
Biofuels, electric mobility and hydrogen - Where is the journey going?

9. Internationaler Fachkongress für Biokraftstoffe des BBE und der UFOP

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VDA

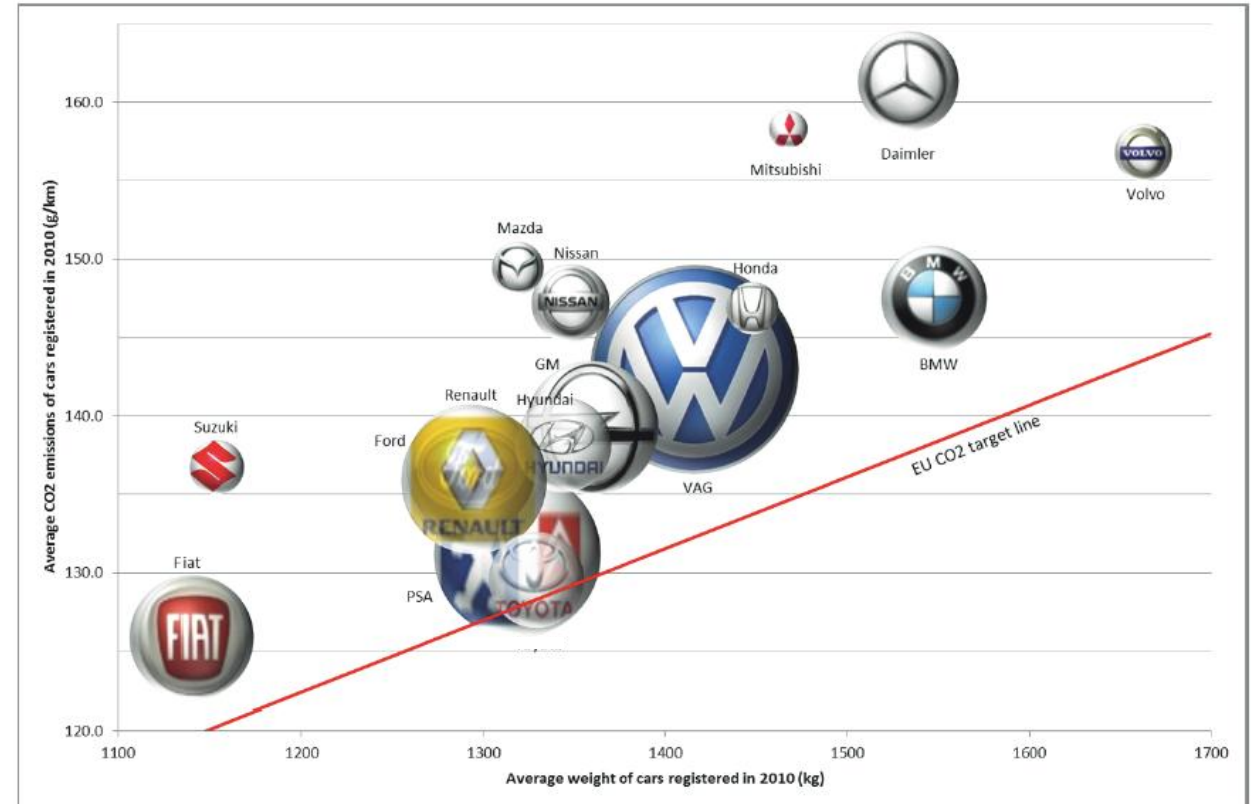
Verband der
Automobilindustrie

- CO₂-Emissions – Challenges for the Automotive Industry
- Drive train and Fuels – Strategy of the Automotive Industry
- Bio-fuels – Requirements
- Electric Mobility – What is that?

