

Life
cycle **COMPACT**
360° ENVIRONMENTAL CHECK



Environmental Certificate Mercedes-Benz GLC

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 GLE bears the ECARF (European Centre for Allergy Research Foundation) seal of quality.

Editorial

“We improve the environmental performance over the entire life cycle of a car”

One of our six environmental and energy guidelines states: “We strive to develop products that are highly responsible to the environment in their respective market segments.” To achieve this goal we have to incorporate environmental protection into products from the very start to a certain extent.

The earlier this “Design for Environment” approach is integrated into the development process, the greater the benefits in terms of minimised environmental impact and cost.


It is likewise crucial to reduce the environmental impact caused by emissions and consumption of resources during the entire life cycle. This comprehensive and exhaustive Life Cycle Assessment (LCA) we call ‘360° environmental check’. It scrutinises all environmentally relevant aspects of a car’s life: from manufacture of the raw materials to production, vehicle operation and then recycling at the end of the vehicle’s life – a long way off in the case of a new Mercedes-Benz.

As well as documenting every last detail of this LCA in-house throughout the entire life cycle, we have the results checked and confirmed by independent assessors from the TÜV Süd inspection authority. Only then does a car receive its Environmental Certificate.

This brochure briefly summarises the results of the GLC 350 e 4MATIC* model’s LCA for you. Incidentally, the GLC plug-in hybrid is a good example of why a comprehensive assessment is necessary to gauge the overall environmental impact. Because the naturally higher use of resources in production is more than compensated for by the clearly superior environmental performance of the car during operation.

If this compact brochure has aroused your interest in the subject, I would recommend you take a look at the detailed documentation of the GLC model’s LCA. The “Lifecycle OVERALL” brochure is available for download from <http://www.mercedes-benz.com>.

Kind regards
Yours,



Anke Kleinschmit
Chief Environmental Officer of the Daimler Group



* Fuel consumption GLC 350 e 4MATIC with automatic transmission (combined): 2.7-2.5 l/100km, 15.2-13.9 kWh/100km; CO₂-emissions (combined): 64-59 g/km.

Second generation marks a big step forward

Mercedes-Benz is already offering its second SUV with a plug-in hybrid drive in the guise of the GLC 350 e 4MATIC, which combines optimum energy efficiency with outstanding performance. This multi-talented vehicle replaces the outgoing GLK and will combine the low fuel consumption figures of a three-litre car with the performance of a V6 engine.

The new GLC 350 e 4MATIC with plug-in hybrid drive boasts a complex AWD drive train that ensures supreme performance, both on the road and off it. It comprises a BlueDIRECT direct-injection four-cylinder petrol engine with 155 kW (211 hp) and a hybrid module with 85 kW (116 hp) of electric power. The system's peak torque is a mighty 560 Newton metres, while the system's overall output is 235 kW (320 hp). This enables the mid-size SUV to accelerate from 0 to 100 km/h in just 5.9 seconds

