

VOLKSWAGEN

AKTIENGESELLSCHAFT

Clean Vehicle Development at VW

Volkswagen Powertrain and Fuels Strategy

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Global Government Affairs
Future Technologies

Volkswagen AG



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Social challenges

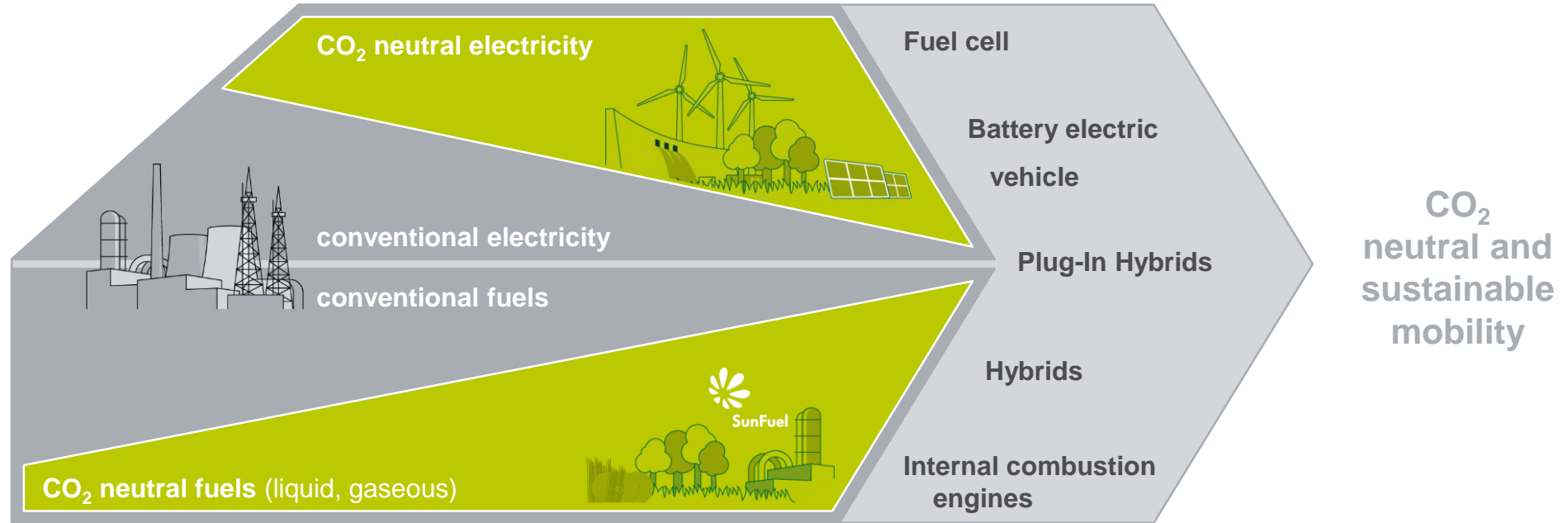
- **Demographic Change and Urbanisation**
 - *Noise, Emissions, Accidents*
- **Global economical development and growth of middle class**
 - *Rising mobility demand*
- **Completion on resources and climate change**
 - *Consumption, CO₂*
- **Connectivity and mobility**
 - *Data safety*