Challenges

- Sustainable Mobility
- Environmental Protection
- Climate Protection
- Mineral Oil – finite Resources
- Energy Diversification
- Cost of Mobility
- Transport Growth and Urbanization (Mega cities/regions)
- EU Requirement (130 g/CO₂/km; 120 g + 10 g “complimentary measures and sustainable biofuels”)

fleet-average weight and fleet-average CO₂ emissions by carmaker, compared with EU target line



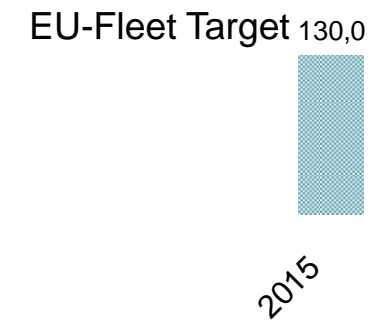
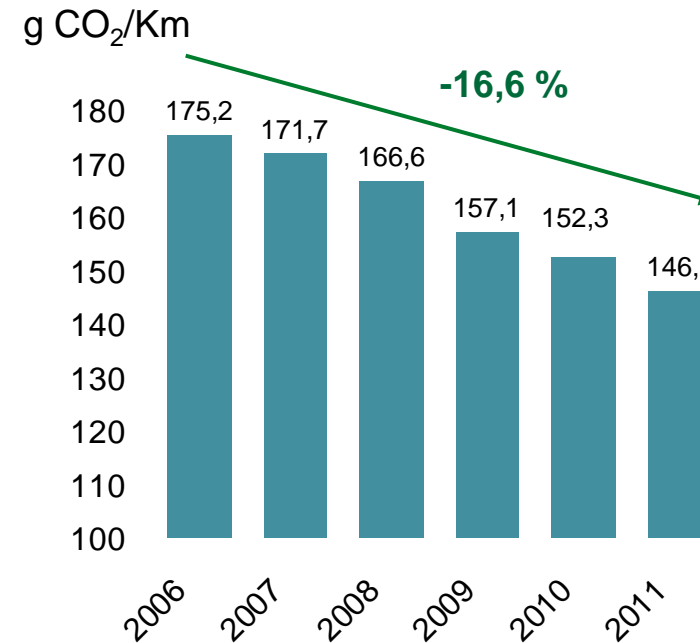
Source: T & E

It is not „the“ CO₂ Regulation

- CO₂ Regulation for Cars
- CO₂ Regulation for Light Trucks
- CO₂ Regulation for Heavy Duty Trucks

Reduction of CO₂ Emissions of German Brands

- CO₂ Emissions of German Cars are steadily decreasing
- Challenging target of 130 g will be reached by innovative Drive Train Technology from German Manufacturers
- We are on track

