

Life
cycle **COMPACT**



360° Environmental check Mercedes-Benz EQE SUV

Mercedes-Benz





360° Environmental check

Mercedes-Benz EQE SUV

The EQE SUV is the multi-purpose variant of the EQE executive saloon. It is a further key milestone on the road to making our new car fleet net carbon-neutral by 2039.

Electrification of the Mercedes-Benz portfolio has been progressing in leaps and bounds for some time. The goal of Mercedes-Benz Cars is to be all-electric by 2030 wherever market conditions allow.

Mercedes-Benz is consistently pursuing the goal of net CO₂ neutrality along the entire value chain in the new car fleet from 2039 onwards. By 2030, we want to reduce the CO₂ emissions per passenger car in the new car fleet by at least 50% along all stages of the value chain compared to 2020. To achieve this goal, the key levers include: electrifying the vehicle fleet, charging with green energy, improving battery technology, an extensive use of

recycled materials and renewable energy in production.

By 2030, it is planned to cover 70 percent of the energy demand in our own Mercedes-Benz Cars production plants with renewable energies. This is to be achieved by expanding solar and wind energy at our own sites and by concluding further corresponding power purchase agreements.

In the life cycle of an electric vehicle, charging with electricity from renewable sources is an essential factor in reducing CO₂ emissions. Mercedes-Benz makes it possible for customers to enjoy the benefits of „Green Charging“ at public

charging stations in Europe, the USA and Canada. For Green Charging, green power certificates are used to ensure that an equivalent amount of electricity from renewable sources is fed into the grid to compensate for the charging processes via Mercedes me Charge.

In this brochure we briefly summarise the results of the Mercedes-Benz EQE SUV LCA for you.

By the way: this brochure is available for download from <https://group.mercedes-benz.com/sustainability/climate/>.

Mercedes-Benz EQE SUV

Multi-purpose variant of the EQE executive saloon

The EQE SUV is the fourth model after the two EQS and EQE Saloons and the EQS SUV to use the new purely electric platform. Depending on the vehicle equipment and configuration, the European models achieve WLTP ranges of over 590 kilometres.

Production of the EQE SUV started at the Mercedes-Benz plant in Tuscaloosa, Alabama (USA) in December 2022. The battery plant in nearby Bibb County supplies the batteries for this model, as well as for the EQS SUV.

The battery of the EQE 350+ SUV (WLTP: combined electrical consumption: 21.8-17.6 kWh/100 km; combined CO₂ emissions: 0 g/km)¹ has a usable energy content of around 90 kWh while the range of up to 593 km¹ makes a car absolutely viable for long distances.

All EQE SUV models have an electric drivetrain (eATS) on the rear axle. The versions with 4MATIC also have an eATS on the front axle. The electric motors on the front and rear axles are permanently excited synchronous motors (PSM). The advantages of this design include high power density, high efficiency and high power constancy.

The EQE SUV offers several variants of energy recovery by means of recuperation: in this process, the high-voltage battery is charged by converting the mechanical rotary

motion into electrical energy during overrun or braking mode. The driver can manually select the deceleration behind the steering wheel. ECO Assist² also offers situation-optimised recuperation – deceleration is so strong or weak that it ultimately results in the most efficient driving style. Recuperative deceleration is also used as far as possible for vehicles detected ahead until they come to a standstill, for example at traffic lights. The driver does not need to press the brake pedal for this – literally one-pedal driving.

¹ Range and electrical consumption have been determined on the basis of Commission Regulation (EC) No. 2017/1151/EU.

² Our driver assistance and safety systems are aids and do not relieve you of your responsibility as a driver. Observe the notes in the operator's manual and the system limits described there.



Powerful cell chemistry meets intelligent software

Battery development is a decisive factor in Mercedes-Benz's electrification strategy. After all, the battery is the heart of an electric car and makes a decisive contribution to, among other things, the range and thus the driving characteristics of the electric vehicle.

In the EQE 350+ SUV, the lithium-ion battery is made up of ten modules and has a usable energy content of 90 kWh. The innovative battery management software, developed in-house, allows updates over the air (OTA).

