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Sustainability Management & Environment@Daimler

SRI Conference, February 7th, 2017, Frankfurt/Main

I. Organisation, Scope & Targets
II. Holistic approach towards Environmental Challenges
III. Production related Issues
IV. CO_2 & Electrification
V. CASE

Dr. Udo Hartmann, Head Group Environmental Protection & Energy Management

Our Sustainability Management Daimler Group

Board of Management

Member of the Board of Management/
Co-Chair CSB
reports to the General Management

Corporate Sustainability Board (CSB)

- Human Resources
- Communication
- Policy and External Relations
- Purchasing
- Group Research & MB Cars Development
- Integrity and Legal Affairs
- Environmental Protection

Mercedes-Benz Cars

Daimler Trucks

Mercedes-Benz Vans

Daimler Buses

Daimler Financial Services

Responsibilities and interfaces of Corporate Environmental Protection

Board of Management

Politics & Society

Analyze legislation and social environmental trends

Determine goals and areas of activity

Push worldwide implementation of goals and ensure legal compliance

Communication & Dialogue

Stakeholder & Customer

Environmental Officer
Business Units

Daimler environmental protection targets 2022 structured by…

Product

Climate Protection & Energy

Europa		Weltweit	
Reduction CO_2 emissions passenger cars	-30% 2007 - 2016 -44% 2007 - 2021	Reduction CO_2 emissions passenger cars and Light-Duty-Trucks USA	-25% 2012 - 2019
Reduction CO_2 emissions CV light	-10% 2014 - 2018	Reduction CO_2 emissions passenger cars China	-25% 2012 - 2019
Reduced consumption CV heavy	-20% 2005 - 2020	Reduced consumption CV heavy (NAFTA)	-10% 2015 - 2019
Reduced consumption of buses	-20% 2005 - 2020		

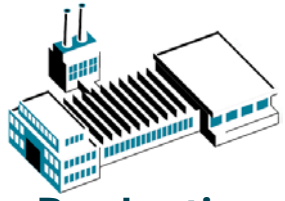
Reduction of CO_2 and nitrogen oxide emissions over the entire life cycle for each new model generation	10-20% compere predecessor
Achieve a leading position in premium segment of electric and hybrid vehicles	End 2017

Air Quality & Health

Market launch of ten models, which conform to the future legislation Real Driving Emissions (Step 1)	End 2017
Ensure allergy sufferer friendly interiors for all new passenger car models	By 2020

Resource Conservation

Use of renewable raw materials (MBC)	+25% 2010 – 2015
Use of recyclates (MBC)	+25% 2010 – 2015
Evaluate recourse efficiency of MBC	By 2020
Increased use of car2go	X 10 2011 - 2015
Construction of a hydrogen infrastructure	400 By 2023



Production

Reduction absolute CO_2 emissions in plants (EU)	-20% 1990 - 2020	Reduction specific CO_2 emissions in plants	-20% 2007 - 2015
		Reductions specific energy consumption MBC plants	-25% 2015 - 2022

Reduction specific water consumption of MBC plants	-15% 2015 - 2022
Reduction specific waste amount of MBC plants	-25% 2015 - 2022

New in 2015

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Elements of the environmental management system RD with focus on design for environment

ISO 14006

EM-system ISO 14001

Design for Environment ISO TR 14062

Environmental aspects

Plan

❶ Daimler Green Strategy
❷ Environmental policy/ program

Do

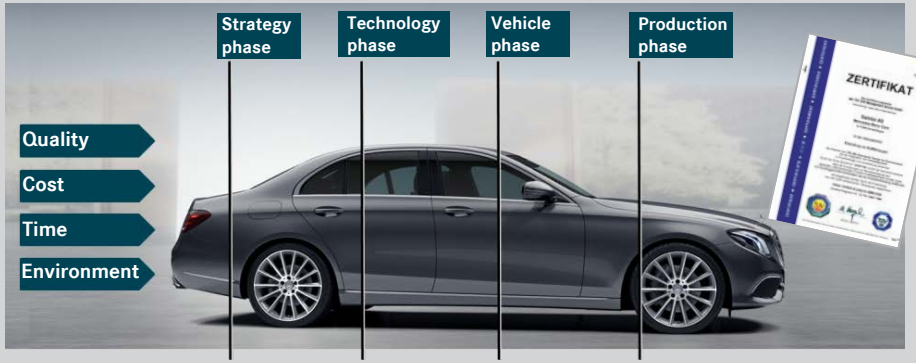
❸ Design for environment as central element of the environmental management system in R&D

Check

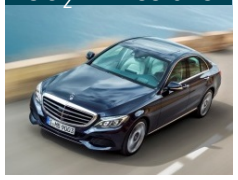
❹ Environmental audit
❺ Management Review

