Mercedes-Benz Group

360° ENVIRONMENTAL CHECK MERCEDES-BENZ CLA WITH EQ TECHNOLOGY

Life cycle **COMPACT**

360° Environmental check Mercedes-Benz CLA with EQ Technology

With the CLA, the pioneer of a new, innovative family of electric vehicles from Mercedes-Benz is going into series production. It is another important milestone on the way to implementing our sustainable Ambition 2039 business strategy.

Sustainability and climate protection are key pillars of the business strategy of the Mercedes-Benz Group. With our Ambition 2039, we have already set the course towards net carbon-neutrality[1] for our new vehicle fleet in 2019. Market conditions, infrastructure, and customer requirements determine the course of the transformation. The company aims to reduce CO_2 emissions per car in the new vehicle fleet by up to 50 % over the next decade across all stages of the value chain and throughout the entire life cycle. 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 more than 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.

For the new CLA, Mercedes-Benz Cars has defined quantitative interim targets for CO_2 emissions in the supply chains for production materials for the first time. The focus here is on materials and components that have high CO_2 emissions during production. These include steel, aluminum, certain plastics, and battery cells. Thanks to the measures agreed with the suppliers, CO_2 emissions for the production of the CLA 250+ can be reduced by around 17 % compared to conventional production.

In the life cycle of an electric vehicle, charging with electricity from renewable sources is an essential factor in reducing CO_2 emissions. Via MB.CHARGE Public[2] Mercedes-Benz makes it possible for its customers to charge with electricity from renewable sources. “Green Charging” is an integral part of MB.CHARGE Public in Europe, Canada, and the USA. If electricity from renewable energy sources is not yet available at the respective charging station, “Green Charging” uses renewable energy certificates. These ensure that an equivalent amount of electricity from renewable energies is fed into the grid for charging processes.

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

By the way: this brochure is available for download from https://group.mercedes-benz.com/en/.

[1] Net carbon-neutral means that carbon emissions that are not avoided or reduced at Mercedes-Benz are compensated for by certified offsetting projects

[2] To use the Digital Extras, you must create a Mercedes me ID and agree to the Terms of Use for Digital Extras and the Mercedes me ID Terms of Use as amended. In addition, the respective vehicle must be linked to the user account. At the end of the limited term, the Digital Extras can be renewed for a fee, provided they are still available for the respective vehicle at that time. In order to use the Digital Extra MB.CHARGE Public, a customer‘s own separate charging contract with a selected third-party provider is required, which is used for payment and billing of the charging processes.

Mercedes-Benz CLA with EQ Technology

Pioneer of a new, innovative family of electric vehicles

The market launch will take place with the CLA 250+ with EQ technology (combined energy consumption: 14.1-12.2 kWh/100 km; combined CO_2 emissions: 0 g/km; CO_2 class: A)[3], and the CLA 350 4MATIC with EQ technology (combined energy consumption: 14.7-12.5 kWh/100 km; combined CO_2 emissions: 0 g/km; CO_2 class: A)[3].

Thanks to outstanding drive efficiency and aerodynamics, the CLA 250+ offers a range of up to 792 kilometers according to WLTP.

The highlights of the electric CLA include the 800-volt electric architecture and the advanced drive units including a two-speed transmission on the main drive at the rear axle. The electric drive unit was developed entirely in-house and is derived directly from the VISION EQXX power unit.

The electric CLA is the first Mercedes-Benz vehicle to feature an air-side heat pump as standard. It no longer has to go the circuitous route through a water circuit and moreover can use three energy sources in parallel: the waste heat from the electric drive unit, the waste heat from the battery and the ambient air.

The electric CLA has a new one-box braking system. The system optimizes the recovery of braking energy and thus increases the range. For reasons of efficiency, almost all braking is carried out entirely by recuperation. In principle, the models can even brake electrically until the vehicle comes to a stop and thus recover kinetic energy. If ECO Assist has detected a moving or stationary vehicle ahead, it can even brake the CLA to a standstill. This is possible, for example, at the tail end of a traffic jam or at a traffic light.

