Life cycle **COMPACT**

360° Environmental Check Mercedes-Benz EQC

Mercedes-Benz
The best or nothing.

Mercedes-Benz has long recognised the importance of vehicle interiors optimised for allergy sufferers. Interior emissions have been measured since 1992. Today designers and developers can make their choice from a database of several thousand interior materials that have been approved by the material department.

The laboratory test with the complete vehicle in a special test chamber lasts one week. Like all new model series, the new EQC will bear the ECARF (European Centre for Allergy Research Foundation) seal of quality.

360° environmental check Mercedes-Benz EQC

The new Mercedes-Benz EQC 400 4MATIC (combined power consumption: 20.8 – 19.7 kWh/100 km; combined CO_2 emissions: 0 g/km)[1] is the first Mercedes-Benz under the technology brand EQ. It is a further milestone by Daimler AG on the road to emission-free driving, and underlines the company's commitment in this field of technology.

Daimler AG is pushing ahead with the transformation to emission-free mobility. With ambition 2039 we aim to have a carbon-neutral new passenger car fleet in 20 years. Our way to sustainable mobility is innovation – in a holistic approach along the entire value chain.

By 2030 we aim to have electric models make up more than half of our car sales – that includes all-electric cars and plug-in hybrids. At the same time we are continuing our efforts to make the production of our vehicles CO_2-neutral. Our Factory 56 is the blueprint: This new addition to our Sindelfingen plant uses renewable energy and will be CO_2-neutral from the start. Next, all of our European plants will follow by 2022.

We want to inspire our customers to charge their vehicles with electricity from renewable energy sources. With Mercedes Me Charge, for example, we enable drivers to conveniently charge their cars at various public charging stations in Europe, wherever possible with energy from renewable sources. But the transformation to a sustainable mobility of the future will only succeed if the auto industry, energy suppliers and policy makers are working hand in hand.

In this brochure we briefly summarise the results of the EQC life cycle assessment for you.

By the way: this brochure is available for download from http://www.mercedes-benz.com.

[1] Power consumption and range have been determined on the basis of Regulation (EC) No. 692/2008. Power consumption and range depend on the vehicle configuration. Further information about the official fuel consumption and the official specific CO_2 emissions for new passenger cars can be found in the publication „Leitfaden über den Kraftstoffverbrauch und die CO_2-Emissionen neuer Personenkraftwagen“ [„Guidelines concerning the fuel consumption and the CO_2 emissions of new passenger cars“], available free of charge from all showrooms and from the Deutsche Automobil Treuhand GmbH (at www.dat.de).