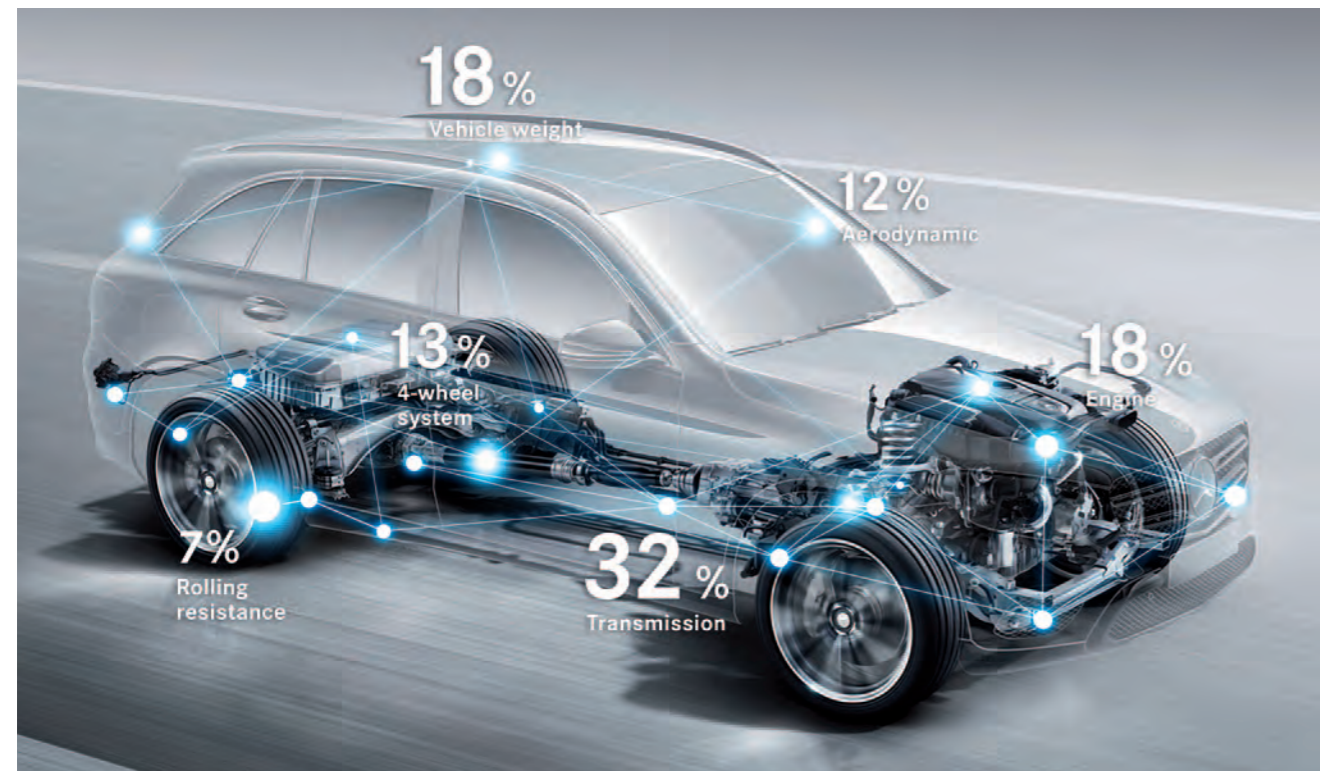
and reach a top speed of 235 km/h. In view of such dynamic performance, the certified standard consumption figures are all the more impressive.

The GLC 350 e 4MATIC consumes just 2.7–2.5 litres of fuel per 100 km. This is equivalent to CO₂ emissions of 64–59 g/km.

In addition to impressive acceleration thanks to the boost function, the highly sophisticated system drive also offers

all-electric driving for distances of up to 34 kilometres. The all-electric top speed of 135 km/h is even above the recommended speed on German autobahns.

The compact hybrid module has been completely integrated into the 7G-TRONIC PLUS seven-speed automatic transmission. The electrical energy is stored in a lithium-ion battery with an energy content of 8.7 kWh, which can be recharged using public charging stations, the wallbox charger



Thanks to the "Energy-Transparent Vehicle" development tool, our engineers can examine and improve energy flow in the vehicle, right down to the smallest component. The optimisation alone of the 7G-TRONIC PLUS automatic transmission with integral electric motor delivered around a third of the total savings potential.



In online contact with the car: customers can as an option connect to their vehicle via "connect.mercedes.me" using a COM module built into the vehicle and, for instance, query how much fuel there is in the tank, locate the vehicle or activate the pre-entry climate control.



at home or at a conventional 220 volt power outlet. The charging time using the wallbox charger or the charging station is around two hours.

The best strategy for efficient operation has always been anticipatory driving. This is even more important in a hybrid model: this is because braking manoeuvres serve not only to deliver deceleration, but are also used to recover kinetic energy.

The route or the traffic also influences the most efficient charging and discharging of the high-voltage battery. For this reason the intelligent drive system management aids the driver with specific control strategies in adopting the most efficient driving style.

Additional comfort functions such as pre-entry climate control in both summer and winter make driving in the GLC 350 e 4MATIC an even more enjoyable experience. Advantages of the new GLC also include optimum on-road and off-road handling, especially in conjunction with the optionally

available multi-chamber air suspension, the far greater spaciousness compared with the previous model and high levels of active and passive safety.