[3] The specified values were determined according to the prescribed measurement procedure WLTP (Worldwide Harmonized Light Vehicles Test Procedure). The energy consumption and CO_2 emissions of a car depend not only on the efficient use of the fuel or energy source by the car, but also on the driving style and other non-technical factors. For models with EQ technology or EQ Hybrid technology, the certified electrical consumption is usually determined with maximum AC charging power using a Mode 3 cable. It is therefore recommended that vehicles with an HV battery are preferably charged at a wallbox or an AC charging station with a Mode 3 cable in order to achieve shorter charging times and better recharge efficiency.

The charging

MB.CHARGE Public: Integrated digital charging service

With the Digital Extra MB.CHARGE Public[4] (previously Mercedes me Charge), Mercedes-Benz bundles all public charging services and offers numerous benefits exclusively for customers of the brand.

Via MB.CHARGE Public, customers with Mercedes-Benz electric vehicles and plug-in hybrids in 35 countries on four continents have easy access to one of the largest charging networks in the world. Mercedes-Benz is continuously expanding the charging network to which MB.CHARGE Public provides access through its own activities to build public charging infrastructures worldwide. Around 45,000 charging points in the global Mercedes-Benz Charging Network and the joint ventures IONITY, IONNA and IONCHI are to be established in Europe, North America, and China by the end of the decade.

Mercedes-Benz consistently relies on the use of electricity from renewable sources. “Green Charging” is an integral part of MB.CHARGE Public in Europe, Canada, and the USA. If electricity from renewable energy sources is not yet available at the respective charging station, “Green Charging” uses renewable energy certificates. These ensure that an equivalent amount of electricity from renewable energies is fed into the grid for charging processes. These are exclusively renewable energy certificates from certified wind and solar power plants[5] that are less than six years old[6]. “Green Charging” is also an integral part of the Mercedes-Benz Charging Network. The Mercedes-Benz Group wants to enable all drivers of electric vehicles to charge with green electricity. This is preferably handled via green power supply contracts, wherever possible, or through the use of renewable energy certificates.

[4] To use the Digital Extras, you must create a Mercedes me ID and agree to the Terms of Use for Digital Extras and the Mercedes me ID Terms of Use as amended. In addition, the respective vehicle must be linked to the user account. At the end of the limited term, the Digital Extras can be renewed for a fee, provided they are still available for the respective vehicle at that time. In order to use the Digital Extra MB.CHARGE Public, a customer's own separate charging contract with a selected third-party provider is required, which is used for payment and billing of the charging processes.

[5] EKOenergy in Europe, Green-e in North America

[6] Ensured in all countries except the UK and Poland

The facts

The Mercedes-Benz CLA 250+ 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 CLA with the CLA 250+ variant fares in the key areas of the comprehensive Life Cycle Assessment (LCA): consumption of resources and emissions.

Fully electric drive:
Locally CO_2 emission-free driving.

Efficient drive with long range (figures according to WLTP)[7]:
Electrical consumption combined 14.1 – 12.2 kWh/100 km,
CO_2 emissions combined 0 g/km,
CO_2 class: A,
694 – 792 kilometers battery-electric range.

Resource-efficient:
42 kg are produced from resource-saving, thermoplastic recyclate.

[7] The specified values were determined according to the prescribed measurement procedure WLTP (Worldwide Harmonized Light Vehicles Test Procedure). The energy consumption and CO_2 emissions of a car depend not only on the efficient use of the fuel or energy source by the car, but also on the driving style and other non-technical factors. For models with EQ technology or EQ Hybrid technology, the certified electrical consumption is usually determined with maximum AC charging power using a Mode 3 cable. It is therefore recommended that vehicles with an HV battery are preferably charged at a wallbox or an AC charging station with a Mode 3 cable in order to achieve shorter charging times and better recharge efficiency.

