based applications (vehicle apps). All that is needed is an internet connection to the BMW servers, as provided by the vehicle's built-in SIM card. For yet greater convenience while travelling, there is the BMW Connected app for smartphones, which includes functions such as web radio, Wiki Local, Facebook, calendar, plus several more besides. All applications, regardless of whether they are vehicle apps used via BMW Online or smartphone apps, are controlled using the intuitive iDrive controller and visualised in a uniform manner in the Control Display with the familiar menu structure.

### **Third-party apps for virtually boundless infotainment possibilities.**

The flexible app concept makes it possible to incorporate not just the applications specially developed by the BMW Group, but also BMW Apps ready applications from other providers. This will allow the wide array of infotainment functions that BMW drivers enjoy when at home or out and about to be smoothly transferred to their vehicle in future. From this summer, application-based integration will also be compatible with smartphones running the Google Android operating system.

### **Easier voice commands thanks to natural speech recognition.**

The new generation of the BMW Navigation system Professional adds various new speech functions to the BMW ConnectedDrive Mobile Office portfolio, most notably a dictation function that employs a full speech recognition

system to simply transcribe the driver's words. The dictated text can then be sent by SMS or email. Another speech-based feature is the voice memo function, which allows the driver to make direct voice recordings of up to two minutes in length and immediately send them by email if required.

**Limitless listening pleasure with BMW Online Entertainment.**

Online Entertainment allows the customer to use cloud-based infotainment in the car without the need of a smartphone. The optional extra Online Entertainment includes a one-year flat-rate subscription for music and data that gives the customer continuous access to over 12 million songs and more than 250 professionally produced music channels in all countries where it is available (UK, DE, NL, FR, ES, IT). The intuitive iDrive Controller is used to search for the desired track or artist in the Control Display.

**Intelligent Emergency Call with automatic vehicle location.**

With Intelligent Emergency Call from BMW ConnectedDrive, BMW already exceeds the functionality of the EU requirement for such a system due to come into force in 2015. Automatic vehicle location and information on the severity of the accident help to significantly reduce the time between an accident and the arrival of the emergency and rescue services. The call centre furthermore stays in contact with the vehicle's occupants until the emergency services arrive, speaking to them in their native language where possible. In future, the Intelligent Emergency Service will be available in virtually all markets and model series as standard.

**Real Time Traffic Information (RTTI) warns of traffic jams as they happen.**

This optionally available traffic information system employs a live traffic jam map with colour-coded road markings in green, yellow, orange and red to visualise the current traffic flow states even more sensitively, as well as providing information on roadworks, accidents and other events affecting traffic. RTTI covers the dense European road networks extending through Germany, the United Kingdom, France and Italy, plus, from July 2013, Belgium, the Netherlands, Austria, Spain, Denmark, Ireland, Norway, Poland, Portugal, Sweden, Switzerland and the Czech Republic.

**LTE mobile high-speed internet available for use in every car.**

The BMW LTE Car Hotspot already makes it possible to enjoy mobile internet in your car today at the high speeds offered by LTE (Long-Term Evolution) technology. All that is required apart from the BMW Car Hotspot is an LTE-capable SIM card, which is inserted into the hotspot. Once in place, it allows passengers in the vehicle to surf the internet at high speed with as many as eight mobile devices at the same time. By late 2014, Germany is expected to

have 100% coverage with LTE-capable networks. The BMW Group will be ideally poised to take the portfolio of BMW ConnectedDrive in-vehicle features to a whole new level.

**BMW i ConnectedDrive services as standard for BMW i models.**

All new BMW i models come as standard with an integral SIM card and can use BMW ConnectedDrive services that have been specially devised for electric vehicles. The onboard navigation system is also tailored to the specific requirements of electric mobility. Examples include the Driving Range Assistant, an overview of the available charging stations and efficient route calculation. The networking with smartphones and navigation systems enables reliable access to the public charging structure as well as a transparent means of payment using the BMW i ChargeNow card. In addition, the BMW i Remote app available for the iOS and Android operating systems gives the driver access to all vehicle data and route-related information anywhere and at any time, while the charging process can be controlled remotely or the vehicle interior set to the desired temperature in advance of a journey. Finally, drivers are able to evaluate their driving style to find out where there is room for improvement.