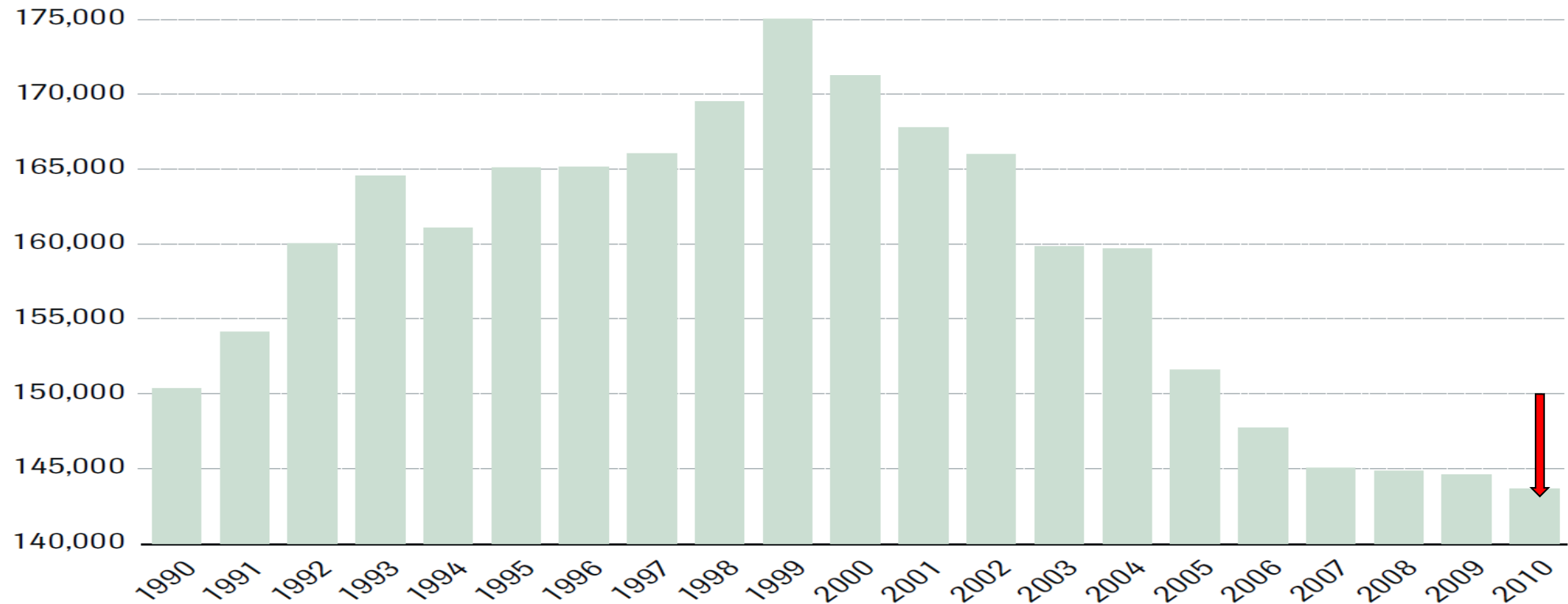


Source: KBA, VDA

Situation: Decreasing CO₂ Emissions

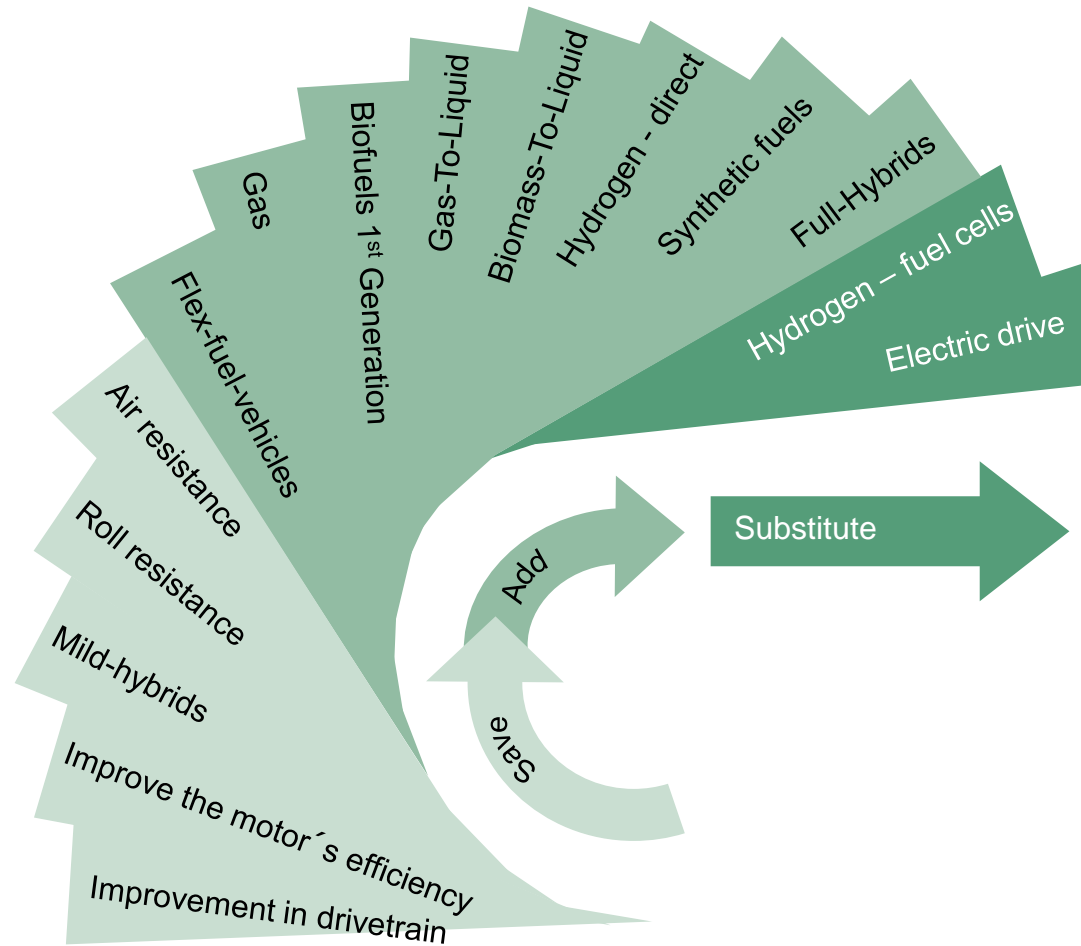
CO₂ emissions from German road traffic