The extensive safety equipment of the new GLC is extended with new assistance systems such as Crosswind Assist or COLLISION PREVENTION ASSIST PLUS. This impressive list of standard anticipatory safety features can be added to. There is the Driving Assistance package Plus, for example, which includes DISTRONIC PLUS with Steering Assist and Stop&Go Pilot, PRE-SAFE® Brake with pedestrian detection, BAS PLUS with Cross-Traffic Assist, the Active Blind Spot Assist and

Lane Keeping Assist systems, plus PRE-SAFE® PLUS.

In addition to the three-point seat belts with pyrotechnical belt tensing and belt force limiters for driver, front passenger and the passengers in the two outer rear seats, numerous airbags serve to protect the vehicle's occupants in an accident. These include pelvisbags for the driver and front passenger, a newly developed windowbag, sidebags for the outer rear seats and a kneebag for the driver.



The facts

The Mercedes-Benz GLC 350 e 4MATIC in the 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 GLC 350 e 4MATIC fares in the key areas of the comprehensive Life Cycle Assessment (LCA): consumption of resources and emissions.

- **Environmentally friendly plug-in hybrid drive:**
up to 62 percent lower CO₂ emissions
- **Economical:**
up to 34 kilometres on electric power alone,
NEDC consumption just 2.5 litres/100 km
- **Resource-efficient:**
34 components made from high-quality recycled plastics



The resources: what is needed to produce

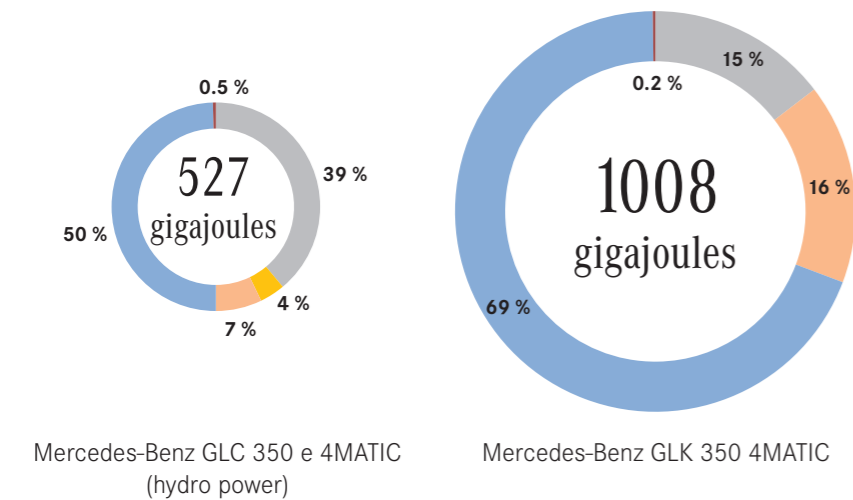
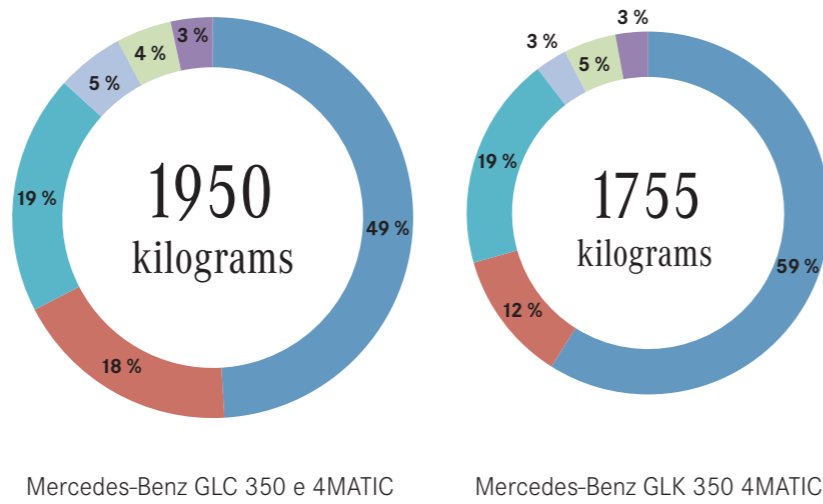
Achieve more with less

The GLC 350 e 4MATIC can be noted for its low consumption of resources, low energy requirements and good recycling characteristics. A comparison with the GLK 350 4MATIC predecessor model highlights the superiority of the plug-in hybrid technology.