Mercedes-Benz EQC

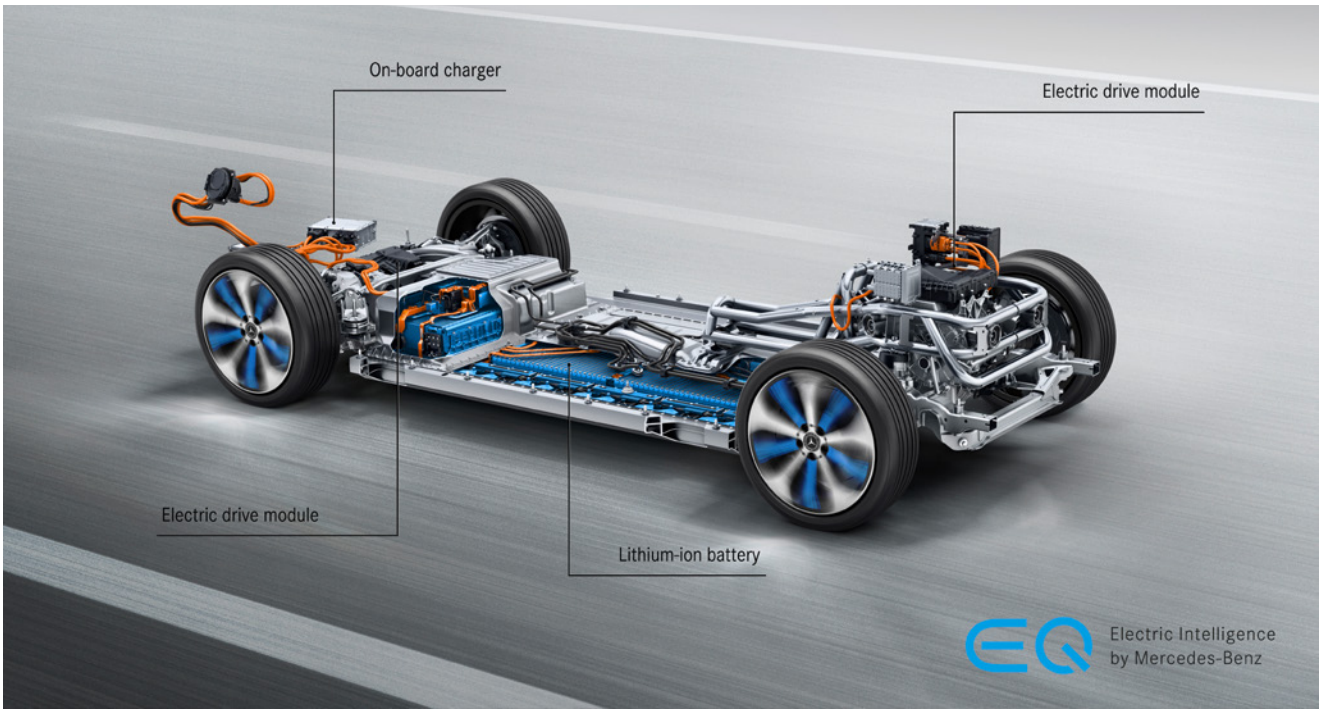
Tailor-made drive system for efficiency and dynamics

To exploit the advantages of locally emission-free electric drive to the full, the developers of the first Mercedes-Benz vehicle under the new technology brand EQ decided on a completely newly developed drive system with intelligent control.

Both the electric powertrains (eATS) and the battery were tailor-made for the Mercedes-Benz EQC. Tractive power is provided by an asynchronous motor at each axle. The asynchronous motors generate an output of 300 kW and a maximum combined torque of 760 Nm. The electric motor, a fixed-ratio transmission with a differential, the cooling system and the power electronics form a highly integrated, very compact unit.

The compact electric powertrains (eATS) at the front and rear axles give the EQC the driving characteristics of an all-wheel drive. Intelligent control allows dynamic torque distribution between the two driven axles over a wide operating range, creating the conditions for high driving dynamics. Torque shifting allows the torque to be distributed dynamically between the front and rear axles, ensuring that there is always a satisfying balance between power and efficiency.

To reduce power consumption and increase dynamism, the electric drivetrains are configured differently: the front electric motor is configured for best possible efficiency in the low to medium load range, while the rear one determines dynamism.



Lithium-Ion Battery

Powerful energy pack from in-house production

The centrepiece of the Mercedes-Benz EQC is the lithium-ion battery arranged in the vehicle floor. The battery is produced in Germany, by the wholly-owned Daimler subsidiary Deutsche ACCUMOTIVE in Kamenz/Saxony.

With an energy content of 80 kWh, the battery employs a sophisticated operating strategy to supply the vehicle with power, enabling an electric range of 445–471 km (NEDC)[1].

The latest-generation lithium-ion battery consists of 384 cells and is located in the vehicle floor, between the two axles.

The battery system is modular in design, consisting of two modules with 48 cells each and four with 72 cells each. The powerful high-voltage battery has a maximum voltage of 405 V and a nominal capacity of 230 Ah. The entire battery system is liquid-cooled. At low temperatures a battery heater ensures outstanding performance and efficiency, especially while charging.

The battery is an integral part of the crash concept for the vehicle as a whole. Its low, central location also has a positive effect on the handling characteristics of the EQC. The battery is produced in Germany, by the wholly-owned Daimler subsidiary Deutsche ACCUMOTIVE in Kamenz/Saxony.