Act

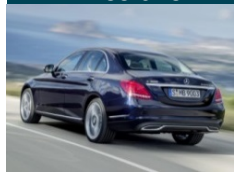
Mercedes-Benz Development Process



Consumption/ CO_2 -Emissions



Exhaust Emissions



Green Materials

Recycling

Prohibited subs./ Indoor Emissions

Acoustic/ Noise

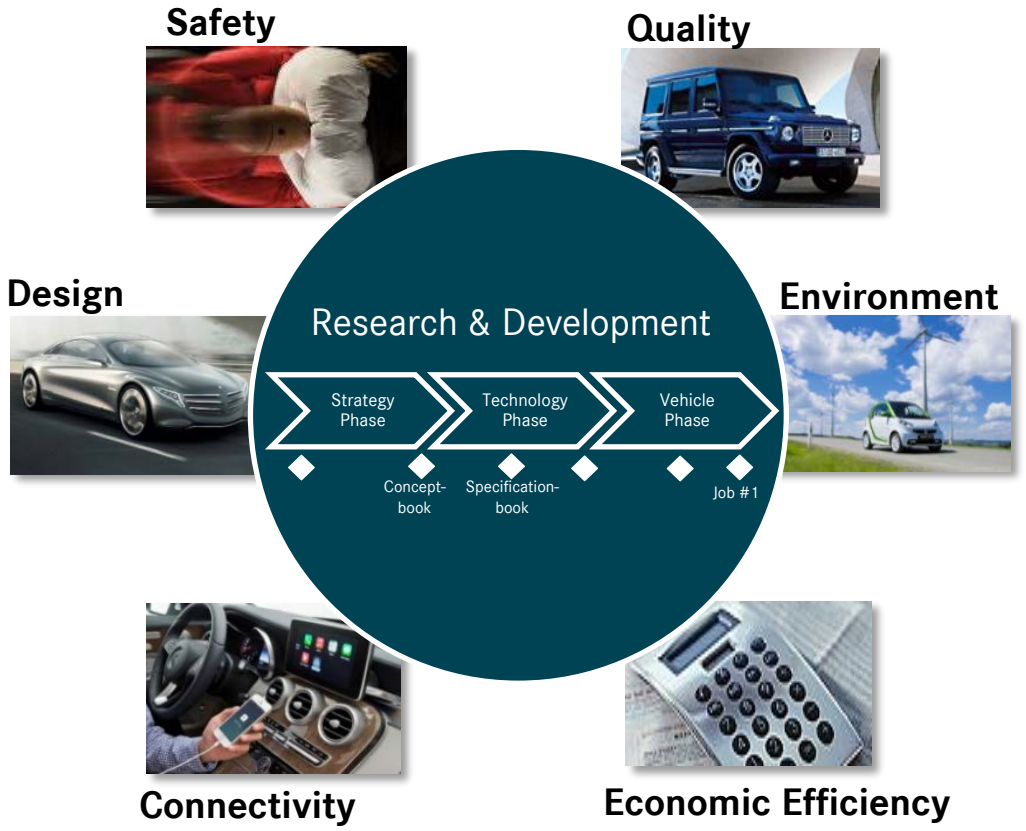
Climate protection & air quality

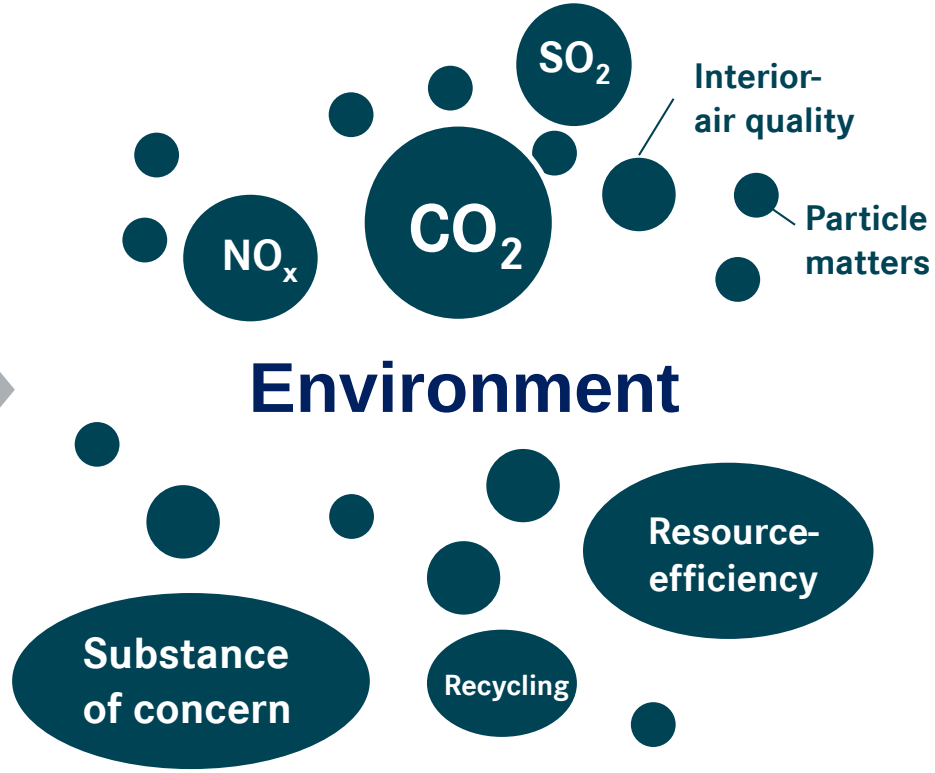
Resource Conservation

Health

Life Cycle Assessment

Challenges for research & development of automobiles

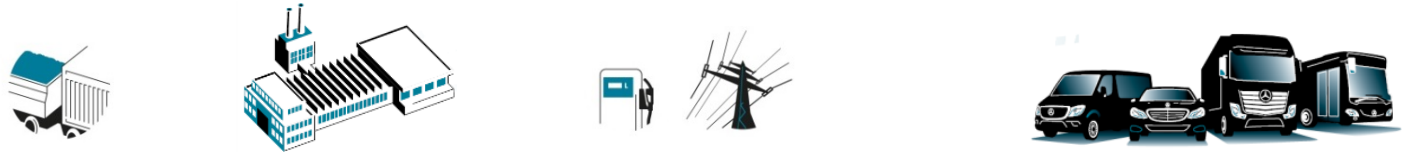




Balancing of disparate requirements in a permanent task in Research & Development

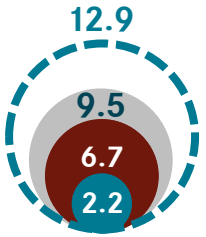
Within the different environmental targets contradictory effects are possible

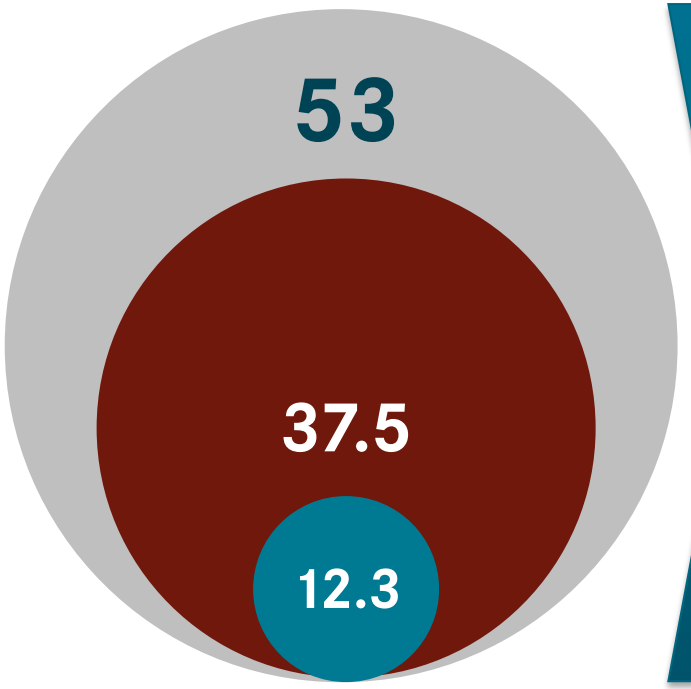
For our Products a look at the whole life cycle is crucial – E-Class Plug-In Hybrid E 350 e



Production | **Utilization phase(250 tKm)** | **Sum**

Supply chain | Daimler production | Fuel supply | Driving emissions





- E 300 Predecessor- 2009
- E 300 New - 2016
- E 350e Hybrid – water power
- E 350e Hybrid – EU-electricity