**The future of BMW ConnectedDrive: highly automated driving on Europe's motorways.**

With the aim of offering motorists vehicles equipped with cutting-edge driver assistance systems for supreme convenience and safety in the future, the engineers at BMW Group Forschung und Technik, the company's research and technology arm, have for a number of years been working on an electronic co-pilot for highly automated driving on the motorway. A prototype vehicle from BMW Group Forschung und Technik already drove along the A9 motorway from Munich towards Nuremberg with no driver intervention back in 2011. The research work has now reached the stage where highly automated changes between motorways are possible at motorway intersections. This is a further key step towards the universal handling of motorway networks, something that will in future allow customers to enjoy a continuous highly automated driving experience.



## 2.11 Intelligent drive management for more driving pleasure and lower CO<sub>2</sub>: The latest innovations from Efficient Dynamics.

The introduction of groundbreaking Efficient Dynamics innovations fitted as standard in BMW models since 2007 has allowed the BMW Group to set new benchmarks in the reduction of fuel consumption. Efficient Dynamics focuses on drive system technology, vehicle concepts and energy management systems which significantly enhance both the driving pleasure and the efficiency of every new model. An important pillar of this strategy is BMW eDrive technology, which is applied in its most complete form in the new BMW i3, the BMW Group's first series-produced vehicle to run purely on electric power. Efficient Dynamics has played a major role in helping the BMW Group earn an industry-leading ranking in the Dow Jones Sustainability Index in each of the last eight years.

By constantly enhancing the effectiveness of conventional combustion engines and developing revolutionary concepts for alternative drive systems, the BMW Group has put all its brands' models in a position to claim outstanding efficiency vis-à-vis their competitors. At the IAA 2013, the BMW Group is presenting another raft of innovations on the drive system and energy management front. For example, the Driving Experience Control switch allows unparalleled scope for tailoring a car's set-up to its driver's requirements. The spectrum of clearly distinguishable settings ranges from the ultra-dynamic profile of SPORT mode all the way to ECO PRO mode, which helps the driver minimise fuel consumption. New functions offered by ECO PRO mode use features such as a link-up with the car's navigation system to optimise intelligent energy management. As well as a bespoke version of ECO PRO mode, the BMW i3 also comes with an interior heating system which uses heat pump technology. This reduces the energy required to heat the interior and, in so doing, increases the range of the all-electric i3.

### **Maximum efficiency at the touch of a button: Driving Experience Control switch with ECO PRO mode, including coasting function and Proactive Driving Assistant.**

ECO PRO mode adjusts the car's drive system management and accelerator responses and, if necessary, the gearshift characteristics of its automatic transmission. In addition, intelligent output regulation for electrically operated comfort-enhancing functions ensures extremely efficient energy management. Special displays provide constant updates on increases in range achieved as a result, and drivers are also given helpful tips on how to adapt their driving style



to boost fuel economy even further. Depending on the individual driving style, selecting ECO PRO mode can reduce fuel consumption by as much as 20 per cent. In many high-volume models, ECO PRO mode now links up with the optional automatic transmission to offer a coasting function. Here, the drivetrain is disengaged as soon as the driver takes his foot off the accelerator at speeds between 50 and 160 km/h (approx. 30 – 100 mph). The vehicle then glides along on minimal fuel using the available kinetic energy. The electric motor powering the BMW i3 also has zero torque control, which allows the car to coast and conserve energy reserves in the process. The range of the BMW i3 can be increased even further by employing ECO PRO+ mode.

ECO PRO mode teams up with the optional Navigation system Professional to bring the new Proactive Driving Assistant into play. This feature uses navigation data to give the driver tips on efficient driving, highlighting the most efficient moment to lift off the accelerator ahead of corners, speed limits or turn-offs, for example. Following these recommendations helps the driver to fully utilise the fuel-saving potential of coasting mode – paving the way for additional real-world reductions in fuel consumption of up to five per cent.