[1] Power consumption and range have been determined on the basis of Regulation (EC) No. 692/2008. Power consumption and range depend on the vehicle configuration

The facts

The Mercedes-Benz EQC 400 4MATIC 360° environmental check

Early in the development stage of a new model, Mercedes-Benz starts looking at environmental performance over the car's entire life cycle. On the following pages you can read about how the new EQC fares in the key areas of the comprehensive Life Cycle Assessment (LCA): consumption of resources and emissions.

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Battery-electric drive system:
Locally emission-free driving with high vehicle range.

Economical (NEDC values)[1]:
Combined power consumption: 20.8 – 19.7 kWh/100 km,
Combined CO_2 emissions: 0 g/km,
445 – 471 kilometres battery-electric range.

Resource-efficient:
100 components from less resource consuming materials.

The resources: what is needed to produce a car

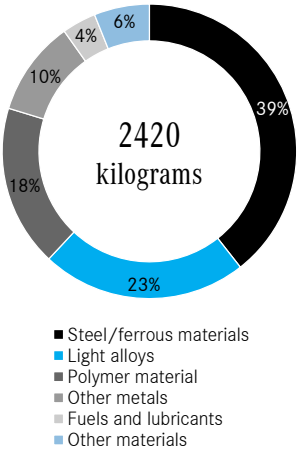
Achieve more with less

When it comes to the overall life cycle assessment, the EQC benefits from continuous locally emission-free operation and the high efficiency of the electric powertrain.

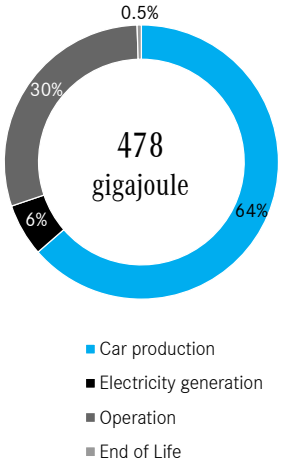
Material resources

In production, the drive components specific to the EQC require a greater use of material and energy resources. The proportion of steel and iron is reduced by the omission of a combustion engine and transmission plus their peripheral units. On the other hand, the proportion of light alloys, polymers and other metals is increased. The importance of the production process increases.

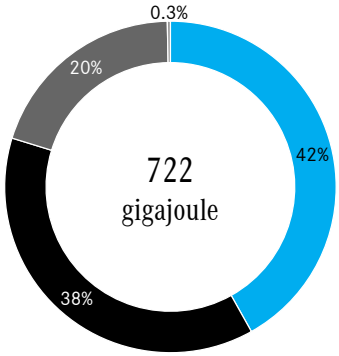
Mercedes-Benz EQC



electricity from hydropower



EU electricity mix



Energy resources

However, a realistic picture only emerges when the entire life cycle (material manufacturing, production, operation for 200,000 kilometres and recycling) is examined. This is because during its operating phase, the EQC benefits from the high efficiency of the electric powertrain.

For the analysis of the operation phase, two sources for high-voltage battery charging were examined.

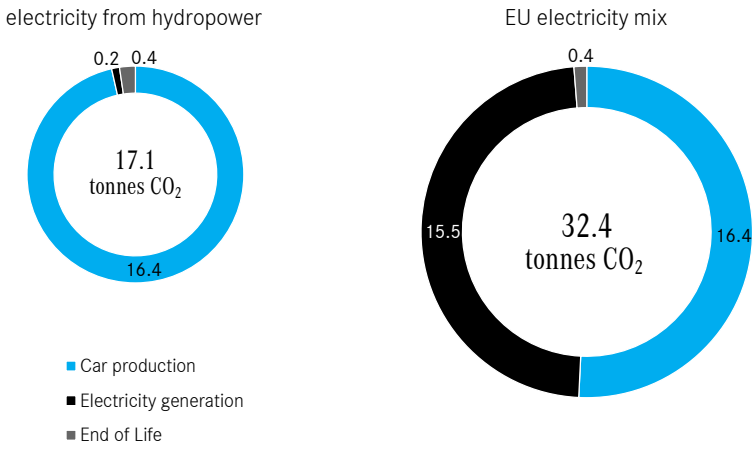
The greatest energy efficiency is achieved by the use of hydroelectric power. Over the vehicle's entire life cycle the analysis shows a primary energy requirement of 478 GJ, of which 250 GJ come from fossil resources and 228 GJ from renewable. If the EU electricity mix is used for the external charging of the high-voltage battery, the proportion of the primary energy requirement of the use phase increases to 58 %. Over the vehicle's entire life cycle, the primary energy requirement amounts to 722 GJ.