All values in tons CO_2

70.8 tons CO_2

52.7 tons CO_2

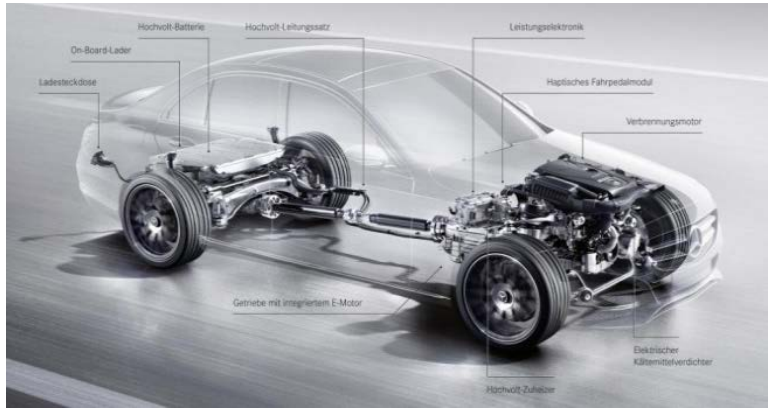
25.0 tons CO_2

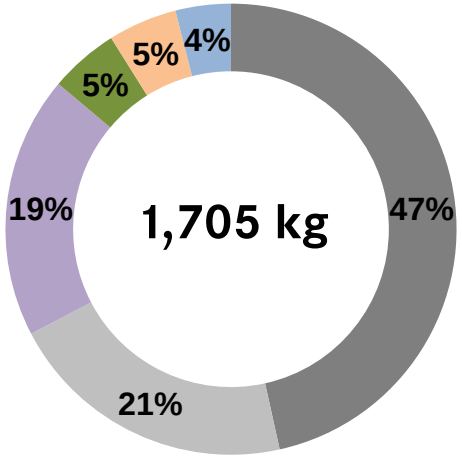
36.0 tons CO_2

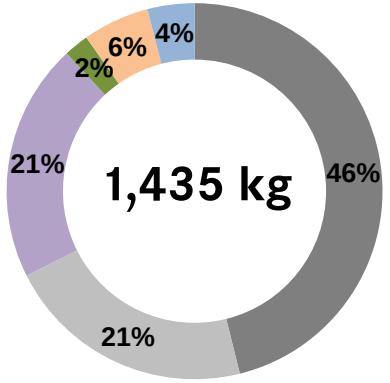
The resource input of C 250 and C 350 e

Comparison of Material Composition

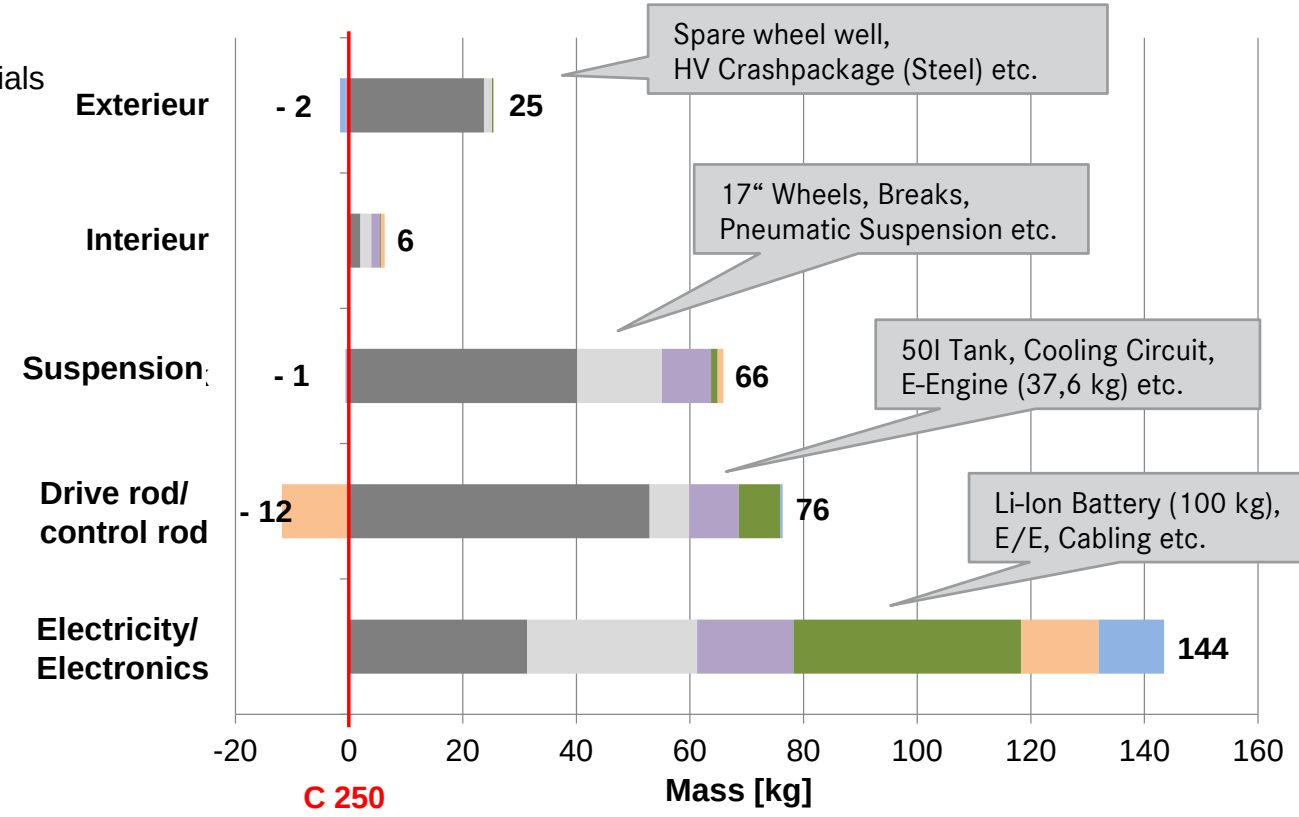
+ 270 kg additional weight of C 350 e compared with C 250





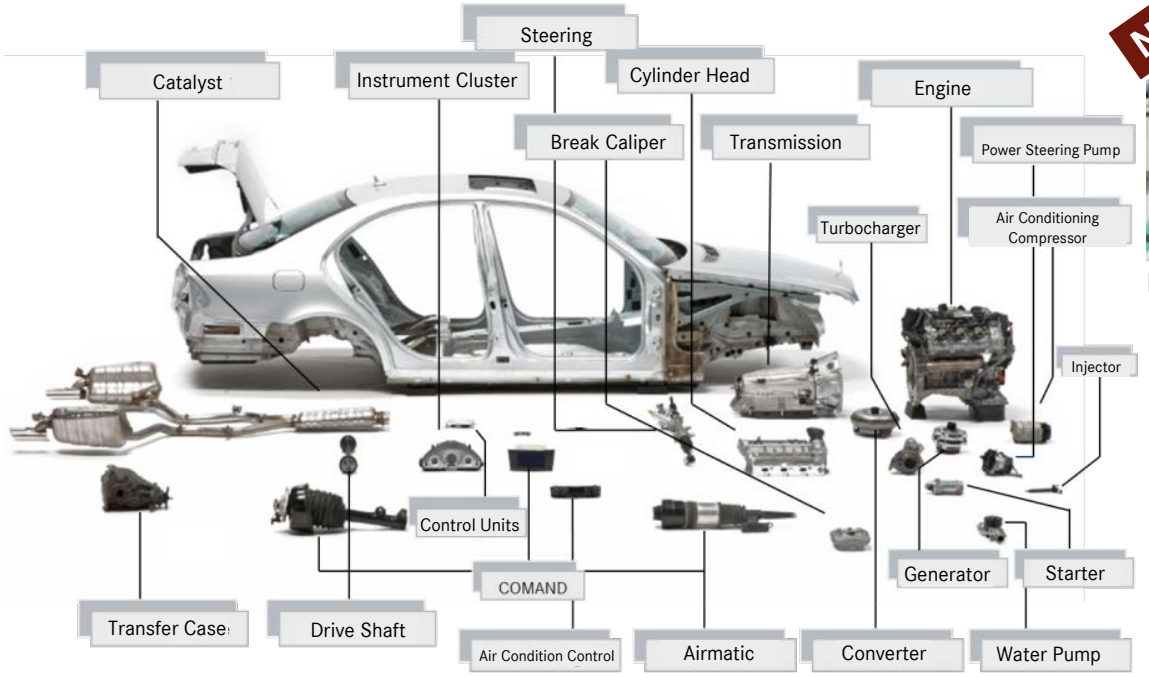


Comparison of Modules [kg] (C 250 vs. C 350 e)



Remanufacturing / Product Recycling
New Life for Used Parts

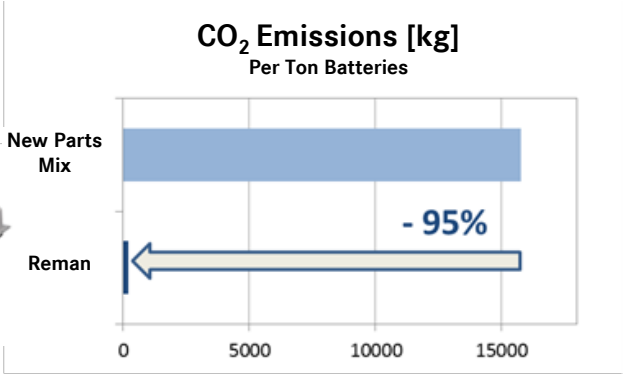
Over 12,000 Parts in Reman Portfolio - incl. E-Drive Components...



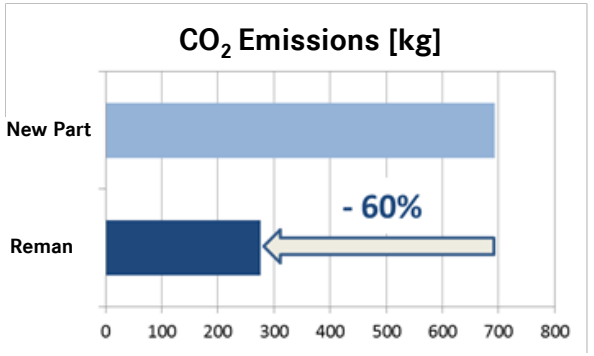
Reman-Prozess HV-Batteries for E-Drive Passenger Cars – Plant Mannheim