21. century → Concept sustainability



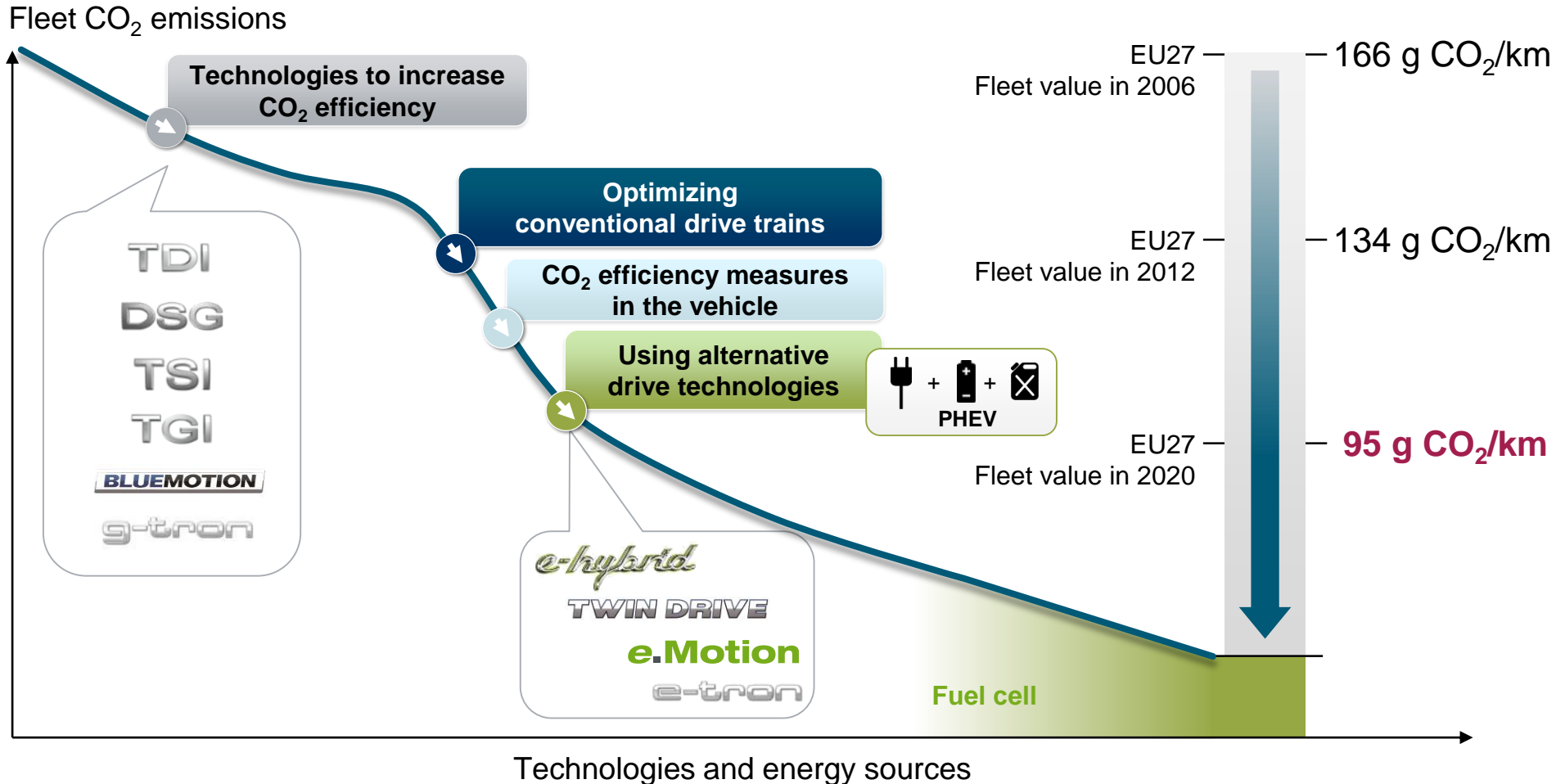
Volkswagen Powertrain and Fuels Strategy

Coexistence of propulsion systems



- ⇒ Coexistence of conventional powertrains and electrified mobility
- ⇒ Decarbonisation of the energy carrier and higher powertrain efficiency
- ⇒ A portfolio of various drivetrains will fulfil the customer expectations

Carbon dioxide: Conventional drive technologies are not enough



Volkswagen Group: Technologies to suit every need

Inter Urban Mobility



Golf TSI BlueMotion



Golf TDI BlueMotion



Jetta Hybrid



eco up!