Units in 1000 tons



Source: UBA National Inventory Report 2011

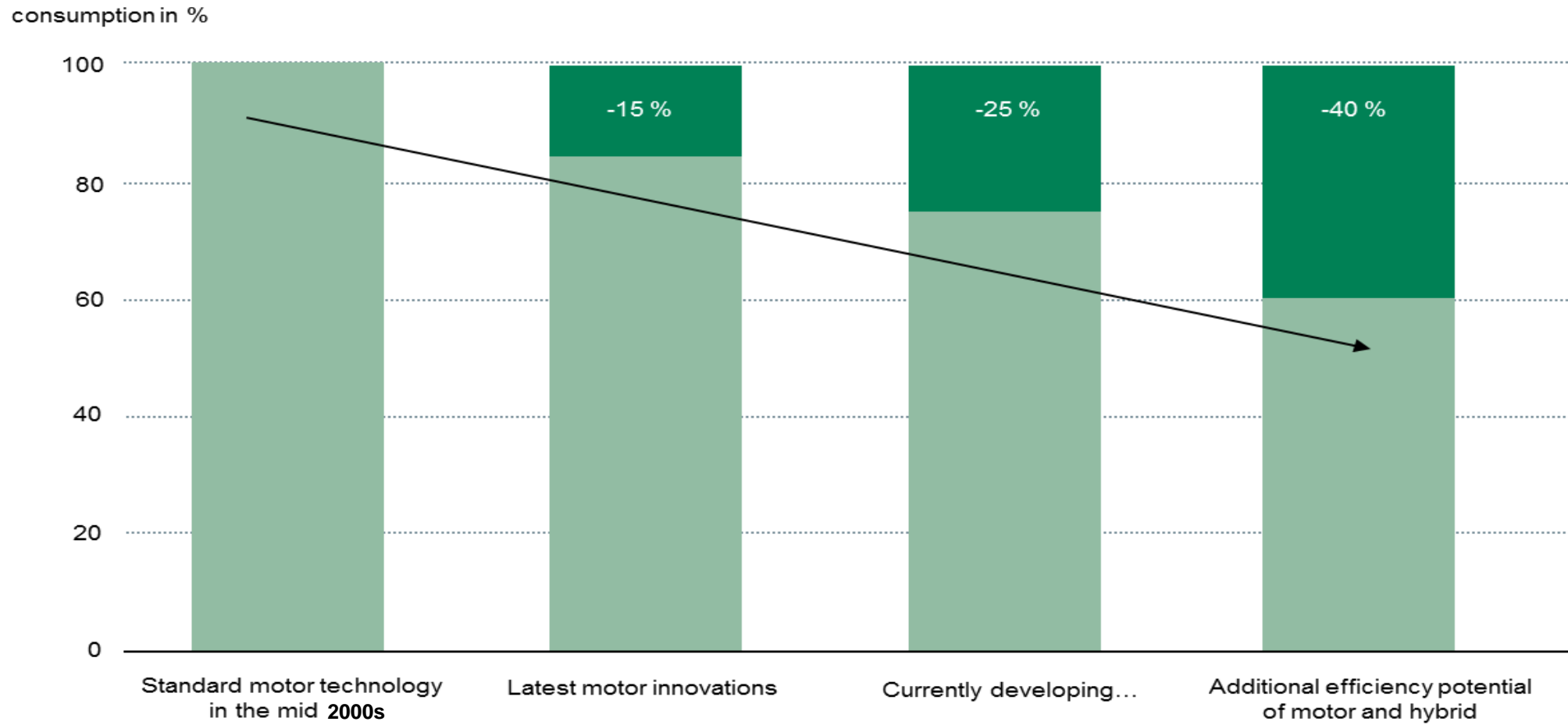
The fan strategy of the German Automotive Industry