With this generation of batteries, a major step has been achieved in terms of the sustainability of the cell chemistry: The optimised active material consists of nickel, cobalt and manganese in a ratio of 8:1:1. This reduces the cobalt content to ten percent.

Mercedes-Benz takes a holistic approach to the battery life cycle: Re-Use, Remanufacture, Recycle. Once the traction batteries of the Mercedes fleet reach the end of their life on the road, it's far from over. The company's focus is in particular on applications from the 2nd-life and replacement parts storage unit sector. Only then is it time for material recycling.

In view of the future return of lithium-ion battery systems from EQ vehicles, Mercedes-Benz is starting

to build its own battery recycling factory based on hydrometallurgy in Germany. The pilot project is scheduled to start at the end of 2023.

The battery certificate confirms the long service life of the high-voltage batteries. It is valid for a period of ten years or up to a distance driven of 250,000 kilometres with a defined residual capacity, whichever comes first.



The facts

The Mercedes-Benz EQE 350+ SUV 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 EQE 350+ SUV fares in the key areas of the comprehensive Life Cycle Assessment (LCA): consumption of resources and emissions.



³ Range and electrical consumption have been determined on the basis of Commission Regulation (EC) No. 2017/1151/EU.

⁴ Further information on the official fuel consumption and the official specific CO₂ emissions of new passenger cars can be found in the publication „Leitfaden über den Kraftstoffverbrauch, die CO₂-Emissionen und den Stromverbrauch neuer Personenkraftwagen“ [Guide to fuel consumption, CO₂ emissions and electrical consumption of new passenger cars] which is available free of charge at all sales outlets and from Deutsche Automobil Treuhand GmbH at www.dat.de.

Fully electric drive:

Locally CO₂ emission-free driving.

Efficient drive with long range (figures according to WLTP)^{3,4}:

Electrical consumption combined 21.8 – 17.6 kWh/100 km

CO₂ emissions combined 0 g/km

481 – 593 kilometers battery-electric range.

Resource-efficient:

132 components with a total weight of 65.1 kilograms can be produced partially from less resource consuming materials (recycled plastics and renewable raw materials).



The resources: what is needed to produce a car

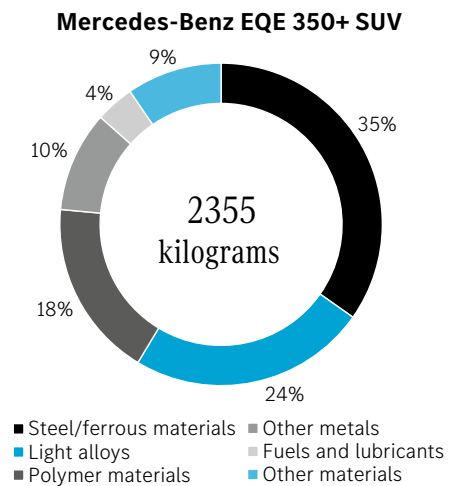
Achieve more with less

When it comes to the overall life cycle assessment, the EQE 350+ SUV benefits from locally CO₂ emission-free operation and the high efficiency of the electric powertrain.

Material resources

In the case of the EQE 350+ SUV, steel and ferrous materials account for the largest share of the materials at 35%. They are followed by light alloys at 24%, polymer materials at 18% and other metals (non-ferrous and special metals) at about 10%. Fuels and lubricants account for around 4%. The other materials (process polymers, electrics/electronics, etc.) account for around 9%.