Panamera Hybrid

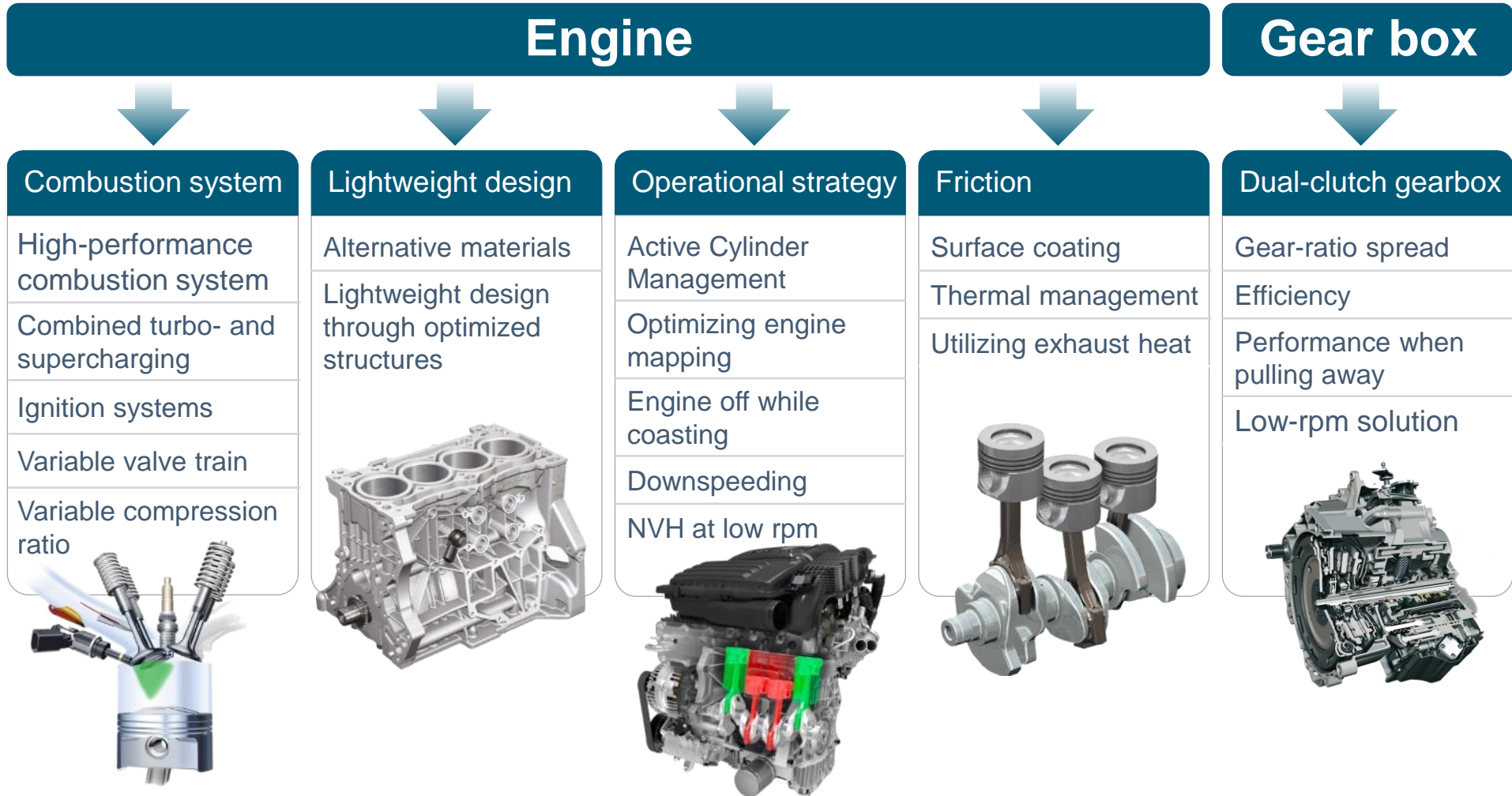


Q5 hybrid

Golf TDI BlueMotion
3,2 ℓ/100km, 85 gCO₂/km



Measures to improve CO₂ efficiency



Volkswagen Group: Technologies to suit every need

Urban Mobility



Golf TSI BlueMotion



Golf TDI BlueMotion



Jetta Hybrid



Golf Blue-e-Motion



e-up!



eco up!



Panamera Hybrid



Q5 hybrid

World Champion in efficiency – e-up!