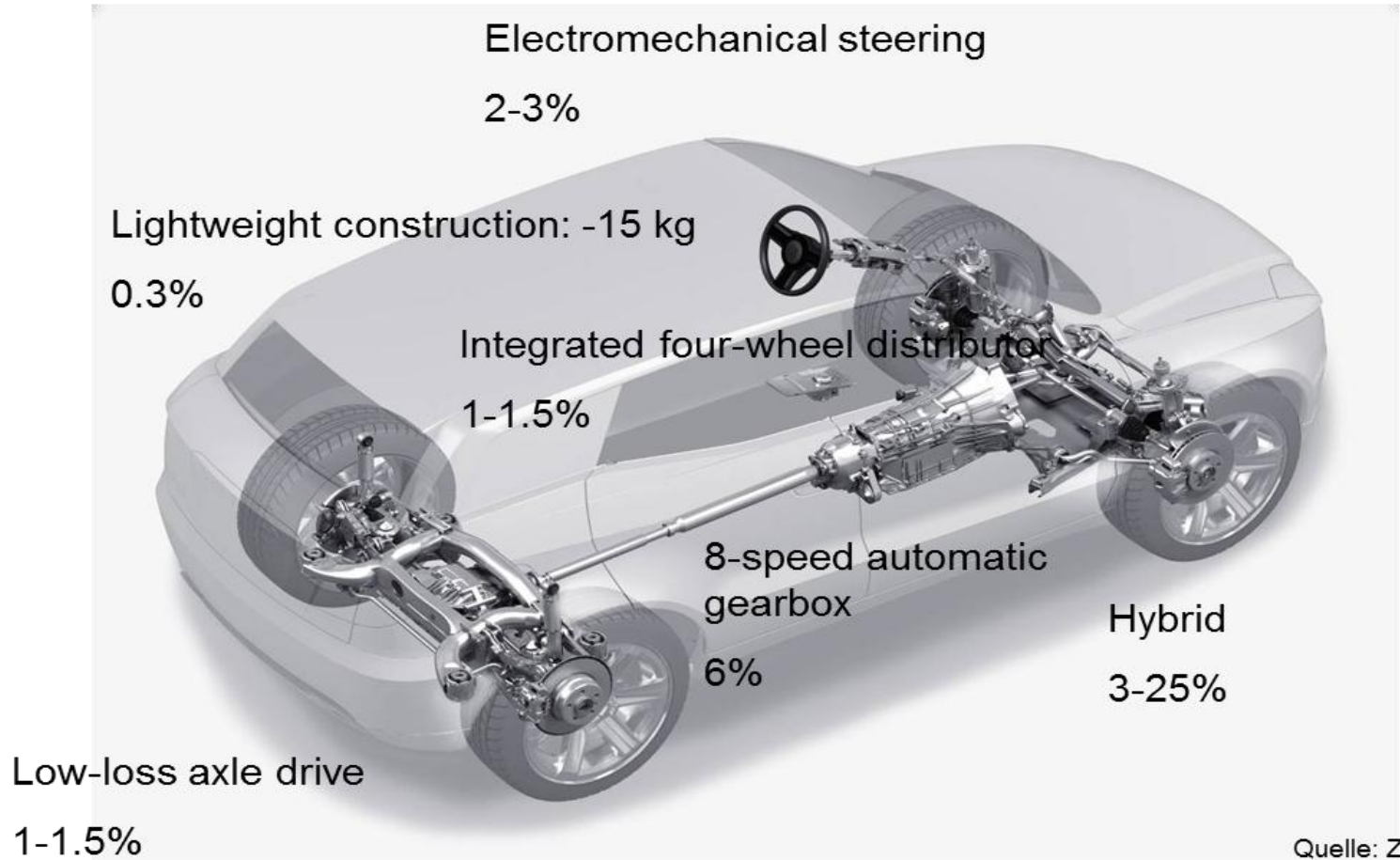
Which Way?