Material resources

- Steel/ferrous materials
- Light alloys
- Polymer materials
- Other metals
- Fuels and lubricants
- Other materials

Due to the hybrid-specific components, the use of material resources is higher in the GLC 350 e 4MATIC than in the GLK 350 4MATIC. However, the materials used are not lost, thanks to the high recycling rate of 95 percent.



Energy resources

- Car production
- Electricity generation
- Fuel production
- Operation
- End of Life

When the individual life cycle phases are considered in detail, the energy required to produce the vehicle is initially higher for the plug-in hybrid. In the operating phase, however, energy requirements are reduced significantly thanks to its excellent efficiency.

Comparative analysis of the energy and material resources used for the GLC 350 e 4MATIC and GLK 350 4MATIC shows that a realistic picture only emerges when the entire life cycle (material manufacturing, production, operation for 200,000 kilometres and recycling) is examined.

The bottom line is that consumption of energy resources is far lower in the GLC 350 e 4MATIC. The best result is achieved when renewable energy is

used to charge the batteries. Over the entire life cycle, this can translate into primary energy savings of 48 percent. This is equivalent to the energy content of around 15,000 litres of petrol.

What's more, the high-quality raw materials used are not lost. This also applies to the lithium-ion battery and other specialised components in the GLC 350 e 4MATIC. Together with the suppliers and the disposal partners, innovative recycling concepts and

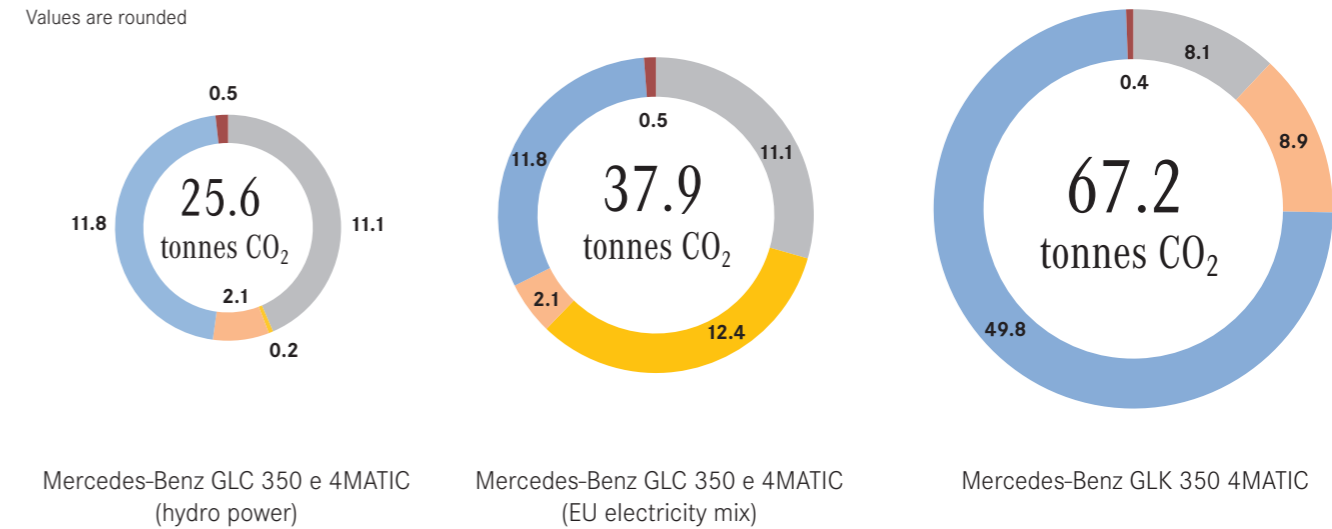
technologies have been evolved that enable recovery of the valuable substances used. The focus here was also on optimising the recycling processes to ensure safe and efficient dismantling and on obtaining marketable products from the recycling of the hybrid components.