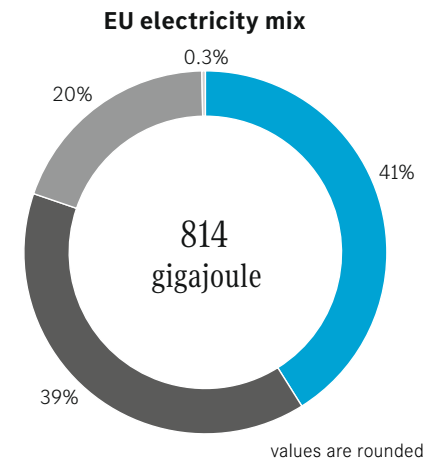
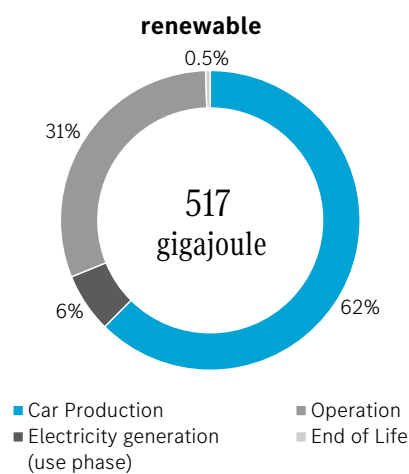
In production, the electric drive components of the EQE 350+ SUV require a greater use of material and energy resources. The importance of the car production therefore increases compared to conventional combustion engines.



Energy resources

However, a comprehensive picture only emerges when the entire life cycle (material manufacturing, production, operation for 250,000 kilometres and end of life⁵) is examined. This is because during its operating phase, the EQE 350+ SUV benefits from the high efficiency of the electric powertrain.

Two scenarios for traction current generation and cell production (high-voltage battery) were investigated for the EQE 350+ SUV life cycle. In the standard “electricity mix” scenario, the EU electricity mix⁶ is used for the traction current, while the China electricity mix⁶ and heat from natural gas⁶ are used for the cell production. In the “renewable” scenario, renewable energies are used in both cases (electricity from hydropower and heat from biomass)⁶. The higher energy efficiency



can be achieved by using electricity generated from renewable sources: for the entire EQE 350+ SUV life cycle, the analysis here results in a primary energy demand of 517 GJ, of which 247 GJ come from fossil sources and 270 GJ from renewable sources. In the “electricity mix” scenario, however, the primary energy demand is significantly higher. In total over the entire life cycle, the

primary energy demand here is 814 GJ.

The materials used are not lost when this life cycle comes to an end. The valuable materials contained in high-voltage batteries can also be recovered to a large extent through targeted recycling. All in all, a recovery rate of 95% is achieved for the EQE SUV according to ISO 22628.

⁵ Not including scrap credits

⁶ The LCA software and database (version: SP2023.01) by Sphera Solutions GmbH was used to carry out the life cycle assessment.

The emissions: the carbon footprint over the life cycle

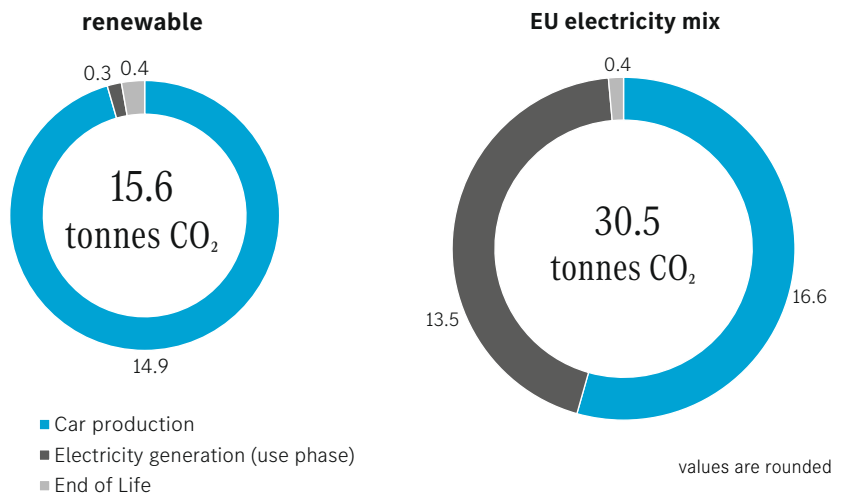
It depends on the electricity mix

It is of decisive importance for the CO₂ balance, whether the power is produced from the renewable sources wind or hydro power, or whether the power mix forms the basis.

CO₂ 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 charging of the battery.