Petrol- and diesel-engine are nowhere near the end of **VDA** development



CO₂-reduction by optimisation of drivetrain and chassis



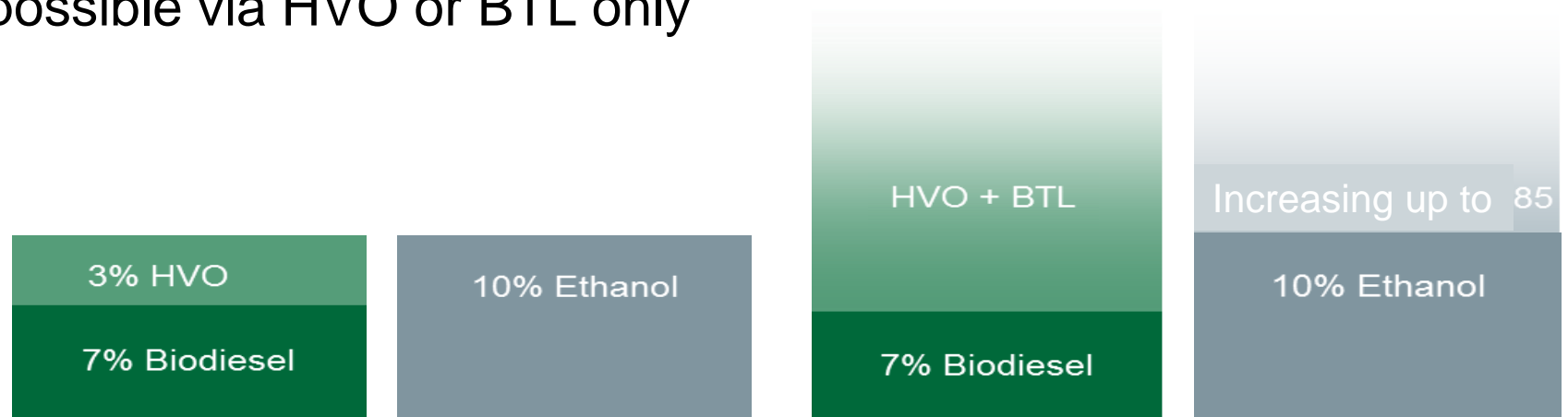
Biofuels - Blending

Roadmap Biofuels 14.11.2007:

1. Increasing blending of biofuels 1. generation
2. Permitting of blending with hydrated vegetable oil (HVO)
3. Establishing the aim of technology open extension of biofuels use until 2020