The emissions: the carbon footprint over the life cycle

It depends on the electricity mix

The GLC 350 e 4MATIC sets new records when it comes to emissions. However, crucial factor for the carbon footprint is whether the electricity is obtained from renewable sources (hydro power or wind power) or whether the EU electricity mix forms the basis.

Values are rounded



CO2 emissions

- Car production
- Electricity generation
- Fuel production
- Operation
- End of Life

When the CO₂ footprint of the GLC 350 e 4MATIC is compared with that of the GLK 350 4MATIC, it is plain to see that, although the production of the plug-in hybrid generates higher emissions, this is ultimately more than compensated for.

Analysis of the emissions during the individual phases of the life cycle makes it very clear: it is still the actual process of car operation that offers the greatest potential to reduce CO₂ emissions in particular. Incidentally, this is also an incentive for the driver to drive as efficiently as possible.

As more and more vehicles are turning to electric power, a further factor is becoming increasingly important: the generation of the electricity, especially

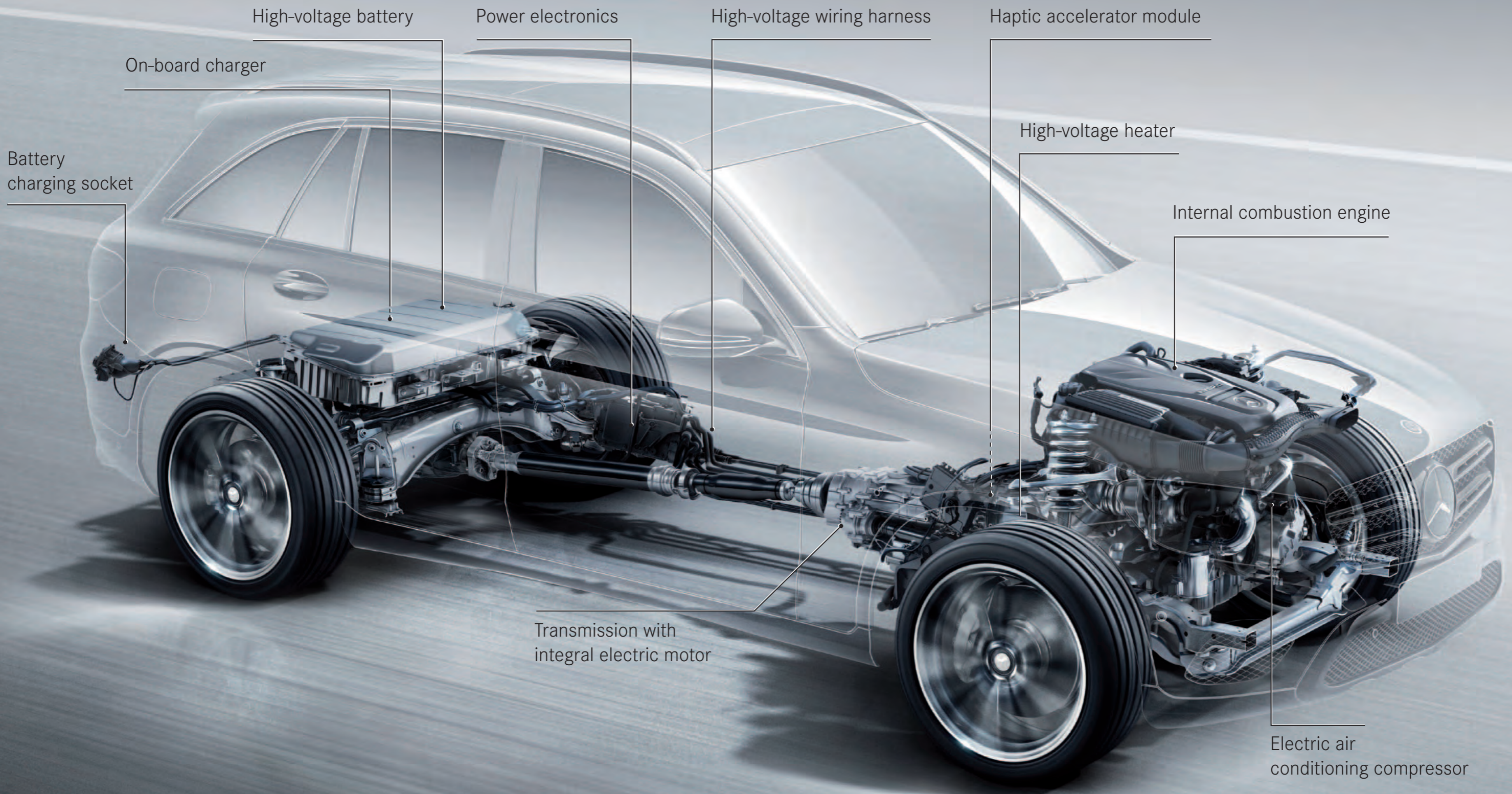


for charging the batteries. If electricity generation takes place by renewable means using wind power or hydro power, the advantage of the plug-in hybrid over the comparable vehicle with combustion engine is greater still.

External charging with the European electricity mix can cut CO₂ emissions by around 44 percent (29 tonnes) compared with the GLK 350 4MATIC. An even more impressive reduction of 62 percent (42 tonnes) is possible if