In EQE 350+ SUV production, about half of the CO₂ emissions are caused by the high-voltage lithium-ion battery and the battery peripherals. Furthermore, the vehicle bodyshell, the wheels/tyres and the electric drivetrain (eATS) contribute significantly to the CO₂ emissions of passenger car production. CO₂ emissions result primarily from the provision of energy for material production. This results in comparatively high values for components that have a large mass and are therefore material-intensive to manufacture.



In addition to vehicle production, the choice of charging current in the use phase is a decisive factor for the overall carbon footprint. In the „electricity mix“ scenario, the EQE 350+ SUV emits a total of 30.5 tonnes of CO₂ over its life cycle (car production, driving over 250,000 km and end of life⁷). Of this, 16.6 tonnes are attributable to car production and 13.5 tonnes to the generation of

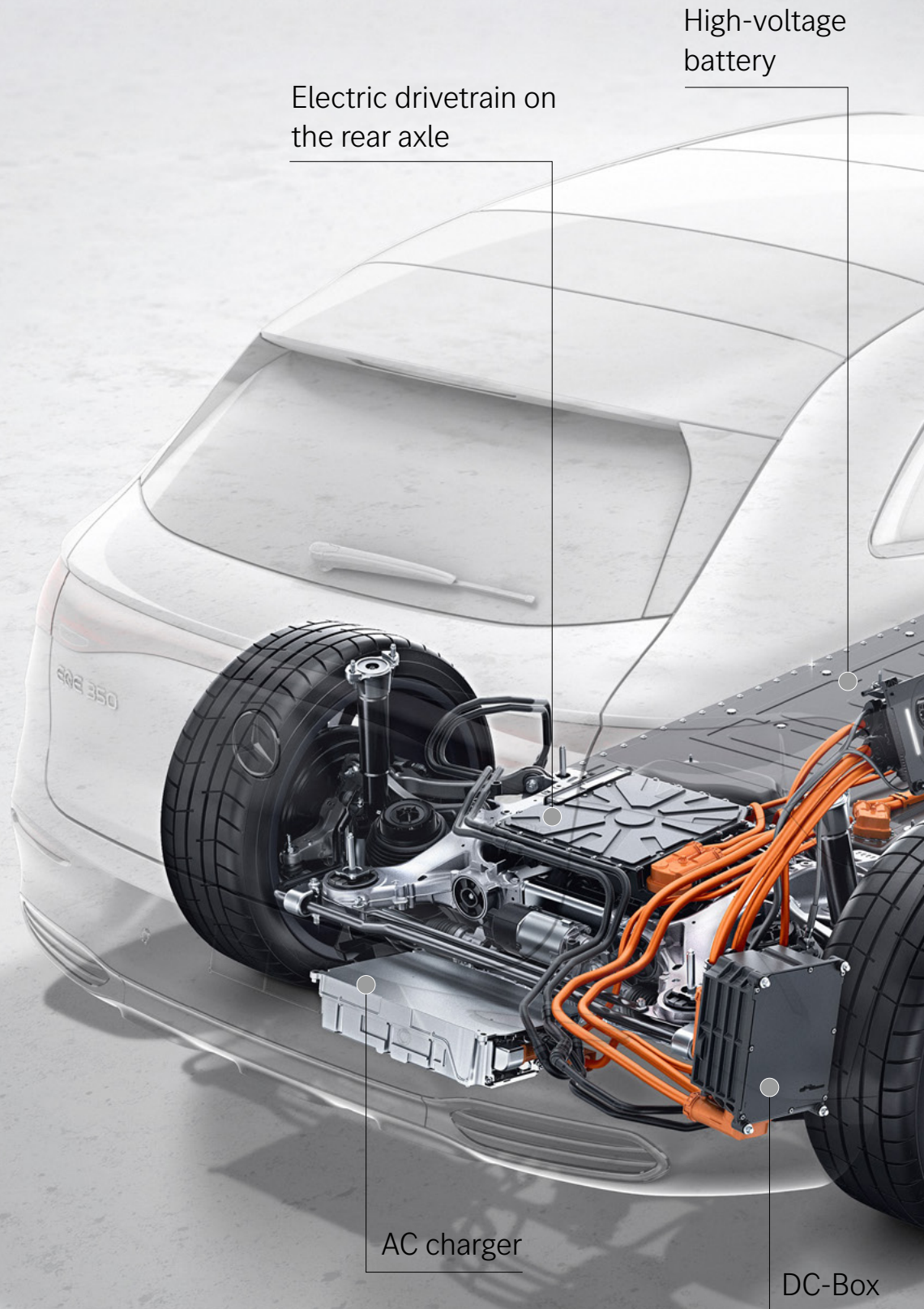
the charging current (EU electricity mix). If renewable energy (electricity from hydropower) is used for the cell production taking place in China and the European charging current, the life cycle CO₂ emissions can be almost halved (15.6 tonnes).