The resources: what is needed to produce a car

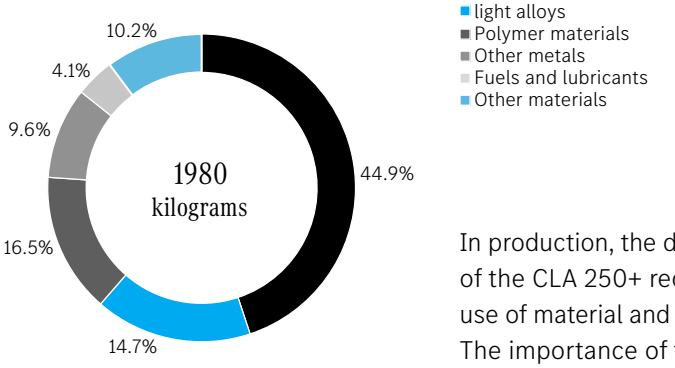
Achieve more with less

When it comes to the overall life cycle assessment, the CLA 250+ benefits from locally CO_2 emission-free operation and the high efficiency of the electric powertrain.

Material resources

In the case of the CLA 250+, steel and ferrous materials account for the largest share of the materials at 44.9 %. They are followed by polymer materials at 16.5 %, light alloys at 14.7 %, and other metals (non-ferrous and special metals) at 9.6 %. Fuels and lubricants account for 4.1 %. The other materials (process polymers, electrics/electronics, etc.) account for 10.2 %.

Mercedes-Benz CLA 250+



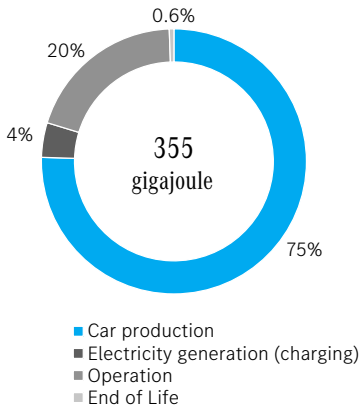
In production, the drive components of the CLA 250+ require a greater use of material and energy resources. The importance of the car production therefore increases compared to conventional combustion engines.

Energy resources

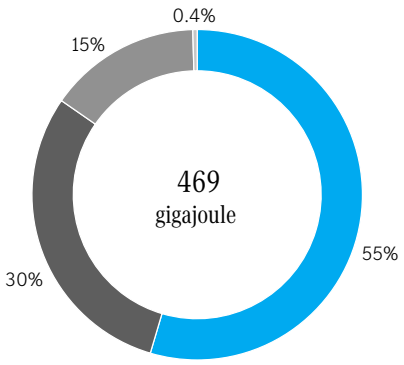
However, a comprehensive picture only emerges when the entire life cycle (material manufacturing, production, operation for 160,000 kilometres and end of life[8]) is examined. This is because during its operating phase, the CLA 250+ benefits from the high efficiency of the electric powertrain.

Two scenarios were examined for the life cycle of the CLA 250+. In the conventional scenario, the EU electricity mix[9] is used as the basis for the traction current, and the car production is calculated using standard LCA datasets[9] that reflect the industry average. In the scenario for the start of production, the quantities of CO_2-reduced aluminum and steel, CO_2-reduced battery cells, and recycled plastic used in the new CLA are mapped specifically. In addition, traction current from renewable energy is used as a basis. The higher energy efficiency can be achieved by using electricity generated from renewable sources: for the entire CLA 250+ life cycle, the analysis here results in a primary energy demand of 355 GJ, of which 165 GJ come from fossil sources and 190 GJ from renewable sources. However, if the European electricity mix for charging the high-voltage battery and average data for modelling the car production are used, the primary energy requirement is significantly higher. In total over the entire life cycle, the primary energy demand here is 469 GJ.

start of production



conventional scenario



values are rounded

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[8].

[8] No consideration of recycling credits for end-of-life accounting
[9] The LCA software and database (version: SP2024.2) 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 CO_2 balance, whether the power is produced from the renewable sources wind or hydro power, or whether the power mix forms the basis.

CO_2 emissions

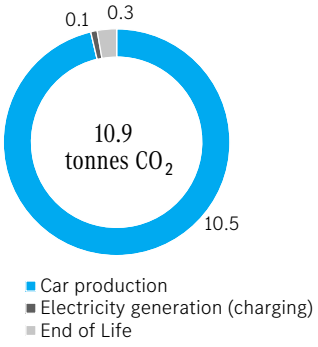
Analysis of the emissions during the individual phases of the life cycle makes it clear: As more and more vehicles are turning to electric power, two factors are becoming increasingly important, the production of the high-voltage battery and the generation of the electricity for the external charging of the battery.