The materials used are not lost when this life cycle comes to an end. The valuable materials contained in the high-voltage battery can for the most part be retrieved by specific recycling. All in all, a recovery rate of 95% is achieved for the EQC.

The emissions: the carbon footprint over the life cycle

It depends on the electricity mix

It is of decisive importance for the CO_2 balance, whether the power for the external charging of the EQC battery is produced from the renewable sources wind or hydro power, or whether the European electricity mix forms the basis.



Values are rounded

CO_2 emissions

Analysis of the emissions during the individual phases of the life cycle makes it clear:

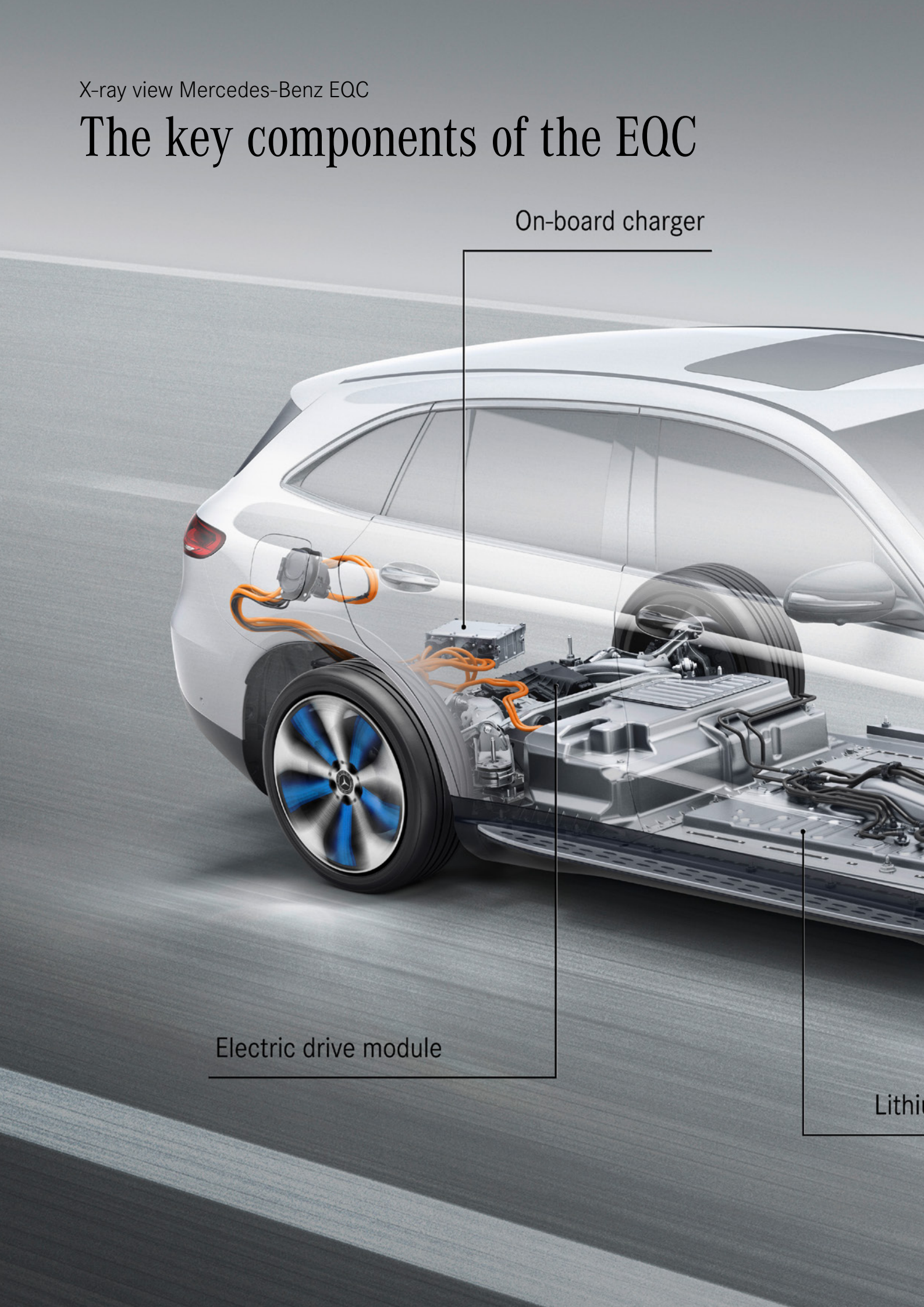
As more and more vehicles are turning to electric power, two further factors are becoming increasingly important, the production of the high-voltage battery and the generation of the electricity for the external charching of the battery.