Technical Data

Acceleration 0 – 100 km/h: 12,4 s

Top speed: 130 km/h

Energy demand: 11,7 kWh/100 km

Practical mileage: 120 – 160 km

Mileage (NEFZ): 160 km

Powertrain

- Electric engine: 60 kW
- Torque: 210 Nm



Combined
Charging System

Lithium-Ion Battery

- Energy content: 18,7 kWh
- Weight: 230 kg

The e-Auto (BEV) – e-Golf

Technical Data

Acceleration 0 – 100 km/h: 10,4 s

Top speed: 140 km/h

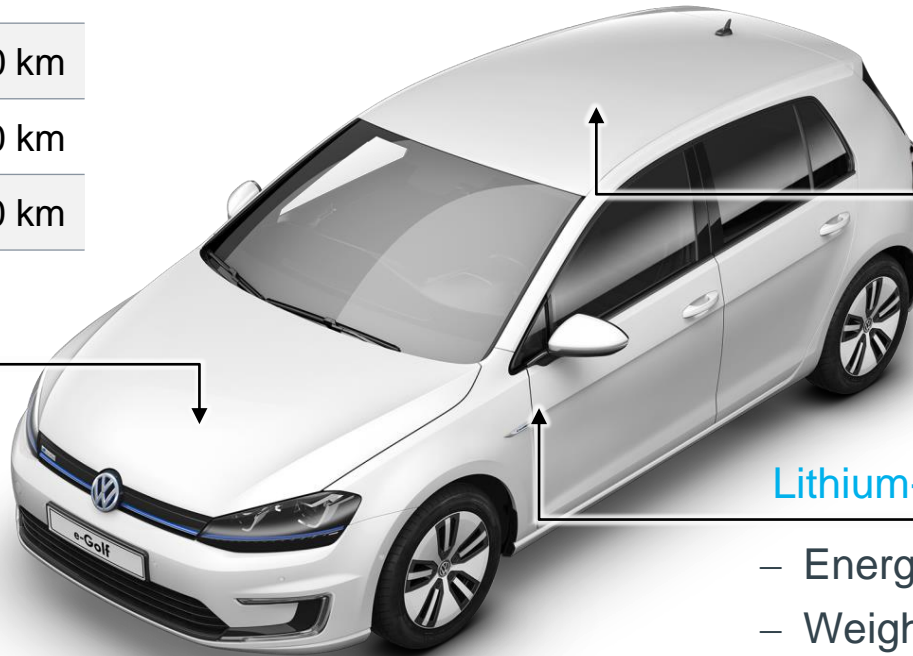
Energy demand: 12,7 kWh/100 km

Practical mileage: 130 – 190 km

Mileage (NEFZ): 190 km

Powertrain

- Electric engine: 85 kW
- Torque: 270 Nm



Combined
Charging System

Lithium-Ion Battery

- Energy content: 24,2 kWh
- Weight: 318 kg

Roadmap for high-energy batteries

All-electric range
in km **



* Energy density per cell

** Based on e-Golf with constant battery volume

Volkswagen Group: Technologies to suit every need

The best of two worlds



Golf TSI BlueMotion



XL1



Golf TDI BlueMotion



Jetta Hybrid



Golf GTE



Golf Blue-e-Motion



e-up!



Porsche
Panamera S e-hybrid



eco up!