In the production of the CLA 250+, around half of the CO_2 emissions are caused by the high-voltage battery, and in particular the battery cells are highly relevant. In addition, steel and aluminum in the bodyshell, wheels, axles, and drivetrain play a key role in CO_2 emissions. This is where the reduction measures agreed by Mercedes-Benz in the supply chain come in: By sourcing CO_2-reduced battery cells and using aluminum and steel produced with renewable energy, as well as recycled plastics, CO_2 emissions from car production can be visibly reduced.

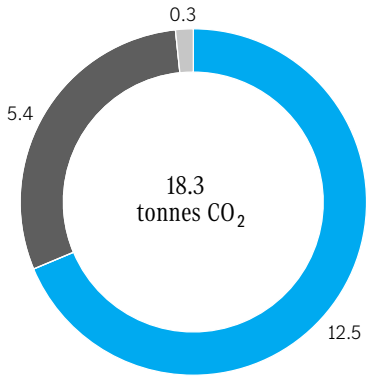
In addition to vehicle production, the choice of charging current in the usage phase is a decisive factor for the overall CO_2 footprint. With the electricity mix, the CLA 250+ emits a total of 18.3 tonnes of CO_2 over its life cycle (car production, driving over 160,000 km and end of life[8]). Of this, 12.5 tonnes are attributable to car production and 5.4 tonnes to the generation of the charging current (EU electricity mix[9]).

Thanks to the CO_2 reduction measures agreed by Mercedes-Benz in the supply chain and the use of charging electricity generated from renewable resources (electricity from hydropower[9]), life cycle CO_2 emissions can be almost cut by half (10.9 metric tons).

start of production



conventional scenario



values are rounded

Requirements for the supply chain

Sustainable supplier management

With Ambition 2039, the Mercedes-Benz Group is consistently pursuing the goal of net carbon-neutrality[10] in the new vehicle fleet from 2039 across all stages of the value chain and the entire life cycle.

The Mercedes-Benz Group pursues sustainable supply chain management. Suppliers must comply with the Responsible Sourcing Standards (RSS) in order to participate in new contracts awarded by the Group. The RSS is the central contractual document for sustainability requirements on the part of suppliers and defines e.g. mandatory requirements with regard to environmental protection.

Above and beyond these minimum requirements, the expectations also set out in the report provide a non-binding perspective for the coming years, which forms the content basis for strategy dialogues and other formats. The RSS is therefore the most important instrument for implementing the Mercedes-Benz Group's ambitious goals in the complex supply chains. These standards therefore form the guidelines for sustainable supply chain management.

For future model series and vehicle architectures, suppliers must comply with targets set by Mercedes-Benz Cars and Mercedes-Benz Vans, particularly with regard to reducing CO_2 emissions, and implement appropriate measures. These requirements apply in particular to CO_2 and energy-intensive focus materials such as steel, aluminium, polymers and battery cells. Target values for these materials and components were integrated as criteria in the awarding processes and used as key criteria in awarding contracts for the new Mercedes-Benz Modular Architecture (MMA) vehicle platform.

[10] Net carbon-neutral means that carbon emissions that are not avoided or reduced at Mercedes-Benz are compensated for by certified offsetting projects