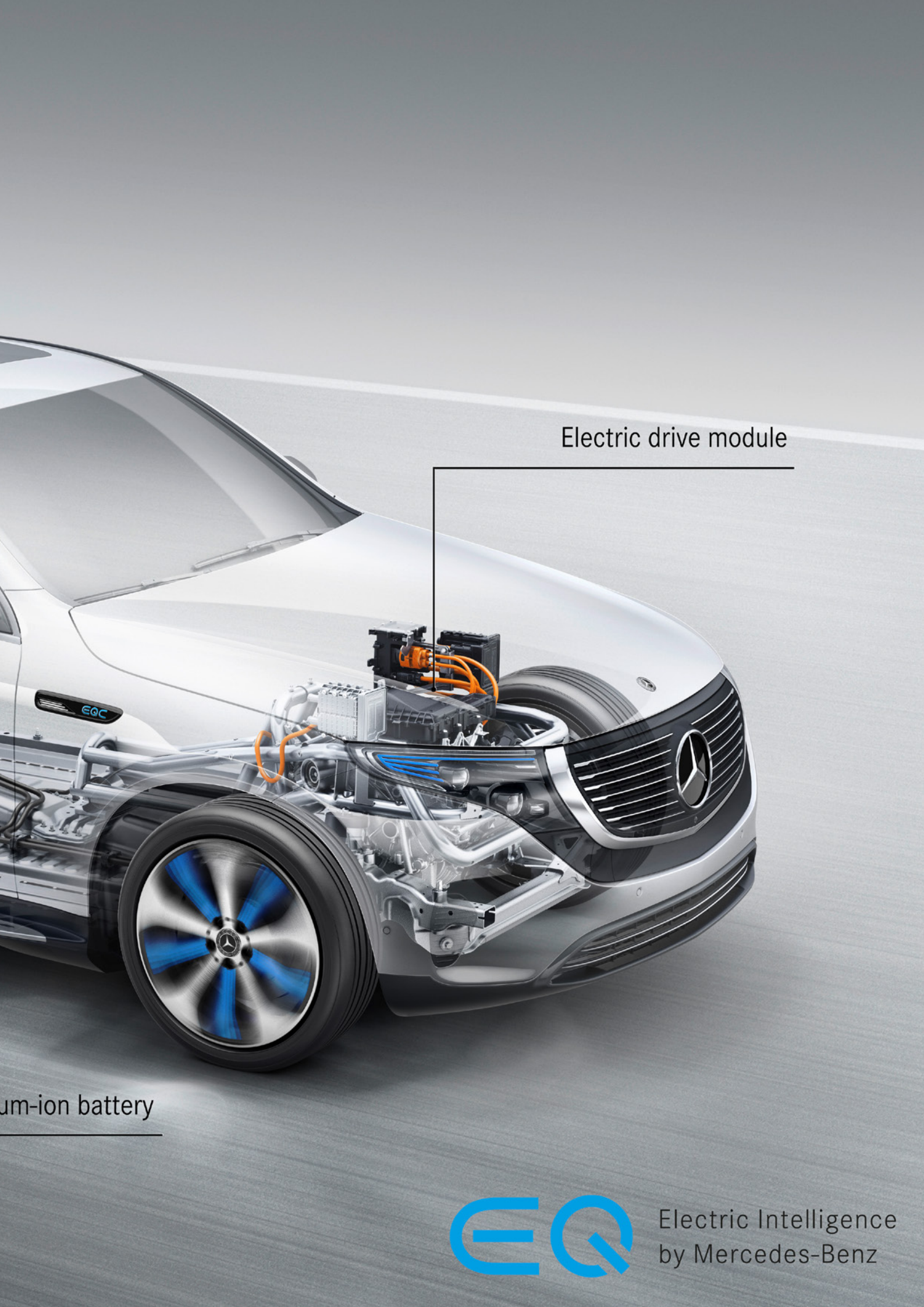
Approximately half of the CO_2 emissions generated during production of the EQC stem from the lithium-ion high-voltage battery and the battery periphery. The impact of the charging current also makes itself felt: if it is produced from renewable sources, for example using hydroelectric power, the CO_2 emissions can be reduced significantly by comparison with the EU electricity mix and kept almost to the level for passenger-car production.