Panamera Hybrid



Audi A3 e-tron



Q5 hybrid

The best of two worlds – Golf GTE

Technical data

Acceleration 0 – 100 km/h: 7,6 s

Top speed: 220 km/h

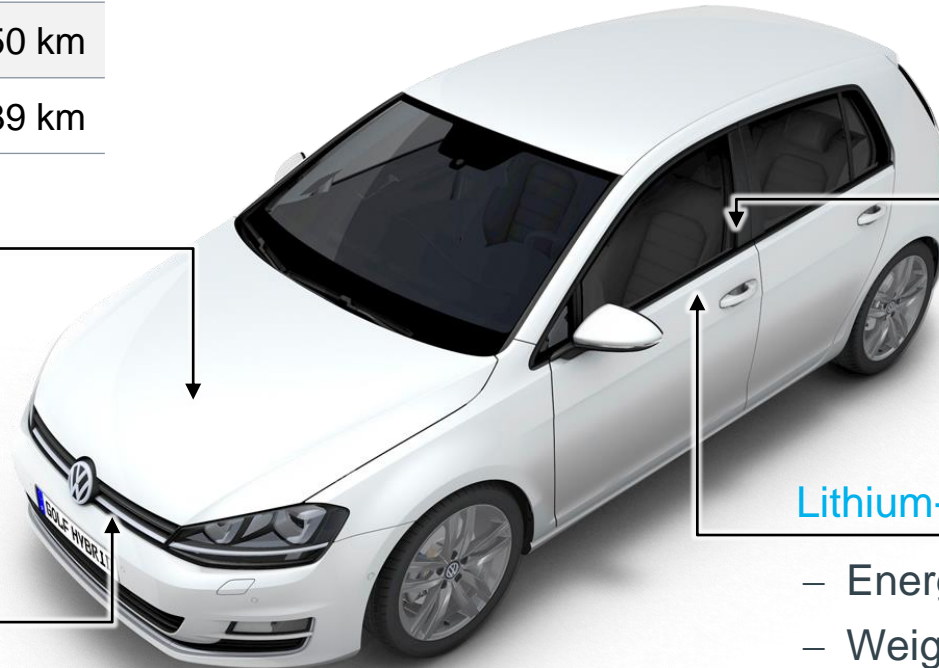
Electric mileage (NEFZ): 50 km

Total mileage (NEFZ): 939 km

Powertrain

- 1,4l TSI & Electric engine
- System torque: 350 Nm
- System- power: 150 kW