...with significant environmental benefits

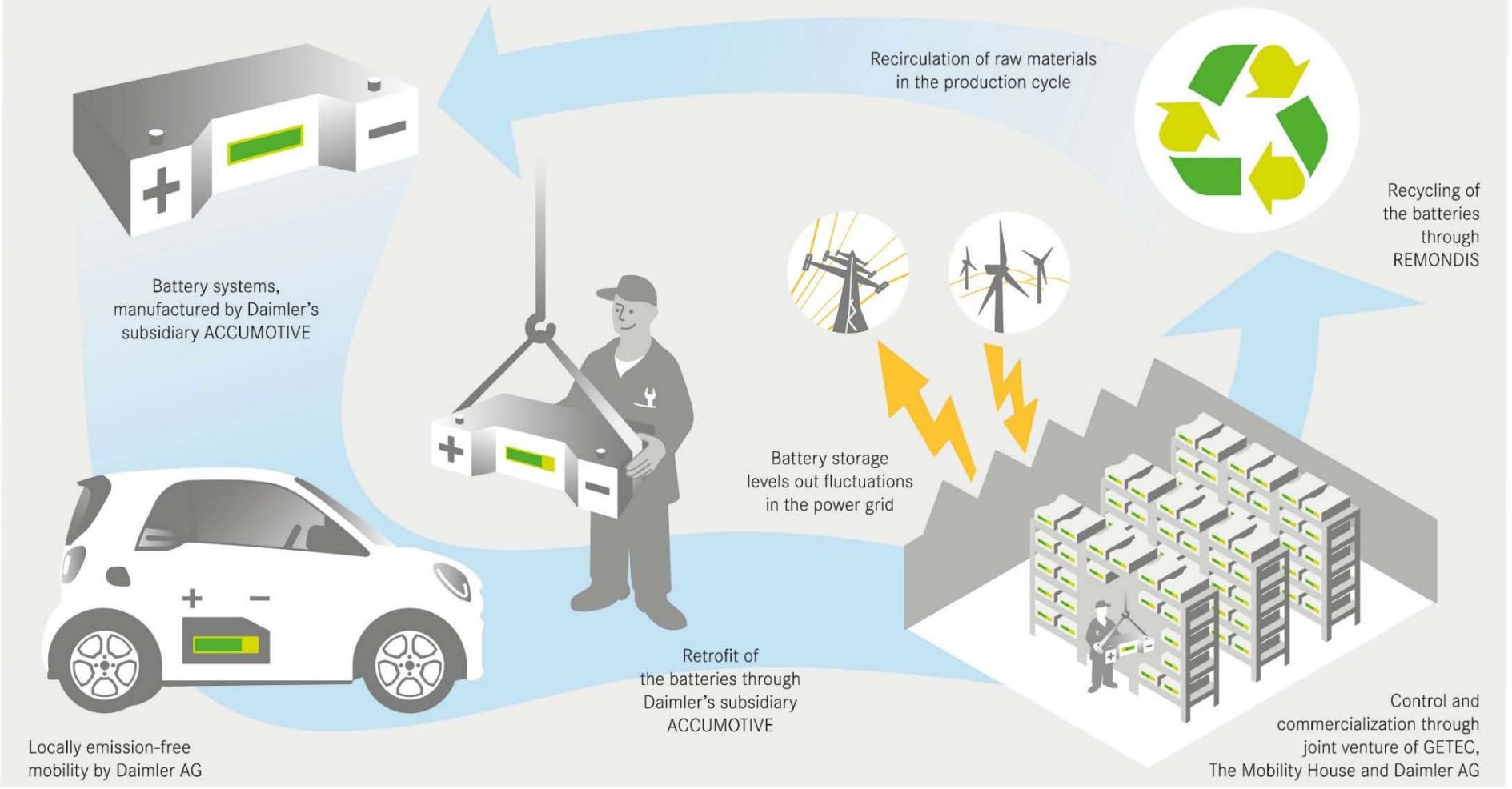
High-Voltage Battery-Mix



Exchange Transmissions G281



E-Mobility thought to the end
World's largest 2nd-use battery storage (13MW) in operation



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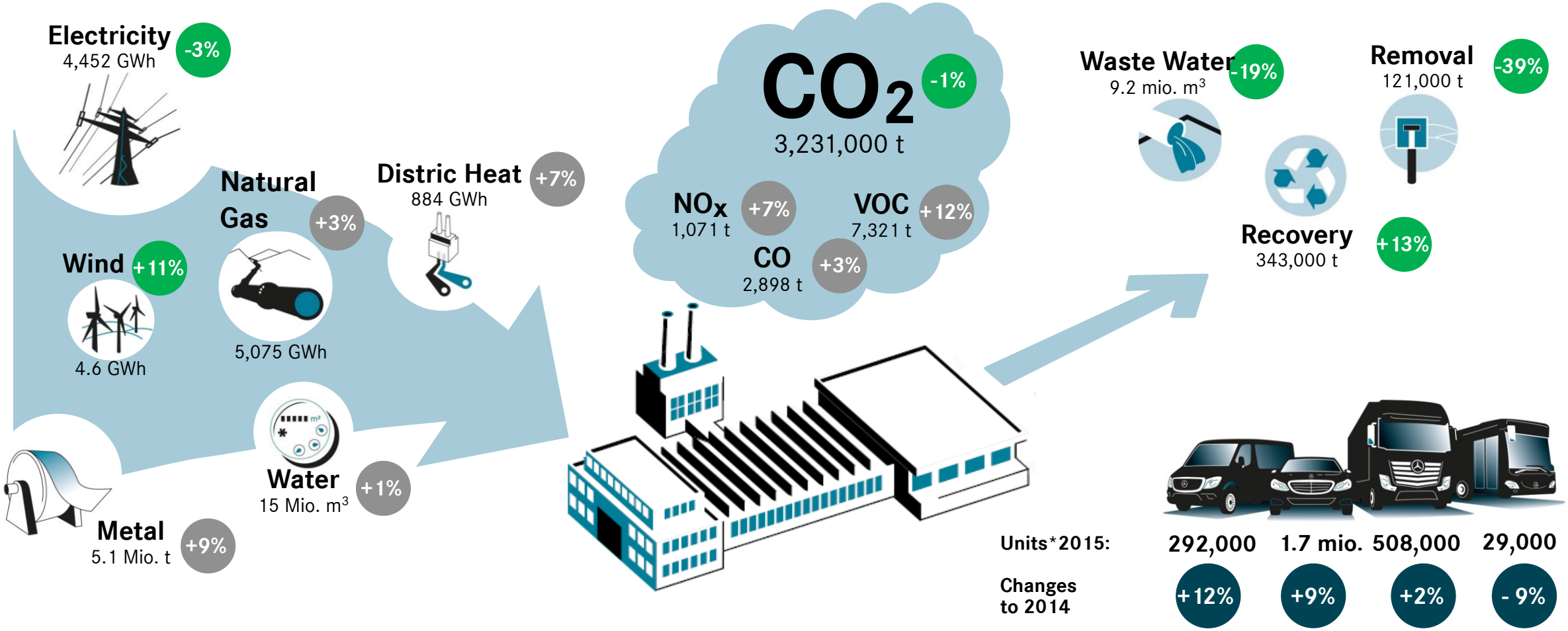
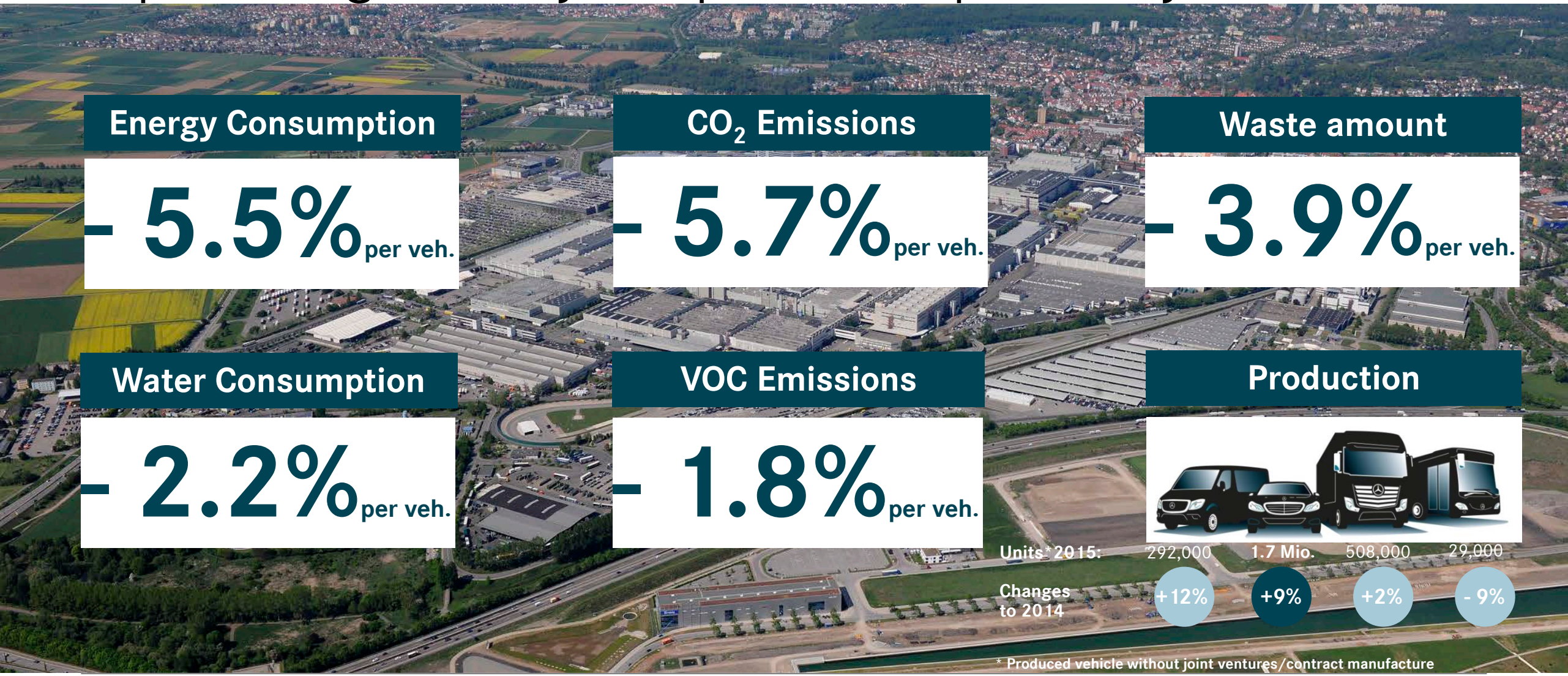
Despite massive quantity increase, we reduced essential environmental impacts of **Daimler plants** in 2015