If the European electricity mix is used for external battery charging, the EQC 400 4MATIC emits a total of 32.4 tonnes of CO_2 over the entire life cycle. The use of power completely generated from renewable resources even makes a reduction to 17.1 tonnes of CO_2 possible.

X-ray view Mercedes-Benz EQC

The key components of the EQC





Electric Intelligence
by Mercedes-Benz

The charging

Mercedes me Charge

Via Mercedes me Charge the customer receives access to the world's largest charging net with over 300,000 charging points and over different operators of public charging stations in Europe alone (municipalities, carparks, motorways, shopping centres, etc.).

Thanks to EQC-optimised navigation, Mercedes-Benz customers can find these stations easily and can gain convenient access to the charging stations via the Mercedes me Charge card, the Mercedes me App or directly from the car.

Mercedes me Charge also allows access to the quick-charging stations of the pan-European network IONITY. Especially over long distances, the short charging times make for a pleasant journey. By 2020 IONITY will construct and operate around 400 quick-charging stations along the main traffic arteries in Europe.

IONITY was founded in November 2017 as a joint venture by BMW Group, Daimler AG, Ford Motor Company and the Volkswagen group with Audi and Porsche.

As standard the EQC is equipped with a water-cooled onboard charger (OBC) with a capacity of 7.4 kW, making it suitable for AC charging at home or at public charging stations.

Charging at a Mercedes-Benz Wallbox is up to three times faster than at a domestic power socket. It is faster still with DC charging – which is standard for the EQC – for example via CCS (Combined Charging Systems) in Europe and the USA, CHAdeMO in Japan or GB/T in China. Depending on the SoC (status of charge), the EQC can be charged with a maximum output of up to 110 kW at an appropriate charging station. In around 40 minutes, the battery can be charged from 10 - 80 percent SoC[1].

[1] The charging times are for 10 - 80 % full charge when using a DC rapid charging station with supply voltage 400 V, current at least 300 A.

Usage of materials EQC

Responsible resource utilisation

Closed-loop material cycles and the usage of renewable raw materials are the key levers for responsible resource utilisation.

Manufacturing vehicles requires a high degree of material usage. For this reason there is a developmental focus on further reducing the use of resources and the environmental impacts of the materials deployed. To this end, the use of less resource consuming materials such as recycled plastics and renewable raw materials in the vehicles is constantly being extended.