renewable electricity is used. When it comes to other environmental impacts, such as summer smog or acidification and eutrophication potential, the GLC 350 e 4MATIC offers clear benefits over its entire life cycle when charged with electricity from hydro power. Overall, a major improvement in environmental compatibility has been brought about with the GLC 350 e 4MATIC.

The key plug-in hybrid components



Clever strategists in the background

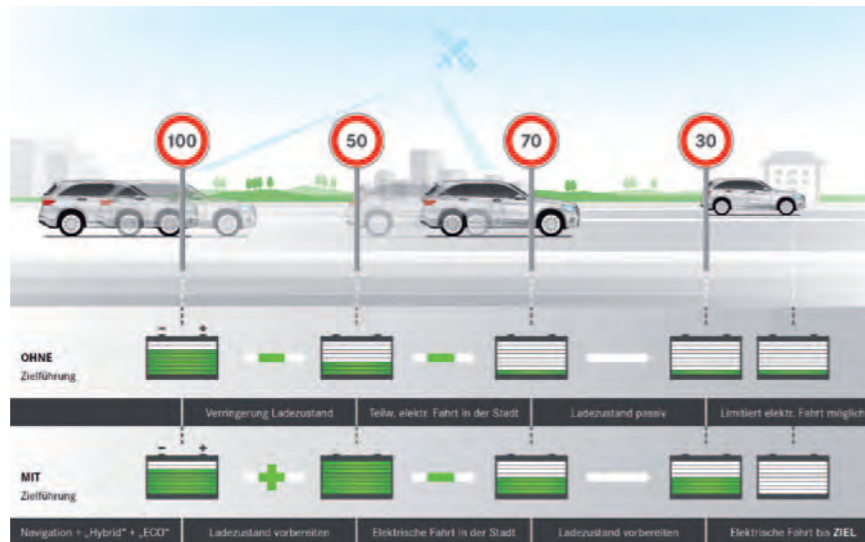
Working in the background, the intelligent drive management system in the GLC 350 e 4MATIC selects the ideal combination of combustion engine and electric motor automatically. Then there are innovative functions such as the haptic accelerator pedal or the route-based or radar-based operating strategy, which help the driver to drive economically.

The sophisticated technology of the GLC 350 e 4MATIC makes it no more difficult to drive than a conventional vehicle with automatic transmission. Working in the background, the intelligent drive management system selects the ideal combination of combustion engine and electric motor automatically.

At the same time, the GLC 350 e 4MATIC offers all the characteristics of a state-of-the-art hybrid vehicle. These include Silent Start (almost noiseless electric start), Boost (activation of the electric motor for accelerating) and Regeneration (when braking and rolling to a standstill, energy is recuperated and stored in the battery).