CO_2-reduced supply chain

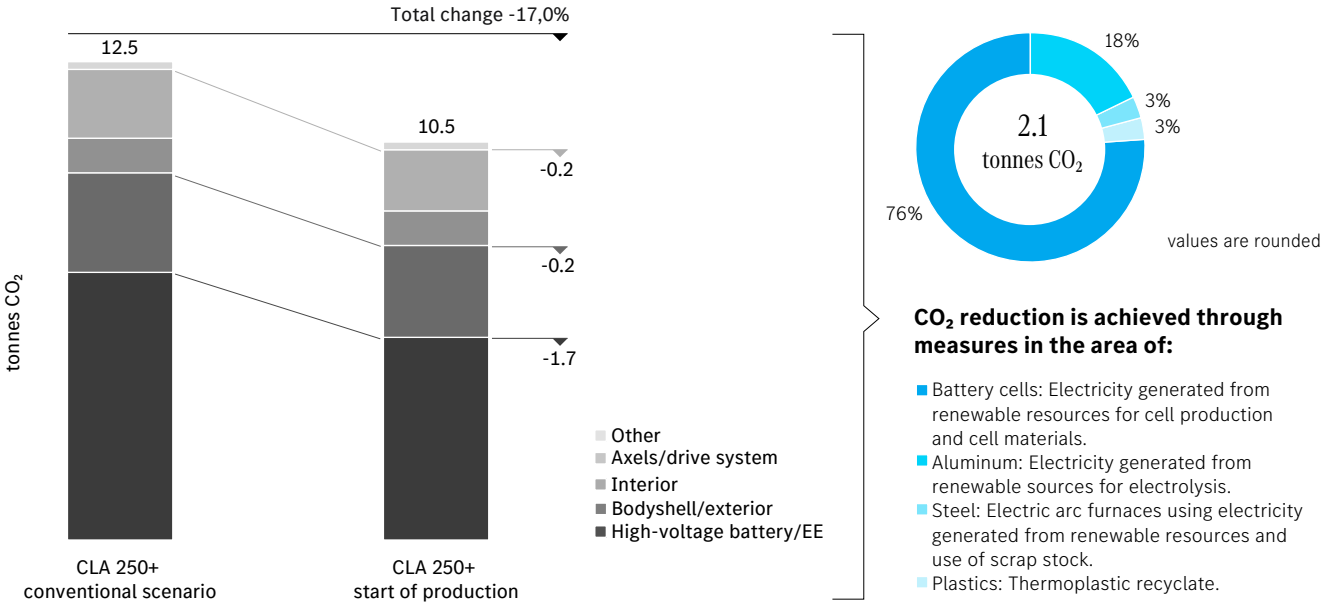
The measures agreed with suppliers can reduce CO_2 emissions for the production of the CLA 250+ by around 17 % compared to conventional production.

The battery is the component in the vehicle that contributes the most CO_2 during production. To reduce this value, the new CLA uses battery cells that are CO_2-reduced from the outset. Various reduction measures in the high-voltage cell reduce the CO_2 footprint by around 30% per cell compared to conventional production. In addition to the use of renewable electricity in cell production, electricity from renewable sources is also used in the production of cathode, anode, and cell housing materials. Looking at an entire battery, this corresponds to a reduction of around 1.6 metric tons of CO_2.

Around 40 % of the aluminum used in the CLA is produced in electrolysis plants using renewable energies. This reduces the aluminum CO_2 footprint by around 40 % per kilogram compared to the conventional import mix and saves a total of around 0.4 metric tons of CO_2 emissions in case of the CLA 250+.

Steel accounts for 45 % of the materials used in the manufacture of the CLA 250+. In this context, Mercedes-Benz AG is working with various steel suppliers and supporting them in their transformation in order to move closer to the climate protection targets of “Ambition 2039.“ The growing availability of CO_2-reduced steel is an important lever for reducing the CO_2 footprint of Mercedes-Benz vehicles. The construction of industrial direct reduction plants and smelting units is therefore an important prerequisite for the gradual decarbonization of the steel supply chain. If the direct reduction process is combined with the electric steel process, and green hydrogen (instead of natural gas) and renewable energies are used to operate the electric arc furnace during direct reduction, steel production can be virtually free of CO_2 emissions. For the new CLA, CO_2 reduction measures are already being taken in steel production. Around 39 kg of steel from electric arc furnaces, which are manufactured using electricity from renewable energy sources, is used for the steel scopes produced in-house in our own stamping plants.

By using recycled plastics, CO_2 emissions can be reduced by a further 60 kilograms compared to primary materials, while at the same time conserving resources.



CO_2 reduction is achieved through measures in the area of:

- Battery cells: Electricity generated from renewable resources for cell production and cell materials.
- Aluminum: Electricity generated from renewable sources for electrolysis.
- Steel: Electric arc furnaces using electricity generated from renewable resources and use of scrap stock.
- Plastics: Thermoplastic recyclate.