* Produced vehicle without joint ventures/contract manufacture

The relative environmental performance of MBC production improved significantly compart to the previous year



Energy Consumption

- 5.5% per veh.

CO_2 Emissions

- 5.7% per veh.

Waste amount

- 3.9% per veh.

Water Consumption

- 2.2% per veh.

VOC Emissions

- 1.8% per veh.

Production

	Van	Car	Truck	Bus
Units* 2015:	292,000	1.7 Mio.	508,000	29,000
Changes to 2014	+12%	+9%	+2%	- 9%

* Produced vehicle without joint ventures/contract manufacture

Production: Technical Modules to improve environmental performance

Powertrain	Body Construction	Surface	Assembly/Logistics
NanoSlide Microcoating in aluminum engines	Energy Optimization **Robots**	**Integrated Coating Process IP2** primer-less painting	Energy Optimized **Conveyor Technology**
Laser Cleaning instead of degrease	Analysis **Product Effect** for energy demand	Energy Efficient **Dryer**	**Cycle Time** Optimization
Energy-Manager for **Machine Tools**	**Laser welding** (RobScan) instead of WPS	Energy-optimized **Pretreatment**	**Building** Energy Management

↓ Energy Resources

↓ Material Resources

Process optimization in all plant to reduce recourses demand, especially focusing on the energy issue

And how do we achieve these values…
For example new Nanoslide Coating Technology

Aluminum Engine Block

Grey Cast Iron Cylinder Liners

Nanoslide Coating

Process Optimization

(2nd Generation*)

Mechanically Roughening

instead of

High-Pressure Water Jet

Electric Energy

- ca. 700 MWh/a per module (Plan: 4 modules)
- ca. 22,500 MWh over life cycle

Process Water

- **ca. 15,000 m³/a** per module (Plan: 4 modules)
- ca. 480,000 m³ water over life cycle

Recirculation of aluminum chips

- Reduction of 8% primary aluminum
- Elimination of 15 t/a aluminum slurry

*) FAME = Family of Modular Engines = new family of state-of-the-art
ku = kilo units

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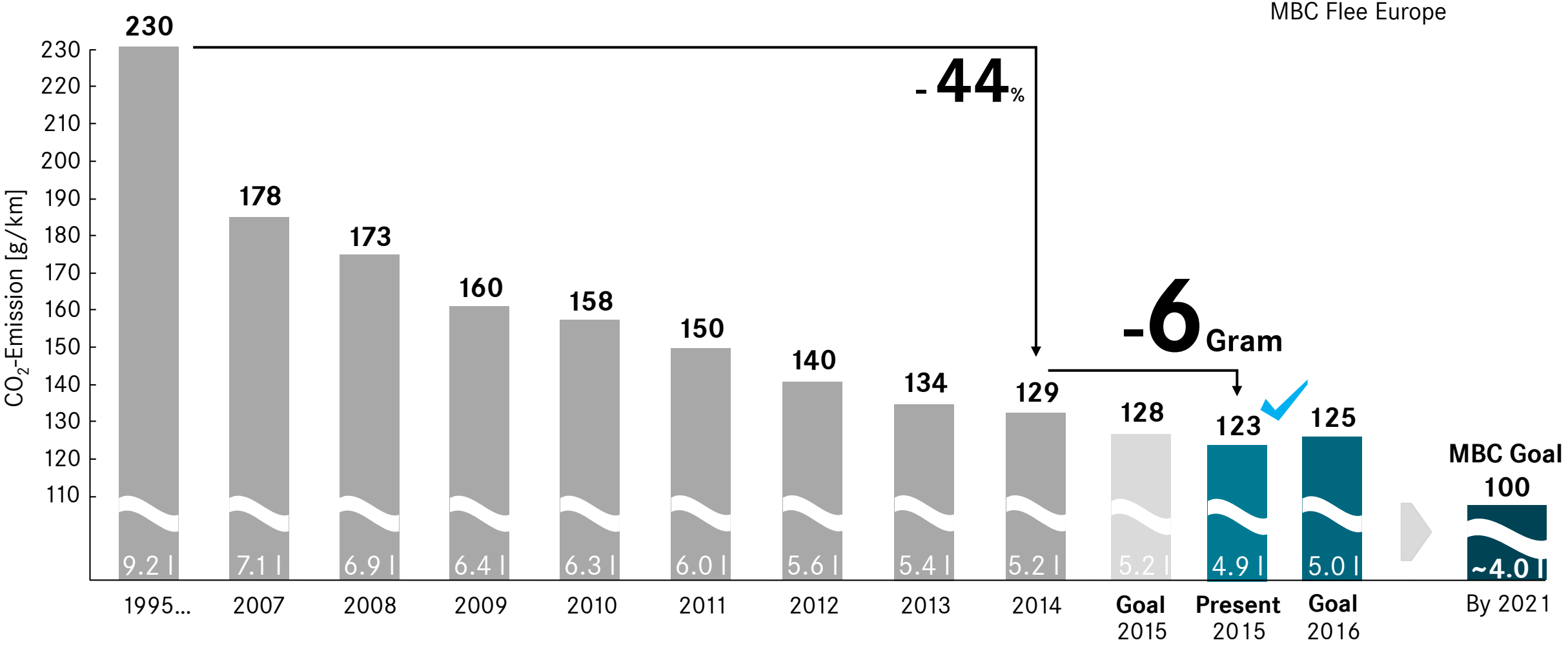
Our road to emission-free driving

Mercedes-Benz Cars Fleet in Europe



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Our road to emission-free driving

High-tech combustion engines

Consequent hybridization

Electric vehicles with battery and fuel-cell

Powerful and efficient: The new 4-Cylinder Diesel OM 654 sets standards in terms of environmental compatibility

- **17%** Weight Reduction
- **24%** Friction Losses
- **13%** CO_2-Reduction
- **80%** NOx-Reduction
- **14%** Performance Increase
- **11%** Improved Acceleration

- Aluminum-Crankase
- Nanoslide Coating
- Stepped Combustion Bowls
- Engine-Related Emission Control