Those who wish can, however, control the hybrid interaction between combustion engine and electric motor themselves, by intervening manually to place the emphasis on economy, comfort or sportiness, for instance. For this purpose, there are four operating modes – HYBRID, E-MODE, E-SAVE, CHARGE – and another four drive modes to choose from. They can be selected using the operating mode switch as well as the rotary push-button control in the centre console.

When the driver enters a destination in the navigation system, the intelligent operating strategy selects the optimum combination of electric motor and combustion engine for providing drive power along the specific route.



Classic round dial instruments and a central display with photo-realistic images provide the driver with comprehensive information.

Responsible resource utilisation

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



34 components in the new SUV with a total weight of 41.3 kilograms consist of high-quality recycling plastics (bottom image). The objective is to obtain secondary raw materials wherever possible from vehicle-related waste flows, so as to achieve closed cycles. To this end, established processes are also used in the GLC: a secondary raw material comprised of reprocessed starter batteries and bumper panelling is used for the wheel arch linings, for example.

Furthermore, 70 components in the new GLC with a total weight of 24.9 kilograms are made using natural materials (top image). This represents an increase of 21 percent compared to its predecessor. For the interior ornaments in the new GLC, so called fine line veneers are used. Thereby, mostly sheets of veneers made of peeled veneer were glue-laminated to veneer blocks in a special process and

sliced to veneers again under variation of the cutting angle. This results in wood reproduction, for example with stripe-, flower- or vein structure but also exclusive design veneers with fantasy decors. By using this process it is also possible to replicate protected tropical wood with domestic types of wood (lime, poplar) and thereby protecting the environment and support domestic timber industry. Together with the ornament suppliers and the different veneer producers, individual designs could already get realized and veneers developed, which satisfy the high technical requirements in the automotive sector.



Would you have known that...

...2005 Mercedes-Benz first received a certificate for systematic environmentally sound product development (Design for Environment) in accordance with ISO TR 14062 from TÜV Süd Management Service GmbH in 2005?

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.

...34 components of the new GLC are made from high-quality recycled plastics? Their total weight is exactly 41.3 kg.

As such, Mercedes-Benz has maintained the percentage weight of recycled material on a par with that of the outgoing model. The recycled components include the wheel arch linings which are made mainly from the plastic polypropylene. Starter batteries and bumper coverings were used for the recycled material.

...24.9 kg is the total weight of components in the GLC manufactured from renewable raw materials? In the new GLC a total of 70 components are produced using natural materials.

Their total weight has increased by 21 percent compared to the previous model. By way of example, paper is used in the luggage compartment floor and bast fibres in trim panels.

...1993 Mercedes-Benz introduced a take-back system, so it leads the way in the area of workshop disposal and recycling, too?

For convenient disposal, a comprehensive network of collection points and dismantling facilities is available to Mercedes customers. Owners of used cars can find out all the important details relating to the return of their vehicles via the free phone number 00800 1 777 7777.