⁷ Not including scrap credits

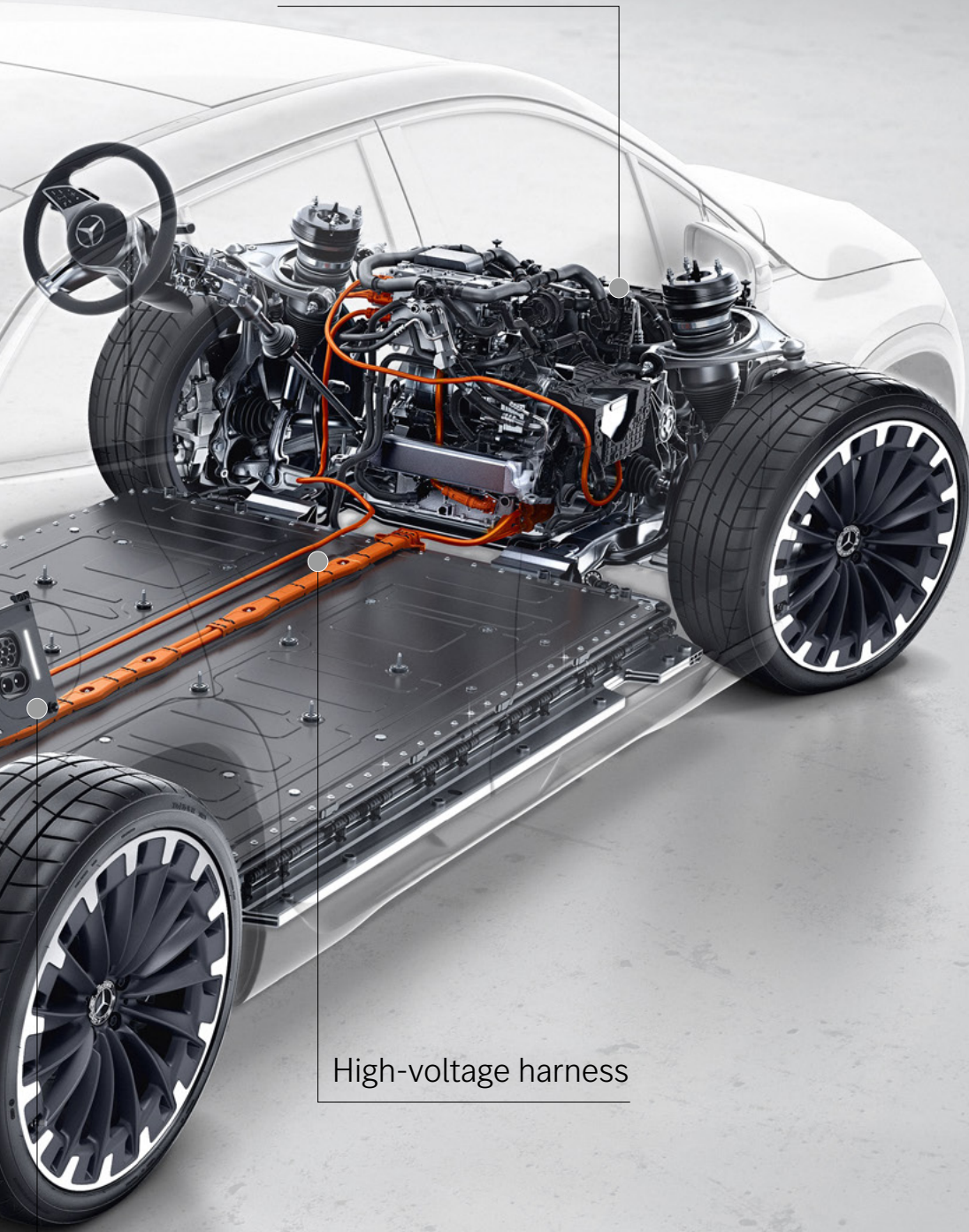


X-ray view Mercedes-Benz EQE SUV

The most important drive components of the EQE SUV



Electric drivetrain on the front axle



High-voltage harness

Charging socket

The charging

Mercedes me Charge

Mercedes me Charge gives customers access⁸ to one of the world's largest charging networks. Currently, Mercedes me Charge includes more than 1,100,000 AC and DC charging points, of which more than 450,000 are in Europe.

The Mercedes me App shows the precise location, current availability, and price at the selected charging station in advance. This information can also be accessed via the navigation system in fully electric vehicles, and is used by the Navigation with Electric Intelligence to calculate a convenient and time-efficient route, including charging stops.

The Mercedes me Charge Plug & Charge⁹ function makes it even more convenient to charge at Plug

& Charge-enabled public charging points: when the charging cable is plugged in, the charging process starts automatically; no further authentication by the customer is required. The vehicle and the charging station communicate directly via the charging cable. Because a charging contract is stored in the system, each charging process is debited automatically – even abroad. The customer chooses the preferred payment method only once. The

individual charging processes are clearly listed in a monthly invoice.

Mercedes me Charge makes it possible for customers to enjoy the benefits of green charging at public charging stations in Europe, the USA and Canada. For Green Charging, green power certificates are used to ensure that an equivalent amount of electricity from renewable sources is fed into the grid to compensate for the charging processes via Mercedes me Charge.