Introduction of 10 plug-in-hybrid vehicles by 2017

S-Class

GLE

GLC

GLC COUPE

C-Class

C-Class Estate

C-Class LWB

E-Class

2014 2015 2016 2017

Electric drive vehicles

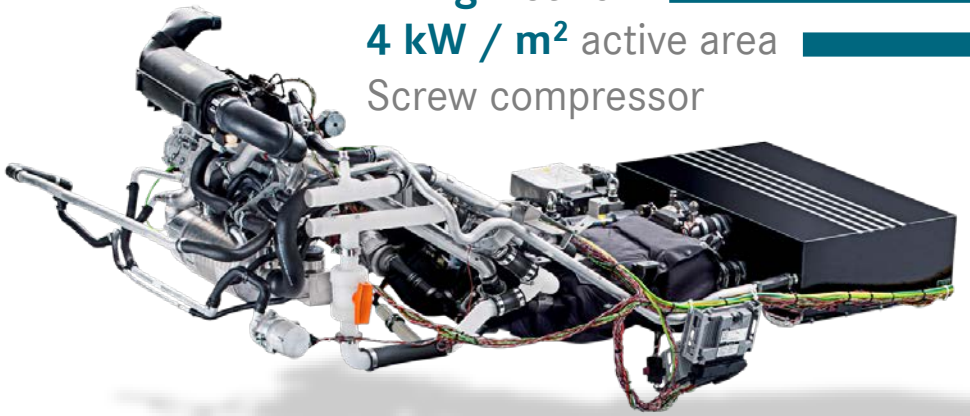
Next generation fuel-cell system: huge technological progress

2010: Underfloor package

206 g Platinum

4 kW / m² active area

Screw compressor



2017: Compartment package

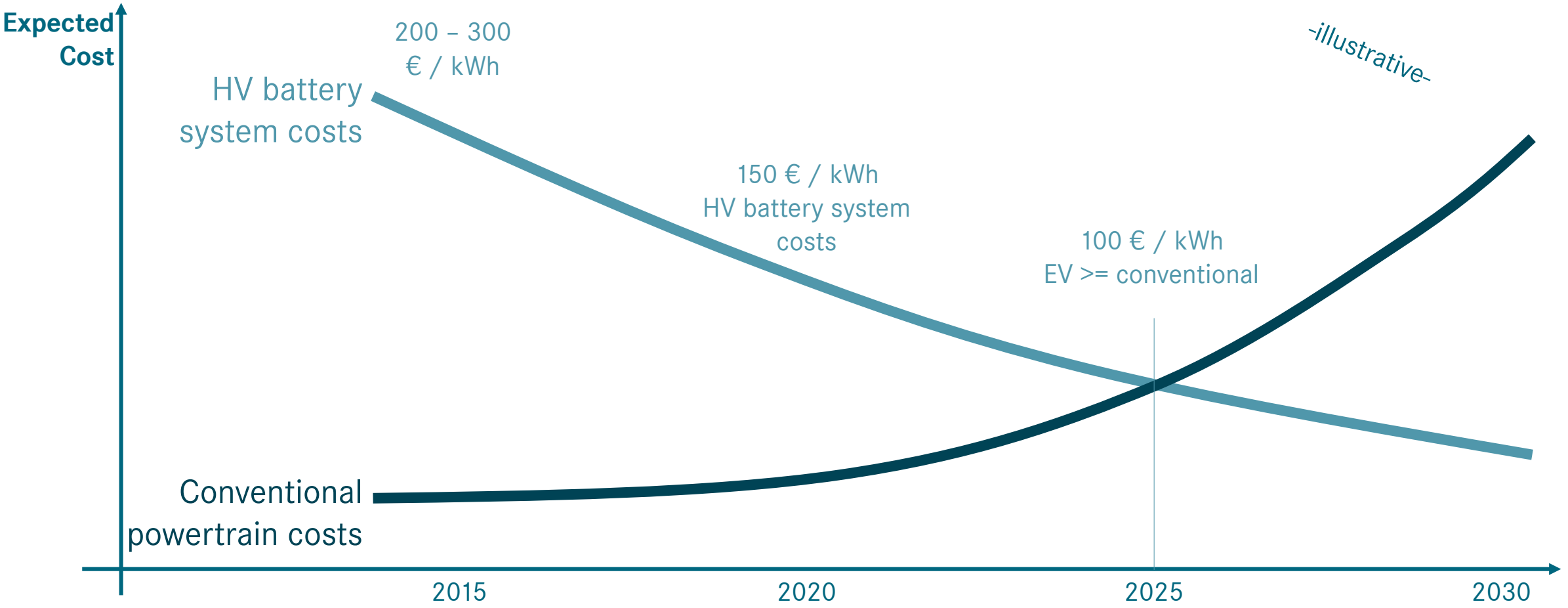
20 g Platinum

9 kW / m² active area

Electric turbo charger with turbine

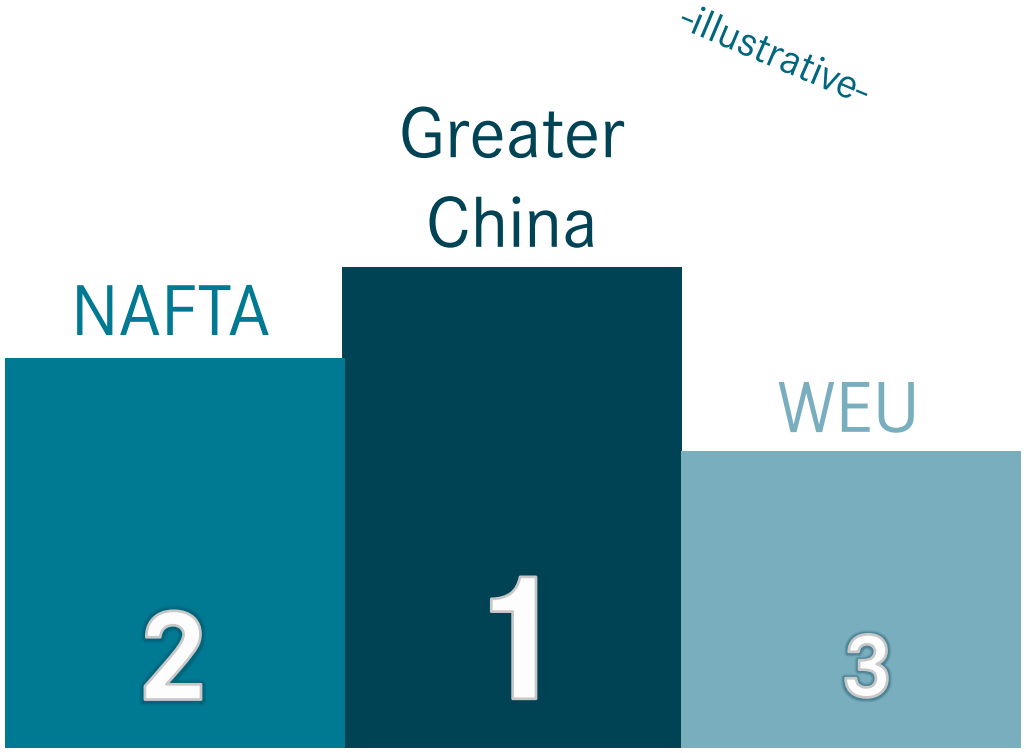
- **30%** reduction fuel cell engine size
- **90%** reduction of Platinum
- **30%** higher electric range in future vehicles
- **40%** higher system performance

Emission regulations and battery technology development favour battery cost position