AC-Charger



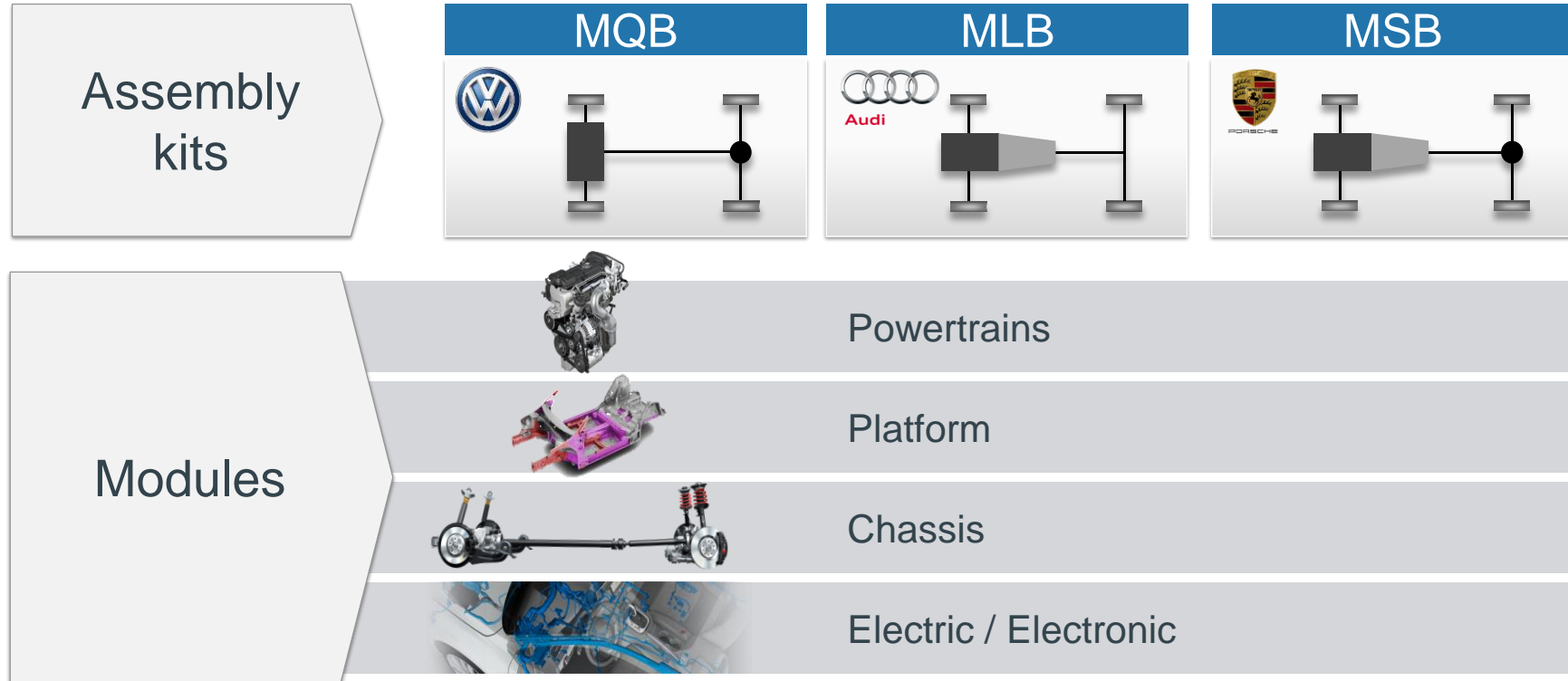
Fuel system

- Gasoline: 40 Liter

Lithium-Ion Battery

- Energy content: 8,8 kWh
- Weight: 120 kg

Standardised Assembly kits and modules in the Volkswagen Group



Powertrains for the MQB

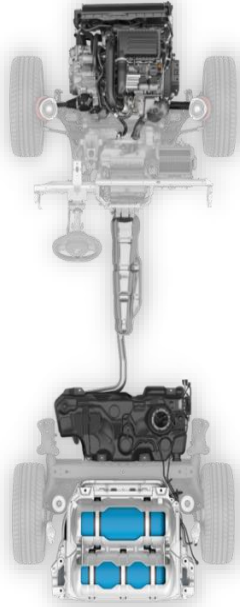
Conventional

Diesel Gasoline



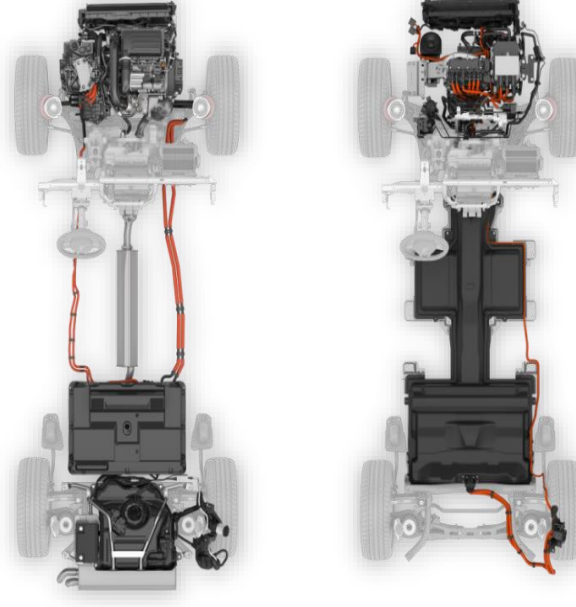