⁸ In order to be able to use the Mercedes me connect service "Mercedes me Charge", a separate charging contract with a selected third-party provider is required, via which the charging processes are paid for and invoiced. The use of Mercedes me connect services requires a personal Mercedes me ID and consent to the Terms of Use for the Mercedes me connect services.

⁹ In order to use Plug & Charge, on vehicles with the appropriate technical equipment you also have to activate the "Plug & Charge" service.



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.

With the Dinamica material, high-quality secondary raw material is also now used in the interior of the EQE SUV. Dinamica® is a microfiber made of recycled polyester and water-borne polyurethane. The recycled polyester contained in Dinamica derives e.g. from textiles remnants and PET bottles. Dinamica has a suede leather optic and haptic and is used in the interior as seat cover.

In the EQE SUV a total of 132 components plus small parts such as push buttons, plastic nuts and cable fasteners with a total weight of 65.1 kilograms can be produced partially from less resource consuming materials.



Facts and figures

LCA results

Input parameters

Material resources	EQE 350+ SUV (EU electricity mix)	EQE 350+ SUV renewable*	Delta to EQE 350+ SUV (EU electricity mix)
Bauxite [kg]	2,700	2,697	-0.1%
Dolomite [kg]	91.7	85.9	-6%
Iron [kg]**	714	750	5%
Non-ferrous metals (Cu, Pb, Zn) [kg]**	281	280	-0.2%

** as elementary resources

Energy resources

ADP fossil*** [GJ]	401	215	-46%
Primary energy [GJ]	814	517	-37%
Proportionately			
Lignite [GJ]	50.3	12.5	-75%
Natural gas [GJ]	176	86.1	-51%
Crude oil [GJ]	67.1	56.2	-16%
Hard coal [GJ]	106	59.9	-44%
Uranium [GJ]	166	31.8	-81%
Other fossil resources [GJ]	1.0	0.40	-61%
Renewable energy resources [GJ]	247	270	9%

* renewably generated energy for cell production (electricity from hydropower, heat from biomass) and charging (electricity from hydropower).