In a short range Diesel can be blended by max.10% biofuel

Higher blending is possible via HVO or BTL only



Technical Conditions for Biofuels: Biofuelquality

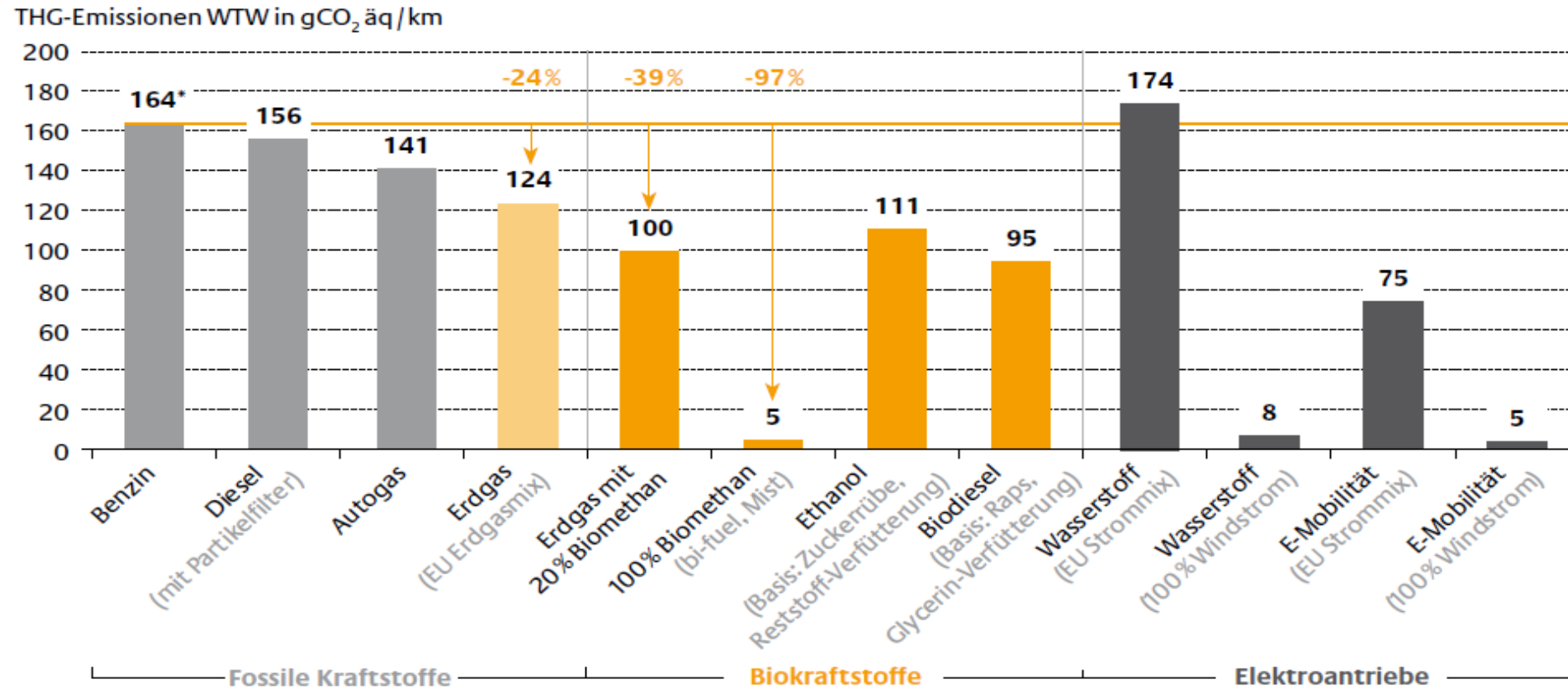
- **(Bio) -fuels must be adapted to requirements of modern combustion engines:**
 - Emission Requirements (Euro 6)
 - Durability (160.00km-750.000km)
 - OBD-Requirements (EOBD-II)
 - High Pressure Injection and Turbo Charging
- **According to the type of Biofuel there are different blending barriers:**
 - 7% Biodiesel for the complete vehicle fleet (according to EN 590)
 - 10% Ethanol for all new vehicles and most of existing gasoline vehicles (according to E DIN 51626-1)
 - Other Biofuels like for example BTL or HVO don't have such strict blending limitations

Technical Conditions for Biofuels: Standardisation of Fuels

- New Vehicle Type can only be developed and cleared to be compatible with well defined fuel types
- Clear and uniform international standards are needed for new fuels and blending components.
- New fuel specifications must be fixed at least 5 year before vehicles can be developed to these new specifications. In general the time gap between specification and market introduction is at least 5 years.
- In general no backwards compatibility of existing cars is given, when fuel quality is lowered.



Potentials for reducing CO₂-emissions



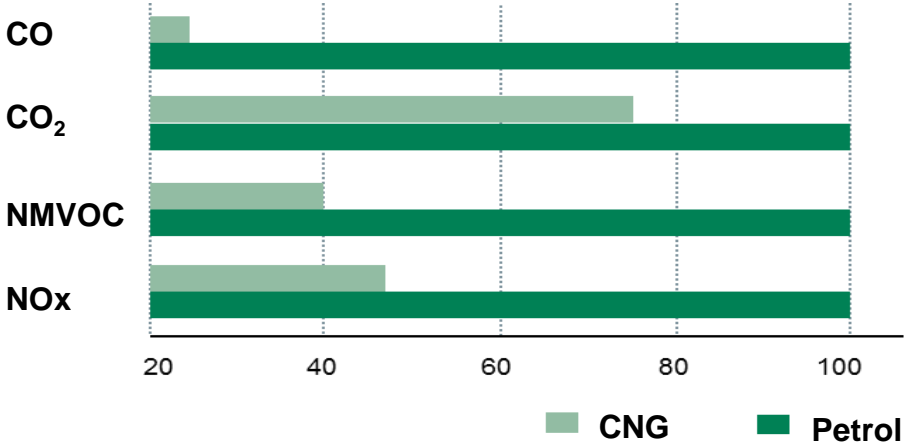
* Referenzfahrzeug: Ottomotor (Benzin, Saugmotor), Verbrauch: 7l/100 km

