
Media information

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Electric Vehicles with Lowest CO₂ Emissions

- **CO₂ benefit proven through certified life-cycle assessment**
- **Further CO₂ reduction planned through life-cycle engineering**
- **Progress is recorded with decarbonisation index**

Wolfsburg, 24 April 2019 - For the same vehicle models with different powertrains, the carbon footprint of the battery-powered E variants is already better than those of the corresponding vehicles with internal combustion engines. In addition, the electric vehicles offer a higher CO₂-saving potential in all phases of the product cycle. Furthermore, it is of crucial importance for CO₂ emissions whether the propulsion energy is generated from fossil or regenerative sources. This is the result of a certified life cycle assessment (LCA) of the Volkswagen Golf, which compares the CO₂ emissions of the different vehicle versions with either an electric or an internal combustion engine.

Carbon dioxide emissions lower in the e-vehicle

In summary, the current Golf TDI (Diesel) emits 140g CO₂/km on average over its entire life cycle, while the e-Golf¹ reaches 119g CO₂/km.

It is evident that in the vehicle with an internal combustion engine most of the emissions occur during the use phase, that is, in the supply chain of the fossil fuel and the combustion. Here the Diesel reaches 111 g CO₂/km. A corresponding vehicle with electric drive emits only 62 g CO₂/km during this phase, which results from energy generation and supply. In contrast, most emissions from the battery-powered electric vehicle are generated in the production phase. According to LCA, a Diesel here generates 29 g CO₂/km, while 57 g CO₂/km were determined for a comparable e-vehicle. The battery production and the complex extraction of raw materials are responsible for this. These emissions account for almost half of the CO₂ emissions of the entire life cycle. During the use phase, CO₂ emissions depend on the sources of energy production. They decrease all the more, the more regenerative energies are available.

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Life cycle assessment as a tool for holistic analysis

Life cycle assessment is an intricate, complex, and-internationally standardized procedure to research the ecological balance sheet of vehicles. Among other things, the carbon dioxide emissions are investigated during all product stages of the automobile:

- The emissions generated by the extraction of raw materials, the production of components, and the assembly are included in the production.
- The use phase includes both the emissions of the fuel and electricity supply, and especially those of vehicle operation over 200,000 km,
- Recycling evaluates dismantling and potential savings through recycling.

With the findings from the "Life Cycle Assessment", Volkswagen can derive additional emission-reducing measures for "Life Cycle Engineering" and specifically optimize the CO₂ balance.

Further reduction of CO₂ emissions is planned in all product stages

Improvements in lithium-ion battery technology and supply chain optimizations lower the carbon footprint during battery manufacturing for the first ID. model planned for 2020 by more than 25 percent per kilowatt hour (kWh) of battery capacity compared with the e-Golf. When using regenerative energy, the reduction potential is almost 50 percent.

By far the greatest potential for reducing CO₂ emissions arises from the source of energy applied during the use phase. If electricity for driving during the use phase is obtained exclusively from renewable sources, CO₂ emissions of 62 g CO₂/km in today's EU electricity mix will drop to just 2 g CO₂/km.

Against this backdrop, since the beginning of the year, in Germany the subsidiary Group Elli (Electric Life) has been offering customers and third parties "Volkswagen Naturstrom", which exclusively comes from renewable energy sources.

Recycling the vehicle offers further opportunities to reduce CO₂ emissions through the circular economy. Thus, a pilot plant for recycling is currently being built at the Volkswagen location Salzgitter. There, from end-of-life batteries - that is, batteries that no longer store enough energy due to aging - a new raw material (black powder) for the cathodes of new batteries is to be obtained. This results in a potential CO₂ reduction of up to 25 percent. However, the group does not expect significant amounts of batteries for industrial-scale recycling until the end of the 2020s.

30 percent CO₂ reduction by 2025 traceable through the decarbonisation index

The decarbonisation index (DKI) measures the CO₂ emissions of an average vehicle of the Volkswagen Group over its life cycle. The DKI is measured in tons of CO₂ equivalent per vehicle. In 2015, the figure was 43.6 and, according to the Volkswagen Group's target, it should decrease by 30 percent by 2025.

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¹⁾ e-Golf: Power consumption, kWh/100 km: combined 14.1 (17 inch)–13.2 (16 inch); CO₂ emissions combined, g/km: 0; efficiency class: A+



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About the Volkswagen Group:

The Volkswagen Group, with its headquarters in Wolfsburg, is one of the world's leading automobile manufacturers and the largest carmaker in Europe. The Group comprises twelve brands from seven European countries: Volkswagen Passenger Cars, Audi, SEAT, ŠKODA, Bentley, Bugatti, Lamborghini, Porsche, Ducati, Volkswagen Commercial Vehicles, Scania and MAN. The passenger car portfolio ranges from small cars all the way to luxury-class vehicles. Ducati offers motorcycles. In the light and heavy commercial vehicles sector, the products include ranges from pick-ups, buses and heavy trucks. Every weekday, 664,496 employees around the globe produce on average 44,567 vehicles, are involved in vehicle-related services or work in other areas of business. The Volkswagen Group sells its vehicles in 153 countries.

In 2018, the total number of vehicles supplied to customers by the Group globally was 10,831 million (2017: 10,741 million). The passenger car global market share was 12.3 per cent. In Western Europe 22.0 per cent of all new passenger cars come from the Volkswagen Group. Group sales revenue in 2018 totalled €235.8 billion (2017: €231 billion). Earnings after tax in 2018 amounted to €17.1 billion (2017: €11.6 billion).