When the driver selects a destination in the navigation system, moreover, an ultra-efficient ECO PRO Route is proposed to improve the car's range. If this route is followed, the display also shows information on how much fuel has been saved as a result. From autumn 2013 the selection of models equipped as standard with the new version of ECO PRO mode will include the BMW 1 Series, BMW 3 Series, BMW 4 Series, BMW 5 Series, BMW 6 Series, BMW 7 Series, BMW X5 and BMW i3.

### **BMW i3: heating system that uses heat pump technology to increase range.**

The BMW i3 is the world's first premium car conceived from the ground up to provide all-electric mobility. A particularly innovative example of the attention to detail inherent in the BMW i3's efficiency-focused energy management system is the use of heat pump technology for its interior heating. This optional system uses ambient heat from the air and waste heat available within the vehicle to regulate the onboard temperature via an air conditioning system featuring additional components.

The use of the heat pump reduces the energy required to heat the interior by up to 50 per cent. The energy saved is made available to power the vehicle and can therefore help it to travel significantly further between battery charges. Indeed, depending on the individual driving style, the car's range can be increased by up to 30 per cent.

## 2.12 Dynamic riding fun with zero emissions: The new BMW C evolution.



The arrival of the new C evolution marks the start of a new chapter in the urban mobility segment for BMW Motorrad. The two conventionally powered maxi scooter models – the C 600 Sport and C 650 GT – already succeed in combining the superb ride qualities of a motorcycle with the specific agility of a scooter and the design's inherent comfort. The new electrically powered C evolution now goes even further by fusing riding fun and dynamism with the benefits of zero-emission performance to create a whole new experience on two wheels.

In keeping with the BMW Group's sustainability strategy, BMW Motorrad is taking a fully committed approach to electric mobility. As with BMW i, development of the C evolution revolved around creating a visionary vehicle concept offering maximum everyday practicality and an inspirational design.

### **Powerful drive unit with liquid-cooled electric motor and air-cooled high-voltage battery. Range of 100 kilometres (62 miles) under practical conditions.**

The C evolution is powered by a drivetrain swing arm with liquid-cooled permanent magnet synchronous motor via a toothed belt and ring gearing. The rated power output is 11 kW (15 hp), with a peak output of 35 kW (47 hp). This enables the C evolution to achieve a top speed of 120 km/h (75 mph, electronically limited) and gives it better acceleration than some maxi scooters powered by engines with displacements of 600 cc or more.

The generous 8 kWh capacity of the air-cooled lithium-ion high-voltage battery allows the two-wheeler to cover a range of up to 100 kilometres (62 miles) before it needs to be charged from any domestic mains supply. When plugged in to a standard 220V domestic socket with a 12A charge current, recharging fully from empty takes around 4 hours (with 220V / 16A = 3 h).

### **Intelligent recuperation and four ride modes ensure riding fun as well as efficiency.**

BMW Motorrad has opted for a form of energy regeneration for the C evolution that has never been seen before on a single-track vehicle. Recuperation takes place automatically both when coasting with the throttle closed and when braking.

Riders of the C evolution can set their preferred mix of dynamic performance and efficiency by selecting from the four ride modes. In Road mode, for instance, they have at their disposal maximum acceleration, approximately 50 per cent energy regeneration when coasting and full regeneration when braking. In Eco Pro mode, meanwhile, acceleration and therefore energy consumption are restricted, while the maximum possible amount of energy is recuperated. Sail mode suppresses recuperation while coasting, allowing the C evolution to glide along virtually free of any braking effect when the throttle is released. And for an added touch of dynamism, Dynamic mode combines full accelerating power with a high degree of recuperation.