Ambitious Re-Definition of our EV market targets

EV Share
Mercedes-Benz Cars
Sales 2025



Highest Potential EV Share
Mercedes-Benz Cars 2025

Electric Line Up extended into the Future

smart fortwo
electric drive

SLS AMG Coupé
Electric Drive

B 250 e

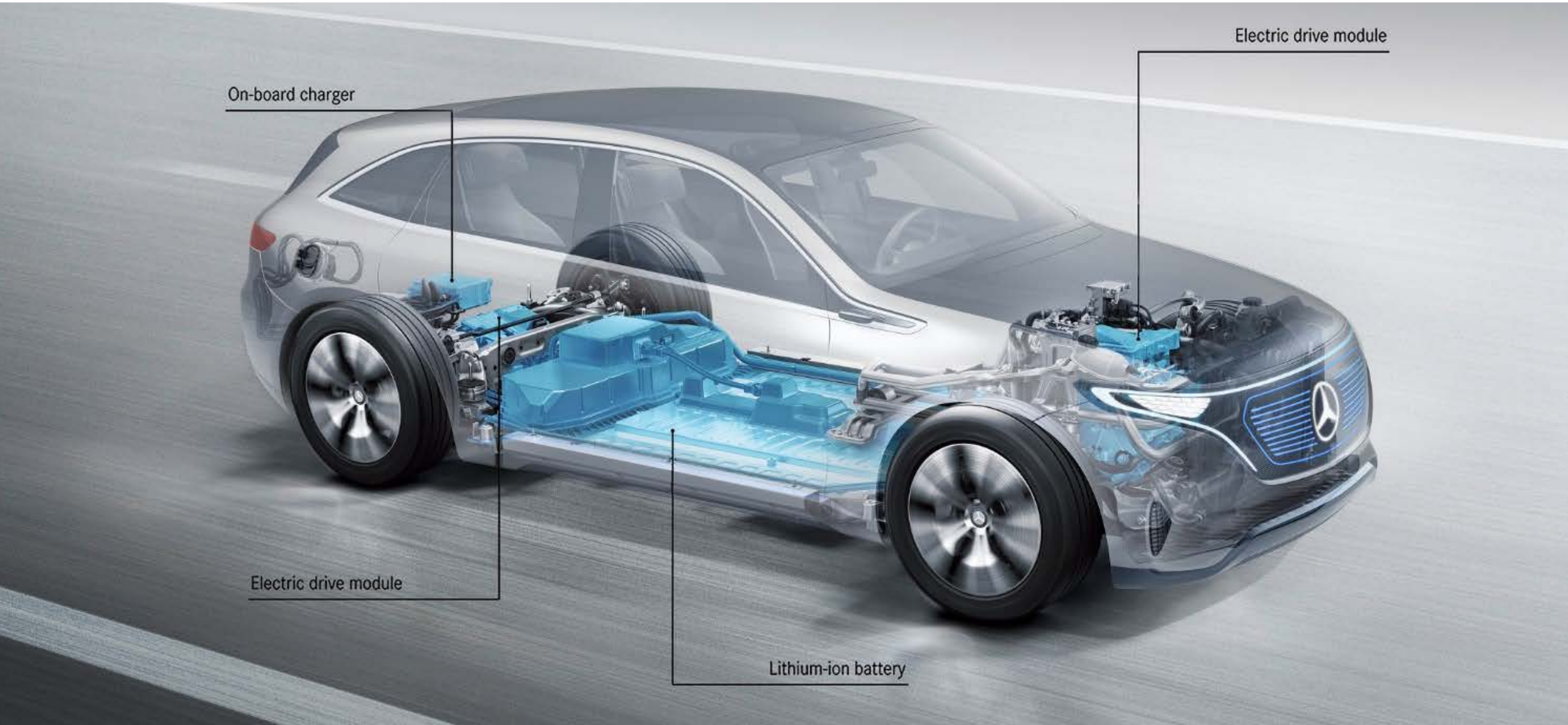
smart electric drive -
fortwo and forfour

Intelligent EV-Architecture

Battery-electric vehicle
with up to 500 km range

Mercedes-Benz GLC F-CELL

Foundation of new Mercedes-Benz electric vehicle strategy

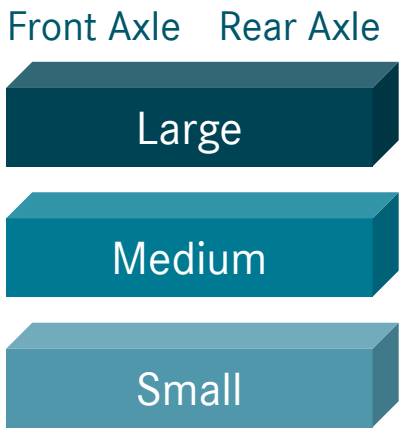


Modular set up of next generation drive train technologies will allow a variety of derivatives

Modular Battery Concept

-illustrative-

Modular eDrive Concept



Investment of 500 million euros in our second battery plant in Germany

Deutsche ACCUMOTIVE GmbH & Co. KG, Kamenz, Germany

- Production space stocked up from 20,000 to 60,000 m^2
- 2nd plant start of operations: summer 2017
- Production of Li-Ion batteries for hybrid as well as electric vehicles and energy storage systems

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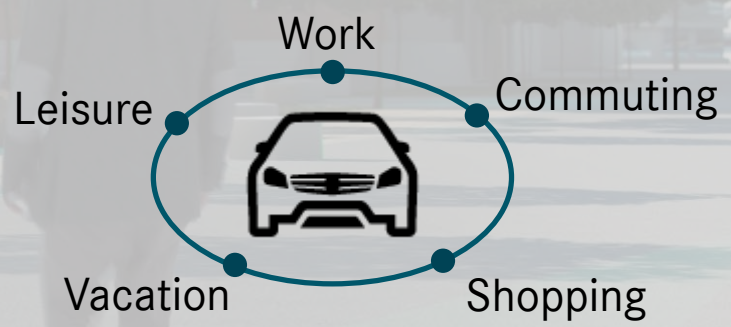
Today: one car for different mobility cases.
Tomorrow: possibly the most suitable car *„on-demand“*.