Alternative / Regenerative

Ethanol CNG

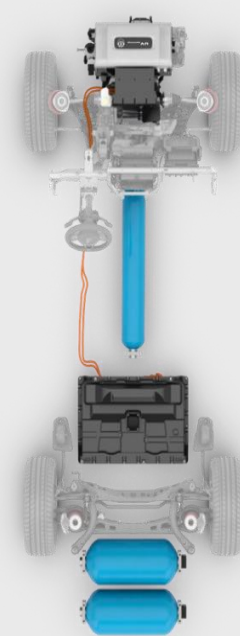


Electrified

Plug-In Hybrid BEV

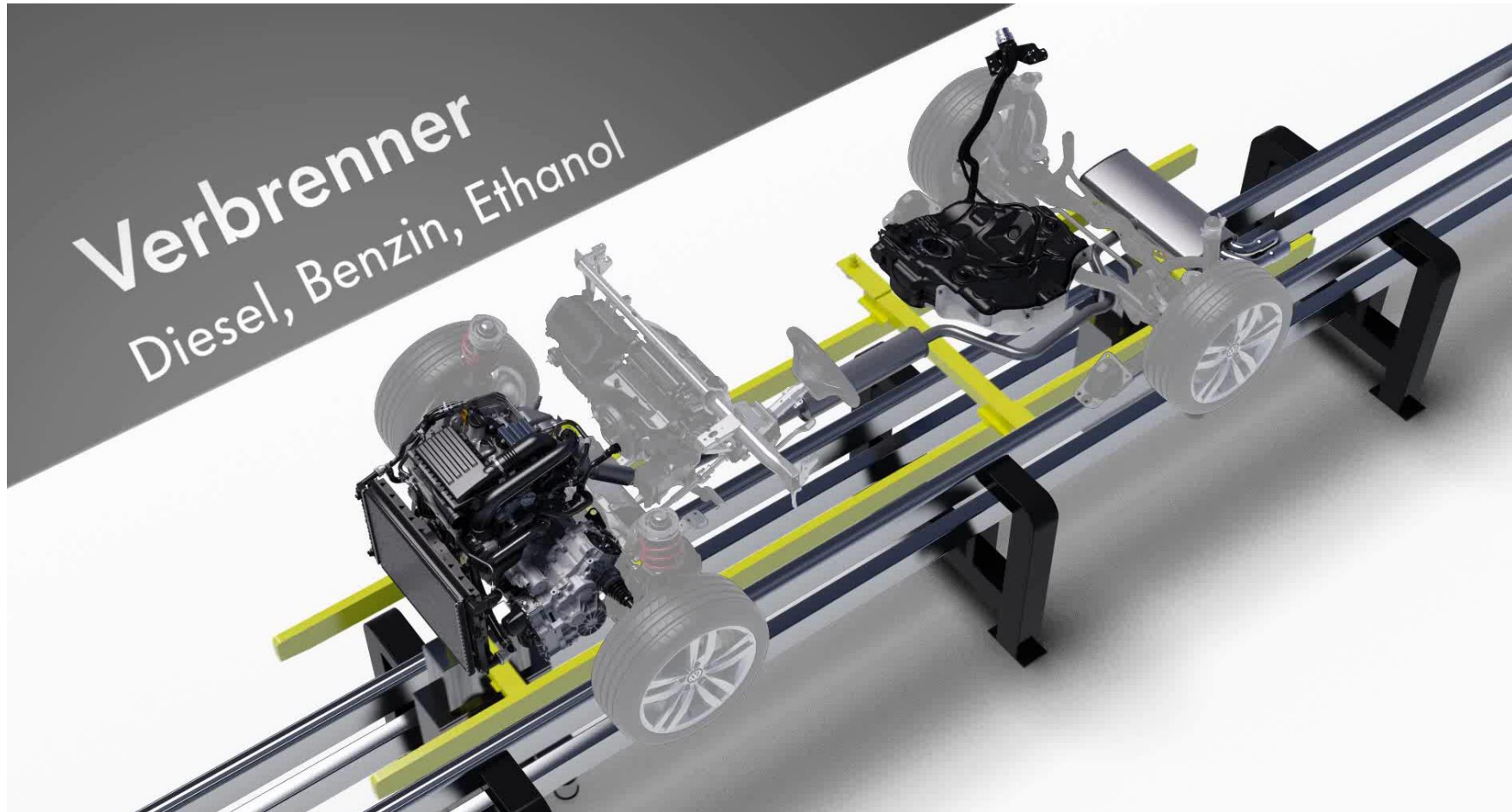


Fuel Cell

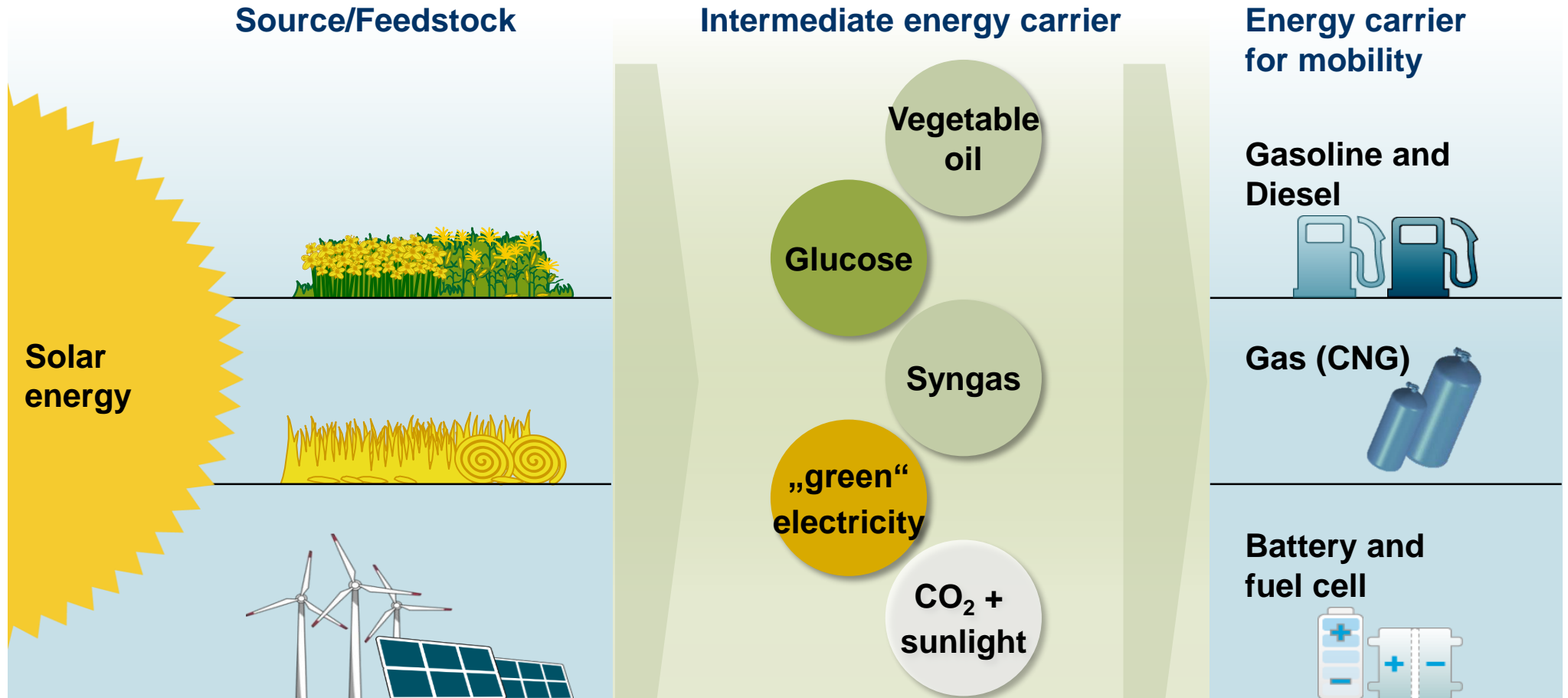


- ⇒ Usage of powertrains via segments and brands
- ⇒ More than 40 group products are based on the MQB assembly kit