As just one example, the high-quality „Response“ upholstery fabric that has been newly developed for the EQC is made 100% out of recycled PET plastic bottles.

Recycled plastic materials are likewise used in typical applications such as for the lining of the spare wheel recess or the covers for the underside of the engine compartment. Renewable raw materials such as hemp, kenaf, wool, paper and natural rubber are also used. Kenaf fibres are used, for example, for the lining of the load compartment, while a paper honeycomb is used within the load compartment floor. The natural fibre is used in such cases to replace mineral fibres such as glass fibre.

In the new EQC a total of 100 components plus small parts such as push buttons, plastic nuts and cable fasteners with a total weight of 55.7 kilograms can be produced partially from less resource consuming materials.

Facts and figures

Would you have known that ...

... EQ is the new Mercedes-Benz brand for electromobility?

The name stands for „Electric Intelligence“ and is derived from the brand values of „Emotion and Intelligence“. The goal has been clearly defined: Within a very short time, EQ is to become one of the most desirable technology brands in the automobile sector. In this context, excitement and fascination are just as important as the message about holistic solutions that provide maximum customer benefit with state-of-the-art technologies.

... the EQC is fully and flexibly integrated into the production line for the series models?

The EQC rolls off the production line at the Mercedes-Benz plant in Bremen. There it is being produced on the same line as the C-Class Saloon and Estate as well as the GLC and GLC Coupé – digitally, flexibly and sustainably. Production of vehicles with various drive systems can be adapted variably and efficiently in line with market demand. This approach is an ideal way to ensure the best possible use of capacity at the plant, and guarantee high Mercedes-Benz production and quality standards.

... some 200 prototype and pre-production EQC vehicles have been driven several million kilometres across four continents?

The test programme included more than 500 separate tests in Europe, North America, Asia and Africa. Like all Mercedes-Benz vehicles, the EQC must successfully complete the demanding standard test programme. On top of this there are special tests for the electric drive system, the battery and for the interplay between all drive system components.

... 1995 the life cycle assessment of the first A-Class started?

The study “Comprehensive life cycle assessment of the Mercedes-Benz A-Class”represented the first time that a Mercedes-Benz vehicle was analysed in detail over its entire life cycle. Since then, the life cycle assessment tool has become an integral part of the Mercedes-Benz development process.

... since 2005 Mercedes Benz has been publishing product-related environmental information as a result of environmentally compatible product development, verified by TÜV SÜD environmental verifiers taking into account ISO 14001, ISO TR 14062 and ISO 14006?

Reducing the environmental impact of a vehicle’s emissions and resource consumption throughout its life cycle is crucial to improving its environmental performance. The environmental burden of a product is already largely determined in the early development phase. In Development at Mercedes-Benz, a “DfE” team ensures compliance with the established environmental objectives. This team comprises specialists from a wide range of fields, e.g. life cycle assessment, dismantling and recycling planning, materials and process engineering, as well as design and production.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CERTIFICATE
The Certification Body
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Daimler AG
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71063 Sindelfingen
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has established and applies
an Environmental Management System
with particular focus on eco design for
Development of passenger vehicles.
A specific audit, Order No. 70014947,
revealed, that the entire product life cycle is considered
in a multidisciplinary approach when integrating environmental aspects
in product design and development
and that the results are verified by means of Life Cycle Assessments.
Thereby the requirements according to
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ISO/TR 14062:2002
are fulfilled.
This certificate is valid only in combination with the
ISO 14001 certificate, registration no.: 12 104 13407 TMS
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Product Compliance Management
Munich, 2019-01-02
TÜV SÜD Management Service
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Mercedes-Benz has published product-related environmental information since 2005, reflecting the results of environmentally compatible product development and verified by environmental assessors at TÜV SÜD. The brochures are made available to the wider public as the „Lifecycle“ series. They can be downloaded at www.mercedes-benz.com.

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Mercedes-Benz – A Daimler Brand