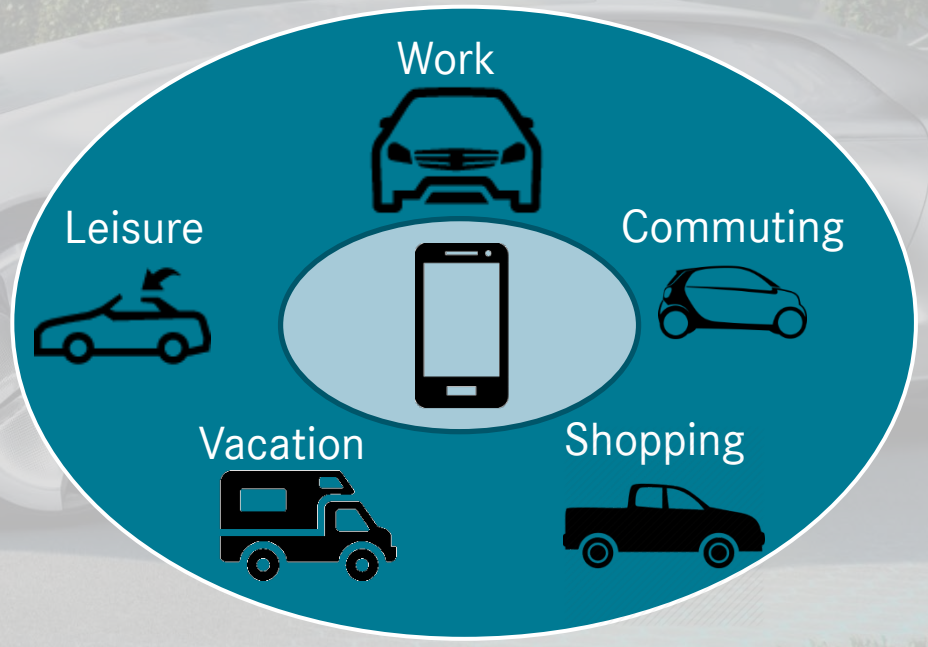
Today

One car for all use cases



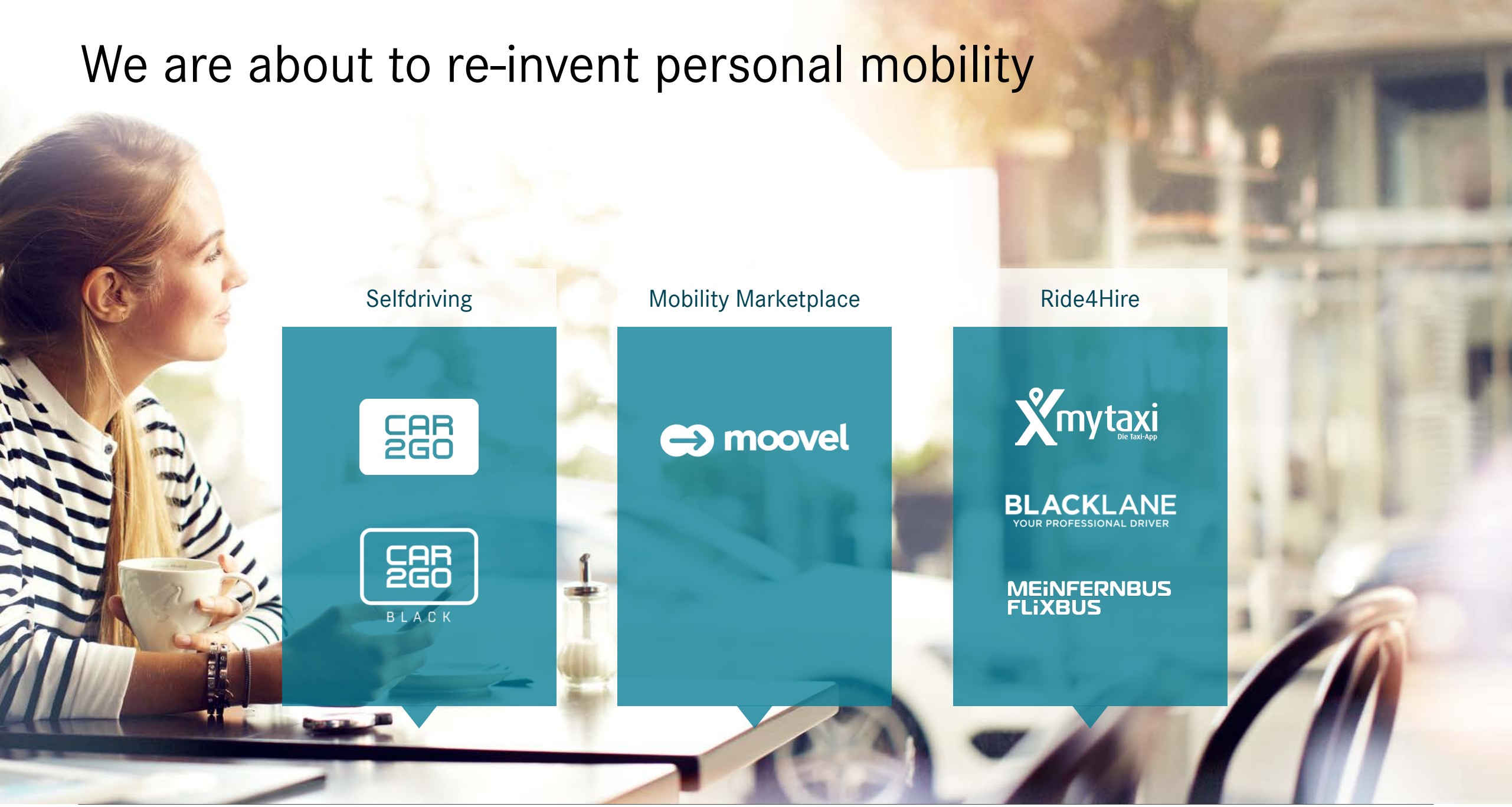
Tomorrow

The fitting solution for each use case



Source: McKinsey&Company “Automotive revolution – perspective towards 2030”

We are about to re-invent personal mobility



moovel – find, book and pay

Public transport

Carsharing

Railway

Taxi

Bikesharing

Forging ahead with increasing business in Mobility Services

	car2go 12/16 (YTD)	mytaxi + HAILO 12/16 (YTD)	Combined change*
Members	2.2 mill.	3,400,000	+131% ↗
Cities	29	>50	+20% ↗
Transactions	22.2 mill.	22.2 mill.	+90% ↗

* car2go and mytaxi combined 12/16 (YTD) vs. 12/15 (YTD)

FLIXBUS BLACKLANE MOOVEL

mytaxi and Hailo create Europe's largest taxi e-hailing company

mytaxi + HAIL O

20 million rides p.a.

100,000 registered taxi drivers

over 50 cities

9 countries

The two innovative leaders in the field of taxi e-hailing are joining forces

Customers enjoy various forms of mobility with a transparent overview and easy-to-pay services

Another strategic step in making Daimler Financial Services a leader of mobility solutions and platforms

Leadership in Future Mobility will be determined by the combination of the four dimensions

Mobility of the Future

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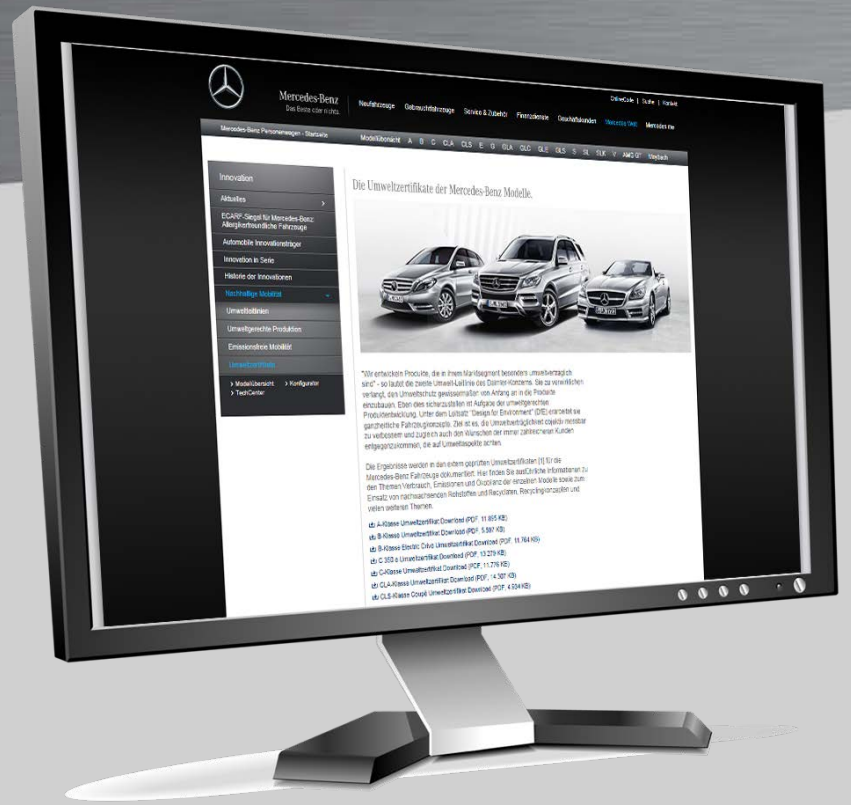

More Information at

www.Mercedes-Benz.com

Innovation – Sustainable mobility

www.Daimler.com

Sustainability

Disclaimer

This document contains forward-looking statements that reflect our current views about future events. The words “anticipate,” “assume,” “believe,” “estimate,” “expect,” “intend,” “may,” ”can,” “could,” “plan,” “project,” “should” and similar expressions are used to identify forward-looking statements. These statements are subject to many risks and uncertainties, including an adverse development of global economic conditions, in particular a decline of demand in our most important markets; a deterioration of our refinancing possibilities on the credit and financial markets; events of force majeure including natural disasters, acts of terrorism, political unrest, armed conflicts, industrial accidents and their effects on our sales, purchasing, production or financial services activities; changes in currency exchange rates; a shift in consumer preferences towards smaller, lower-margin vehicles; a possible lack of acceptance of our products or services which limits our ability to achieve prices and adequately utilize our production capacities; price increases for fuel or raw materials; disruption of production due to shortages of materials, labor strikes or supplier insolvencies; a decline in resale prices of used vehicles; the effective implementation of cost-reduction and efficiency-optimization measures; the business outlook for companies in which we hold a significant equity interest; the successful implementation of strategic cooperations and joint ventures; changes in laws, regulations and government policies, particularly those relating to vehicle emissions, fuel economy and safety; the resolution of pending government investigations or of investigations requested by governments and the conclusion of pending or threatened future legal proceedings; and other risks and uncertainties, some of which we describe under the heading “Risk and Opportunity Report” in the current Annual Report. If any of these risks and uncertainties materializes or if the assumptions underlying any of our forward-looking statements prove to be incorrect, the actual results may be materially different from those we express or imply by such statements. We do not intend or assume any obligation to update these forward-looking statements since they are based solely on the circumstances at the date of publication.