Holistic approach to battery value creation

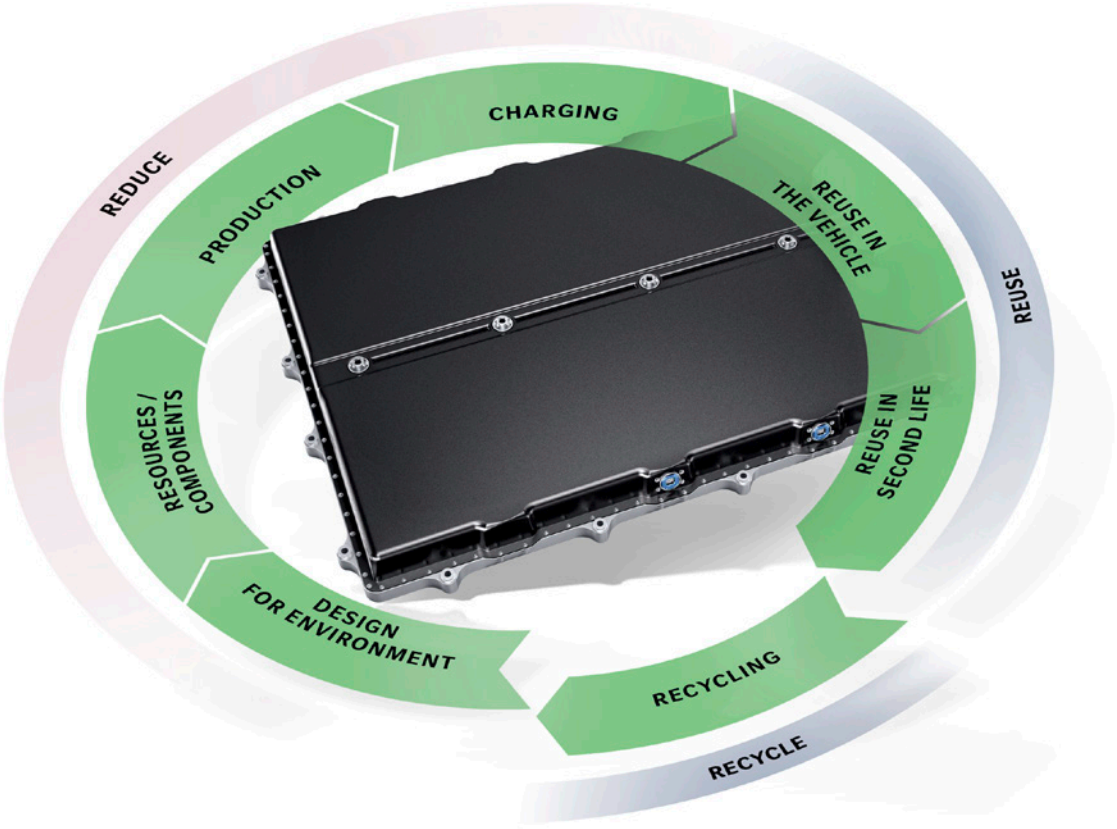
Battery recycling factory in Kuppenheim

Mercedes-Benz opened its own battery recycling plant with an integrated mechanical-hydrometallurgical process at the Kuppenheim site in southern Germany in 2024.

Mercedes-Benz takes a holistic approach to the battery life cycle and considers three core topics: circular design, value retention and closing the material cycle. 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.

With a view to the future return of lithium-ion battery systems from electric vehicles, Mercedes-Benz has set up its own battery recycling plant based on hydrometallurgy in Germany.

The Mercedes-Benz battery recycling factory in Kuppenheim covers every step: From dismantling at the module level, to shredding and drying and processing of battery-grade materials. The process design of hydrometallurgy with recovery rates of more than 96 percent is intended to enable a real circular economy of battery materials. Mercedes-Benz is cooperating with technology partner Primobius (a joint venture between German plant and mechanical engineering company SMS group and Australian process technology developer Neometals). As part of the overarching scientific research project, the entire process of battery recycling is also taken into account.