*** CML 2001, as of August 2016

ADP = abiotic depletion potential

Output parameters

Emissions to air	EQE 350+ SUV (EU electricity mix)	EQE 350+ SUV renewable*	Delta to EQE 350+ SUV (EU electricity mix)
GWP*** [t CO₂-equiv.]	32.5	16.6	-49%
AP*** [kg SO₂-equiv.]	149	117	-21%
EP*** [kg Phosphat-equiv.]	9.3	5.8	-38%
POCP*** [kg Ethen-equiv.]	9.0	6.7	-26%
CO ₂ [t]	30.5	15.6	-49%
CO [kg]	41.0	31.0	-24%
NMVOc [kg]	6.5	4.5	-31%
CH ₄ [kg]	56.7	27.7	-51%
NO _x [kg]	45.4	26.8	-41%
SO ₂ [kg]	94.7	80.3	-15%

Emissions to water

BOD (biological oxygen demand) [kg]	0.16	0.14	-14%
Hydrocarbons [kg]	1.3	1.2	-6%
NO ₃ ⁻ [kg]	4.9	2.5	-50%
PO ₄ ³⁻ [kg]	0.5	0.4	-23%
SO ₄ ²⁻ [kg]	117	90.0	-23%

* renewably generated energy for cell production (electricity from hydropower, heat from biomass) and charging (electricity from hydropower).

*** CML 2001, as of August 2016

AP = acidification potential, EP = eutrophication potential, GWP = global warming potential, POCP = photochemical ozone creation potential

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Norbert Heidelmann
Department Manager for

Responsibilities: Sole liab
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included therein.

Validation

TÜV Rheinland Energy GmbH confirms that a critical review of the life cycle assessment (LCA) study and product-related environmental information of Mercedes-Benz AG, Mercedesstraße 120, 70372 Stuttgart for the following passenger car:

Mercedes-Benz EQE SUV – 2023 model year

was performed.

Proof has been provided that the requirements of the international standards

- ISO 14040:2006 + A1:2020: Environmental management – life cycle assessment – principles and framework
- ISO 14044:2006 + A1:2018 + A2:2020: Environmental management – life cycle assessment – requirements and guidelines
- ISO/TS 14071:2014: Environmental management – life cycle assessment – critical review processes and reviewer competencies; additional requirements and guidelines to ISO 14044
- ISO/TR 14062:2022: Integration of environmental aspects into product design and development
- ISO 14020: 2000: General principles of environmental labeling and declarations and ISO 14021: 2016: Environmental supplier declarations (Type II environmental labeling).

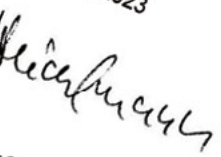
Results:

- The LCA study for the variant EQE 350+ SUV (basis of the environmental brochure) was carried out according to the international standards ISO 14040:2006 + A1:2020 and ISO 14044:2006 + A1:2018 + A2:2020. The methods used and the modelling of the product system correspond to the state of the art. They are suitable to fulfill the goals stated in the study. The report and environmental brochure are comprehensive and provides a transparent description of the framework of the study.
- The assumptions used in the LCA study especially energy consumption based on the current WLTP (Worldwide harmonized Light vehicles Test Procedure) were verified and discussed.
- The assessed samples of data and environmental information included in the LCA study and environmental brochure are plausible.

Review process and level of detail:

- Verification of input data and environmental information as well as the check of the LCA process was performed in course of a critical data review. The data review considered the following aspects:
- Check of the applied methods and the product model,
- Inspection of technical documents (e.g. type approval documents, parts lists, supplier information, measurement results, etc.) and
- Check of LCA input data (e.g. weights, materials, energy consumption, etc.).

2nd August 2023



Sustainability and Carbon Services

liability for the content of the LCA rests with Mercedes Benz AG. TÜV Rheinland Energy GmbH was commissioned to compliance with the methodical requirements, and to verify and validate the correctness and credibility of the information

Mercedes-Benz has published product-related environmental information since 2005, reflecting the results of environmentally compatible product development and verified by independent experts.

The brochures are made available to the wider public as part of the "Lifecycle" series. They can be downloaded at <https://group.mercedes-benz.com/sustainability/climate/>

As at: May 2023

Mercedes-Benz Group Communications, 70546 Stuttgart, Germany - www.mercedes-benz.com
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