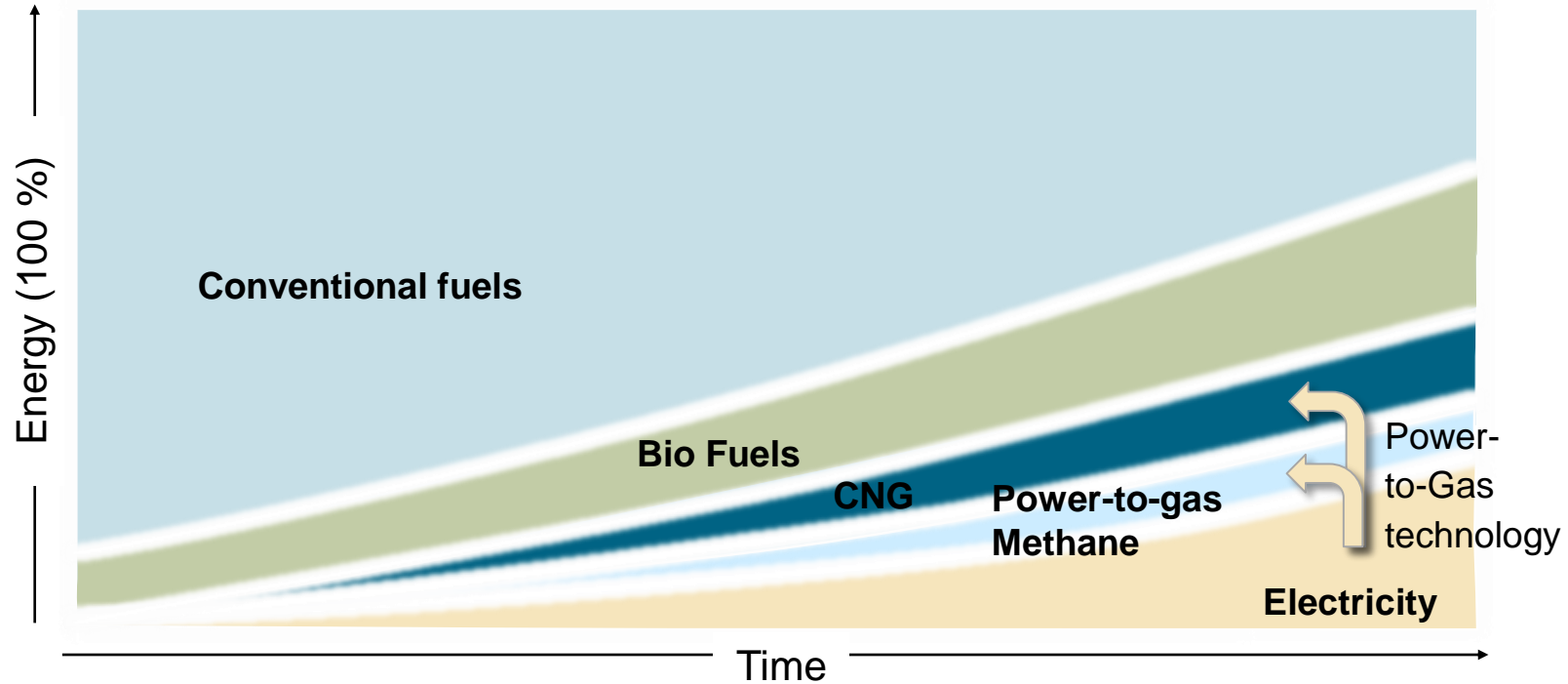
Production Strategy – »Bumper on Bumper«



Evolution of renewable energy pathways



Possible evolution of sustainable energy for the automotive sector



- ⇒ Trend to more **diversification of energy** carriers for mobility
- ⇒ Focus on more **decarbonized energy** carriers. The European goal is to reach 80% of decarbonization in 2050.



Thank You for you attention