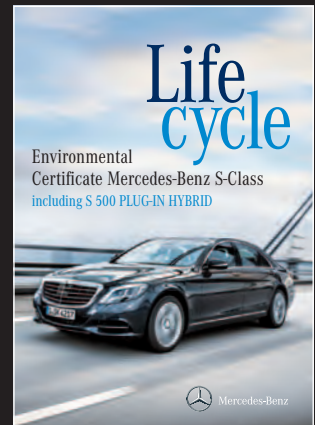
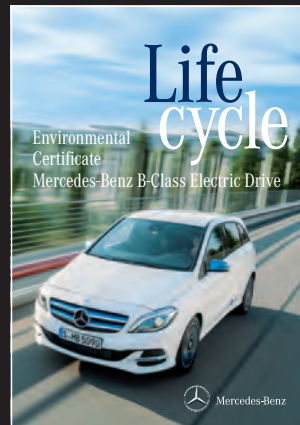
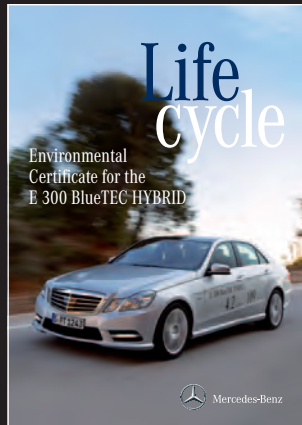
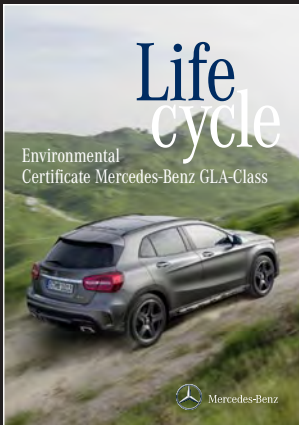
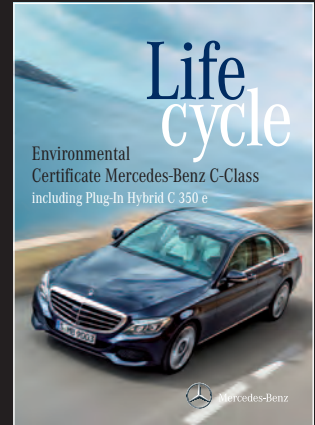
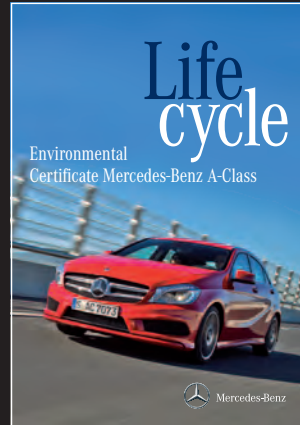
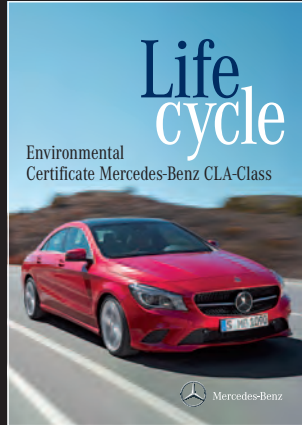
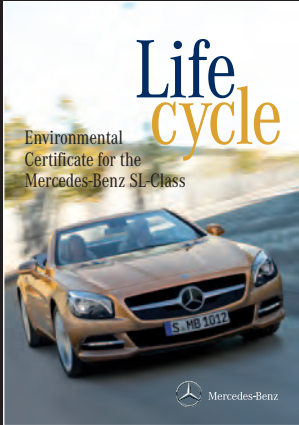
...33 years before the GLC 350 e 4MATIC arrived, Mercedes-Benz had already unveiled the first concept car with hybrid drive in the 190 model – the precursor to the C-Class?

In this special version of the 190 model from the year 1982, a two-cylinder horizontally opposed engine was used to charge the battery. Many further test vehicles followed, culminating in 2009 with the debut of the world's first standard-production hybrid drive system with lithium-ion battery: for a long time, the S 400 HYBRID was the most fuel-efficient petrol-powered luxury saloon and the most successful hybrid in its segment.

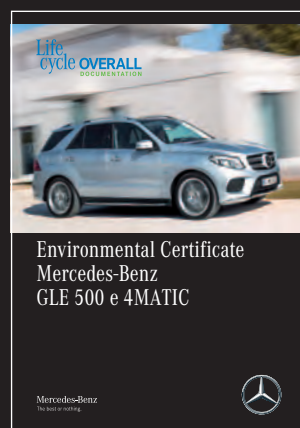


As early as 2005 the Mercedes-Benz S-Class was the first-ever vehicle to be awarded the Environmental Certificate from TÜV Süd.

In 2009, the comprehensive and extremely detailed “Lifecycle” brochure presented the Environmental Certificates for the first time, thus making it available to a broad public.



“Lifecycle COMPACT”, the compact issue with the key data from the Environmental Certificate, has been published since early 2015.



Detailed information on the complex issue of car and environment is now published in the “Lifecycle OVERALL” brochure, the successor to “Lifecycle”.

The brochures can be downloaded from www.mercedes-benz.com.

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