Usage of materials CLA with EQ Technology

Responsible resource utilisation

Closing material cycles and using secondary raw materials are the key levers for the responsible use of resources.

Vehicle production requires a high level of material use. In order to conserve natural resources and promote the circular economy, we aim to decouple resource consumption from volume growth. We aim to increase the proportion of secondary raw materials and use resource-conserving materials.

Measures to conserve resources are carefully integrated into the development process of our vehicles. This includes the “Design for Environment” approach, which is taken into account right from the start of vehicle development. The use of secondary materials is explicitly defined in the requirements for suppliers. In addition, supplier dialogs were held, new recycling technologies were discussed, and the necessary decisions were made to ensure that the use of secondary materials is implemented in accordance with the specifications.

In the development of the CLA, care was taken to use as many secondary materials as possible. The proportion of secondary material in the CLA 250+ with regard to thermoplastics was increased to 42 kg. Around 50 % of the secondary material for thermoplastics comes from post-consumer sources. For example, the jacking points are entirely made from recycled bumpers from end-of-life vehicles. The tub of the frunk contains around 70 % recycled material. A total of 232 components plus small parts such as snap fasteners and plastic nuts were developed sustainably.

Facts and figures

LCA results

Input parameters

Material resources	**CLA 250+ conventional**	**CLA 250+ start of production**	**Delta to CLA 250+ conventional**
Bauxite [kg]	1,331	1,344	1 %
Dolomite [kg]	92	92	0 %
Iron [kg]*	794	799	1 %
Non-ferrous metals (Cu, Pb, Zn) [kg]*	220	220	0 %
* as elementary resources			
Energy resources			
ADP fossil [GJ]**	**243**	**154**	**-37 %**
Primary energy [GJ]	469	355	-24 %
Proportionately			
Lignite [GJ]	24	7	-71 %
Natural gas [GJ]	111	69	-37 %
Crude oil [GJ]	44	39	-12 %
Hard coal [GJ]	64	38	-40 %
Uranium [GJ]	74	11	-85 %
Other fossil resources [GJ]	0.2	0.03	-86 %
Renewable energy resources [GJ]	151	190	26 %
** CML 2001, as of August 2016			
ADP = abiotic depletion potential			

Output parameters

Emissions to air	**CLA 250+ conventional**	**CLA 250+ start of production**	**Delta to CLA 250+ conventional**
GWP [t CO_2-equiv.]**	**20**	**12**	**-40 %**
AP [kg SO_2-equiv.]**	**123**	**109**	**-12 %**
EP [kg phosphate-equiv.]**	**6**	**5**	**-25 %**
POCP [kg ethene-equiv.]**	**8**	**6**	**-17 %**
CO_2 [t]	18	11	-40 %
CO [kg]	29	23	-22 %
NMVOC [kg]	6	4	-23 %
CH_4 [kg]	49	32	-34 %
NO_x [kg]	30	21	-29 %
SO_2 [kg]	84	77	-8 %
Emissions to water			
BOD (biological oxygen demand) [kg]	0.16	0.15	-6 %
Hydrocarbons [kg]	0.3	0.2	-14 %
NO_3- [kg]	2.9	2.0	-32 %
PO_4^{3-} [kg]	0.33	0.30	-8 %
SO_4^{2-} [kg]	104	91	-12 %
** CML 2001, as of August 2016			
AP = acidification potential, EP = eutrophication potential, GWP = global warming potential, POCP = photochemical ozone creation potential			

Validation

TÜVRheinland®

TÜV Rheinland Energy & Environment 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 CLA with EQ Technology – 2025 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).

are considered.

Results:

- The LCA study for the variant CLA 250+ with EQ technology (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, fuel and energy consumption, etc.).

12th March 2025

S. Dunschen

Susanne Dunschen
Sustainability Expert, Team: Carbon Services

Team: Carbon Services

bility for the content of the LCA rests with Mercedes Benz AG. TÜV Rheinland Energy GmbH was commissioned to mpliance 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 the “Lifecycle” series. They can be downloaded at https://group.mercedes-benz.com/responsibility/sustainability/.

As of: February 2025

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