### **Supreme safety thanks to synergies with BMW Automobile.**

As part of the BMW Group, BMW Motorrad was able to harness synergies with BMW Automobile during development of the C evolution. Besides adopting the same energy storage modules and electronic componentry used in the BMW i3, this was particularly beneficial for electrical safety, which is to passenger car standard. The C evolution is the first electrically powered two-wheeler to meet the ISO 26262 standard for functional safety and the ECE R100 standard governing high-voltage safety, both of which have been ratified by the leading carmakers.

As far as the chassis is concerned, the C evolution no longer has a main frame in the conventional sense. The central component here is the battery casing made from diecast aluminium, which has a steering head support made from steel tubing attached to it at the front and, at the rear, the single-sided swing arm as well as a rear frame, also made from steel tubing. The task of wheel suspension and damping is performed by an upside-down telehydraulic fork at the front and a spring strut mounted on the left at the rear. As on all vehicles from BMW Motorrad, the C evolution comes equipped with safety-boosting ABS together with powerful disc brakes as standard.

### **Torque Control Assist (TCA) for superior traction control.**

The new C evolution is available with Torque Control Assist (TCA), which works in a similar way to the Automatic Stability Control feature on BMW motorcycles with combustion engines. TCA limits the motor's torque depending on the slip at the rear wheel.

To ensure optimum controllability of the drive torque for the rider, the electric motor's control electronics monitor the rear wheel speed and reduce the drive torque if a certain plausibility threshold is exceeded. TCA is a particularly useful aid for the rider when starting off and prevents uncontrolled spinning of the rear wheel on road surfaces with reduced grip (e.g. wet cobblestones).

The Torque Control Assist additionally serves to stop the rear wheel from skidding when a sharp rate of recuperation produces a correspondingly high level of drag torque, especially on slippery road surfaces.

### **Large TFT colour display and LED daytime running light.**

A host of other features further underline the innovative character of the C evolution. It is equipped with a reversing aid, for instance, that enables easy manoeuvring at walking pace. There is also a first in the form of an LED daytime running light, which additionally dims to double as the sidelight. And for added comfort on cold days, there are heated handlebar grips.

A large TFT colour display in the instrument cluster offers a wealth of information. Apart from the current speed, the rider is also kept informed of data such as the average consumption in kWh/100 km, total power consumption, battery charge status in kWh, average speed, voltage of the on-board electrical system and the high-voltage system, as well as the remaining range in kilometres taking into account the selected ride mode. A bar graph furthermore indicates the current level of energy draw or regeneration.

### **Inspirational design.**

Last but not least, the C evolution also charts new territory in terms of styling and colour scheme. Design-wise, the C evolution fits harmoniously into the BMW Motorrad family, while the colour combination of Light White non-metallic and Electric Green symbolises its ability to blend maximum eco-friendliness with superb dynamic performance.

### **The highlights at a glance:**

- Innovative electric drive system via drivetrain swing arm with liquid-cooled permanent magnet synchronous motor, toothed belt and ring gearing.
- Rated power output 11 kW (homologated according to ECE R85) and 35 kW peak output.
- Maximum torque 72 Nm (53 lb-ft).
- Top speed 120 km/h (75 mph).
- Acceleration 0 – 50 km/h (31 mph) in 2.7 s.
- Acceleration 0 – 100 km/h (62 mph) in 6.2 s.
- High range of 100 kilometres (62 miles) in practical operation.
- 4 ride modes available to choose from: Road, Eco Pro, Sail and Dynamic.
- Reversing aid for supremely easy manoeuvring.
- Torque Control Assist (TCA).
- High-voltage battery with high capacity of 8 kWh and innovative air cooling.
- Intelligent recuperation when coasting and when braking.
- Recharged from the domestic mains supply.

- Takes just 4 h to charge to 100 % capacity at 220V / 12A (220V / 16A = 3 h).
- Synergies with BMW Automobile harnessed during development.
- Electrical safety to passenger car standards.
- Hybrid chassis with agile handling due to low centre of gravity.
- Powerful braking system with ABS.
- Large TFT colour display.
- LED daytime running light and sidelight.
- Inspirational colour scheme and design.