Source: „Erdgas und Biomethan im künftigen Kraftstoffmix“, DENA 2010

Natural Gas (CNG) as an integral part of the German **VDA** Automobile Industry's fuel strategy

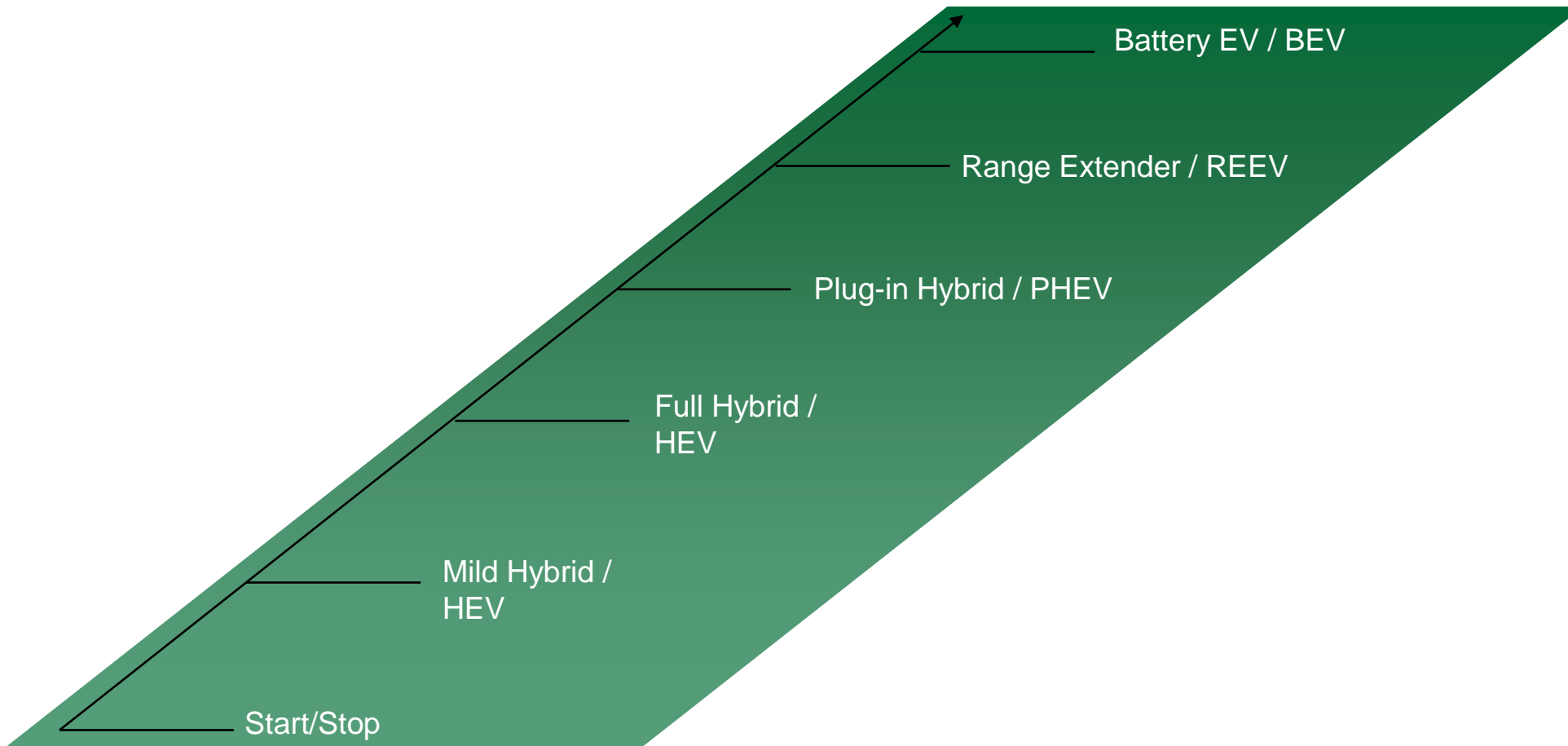


* Euro NCAP Crash Test, Burning Tests, ADAC



Source: Volkswagen AG

Electromobility – What is that?



Electric mobility – What is that? What do we need?

- In order to introduce electric mobility successfully we need a uniform approach.



Renewable energies

Market potential

Distances

User behaviour

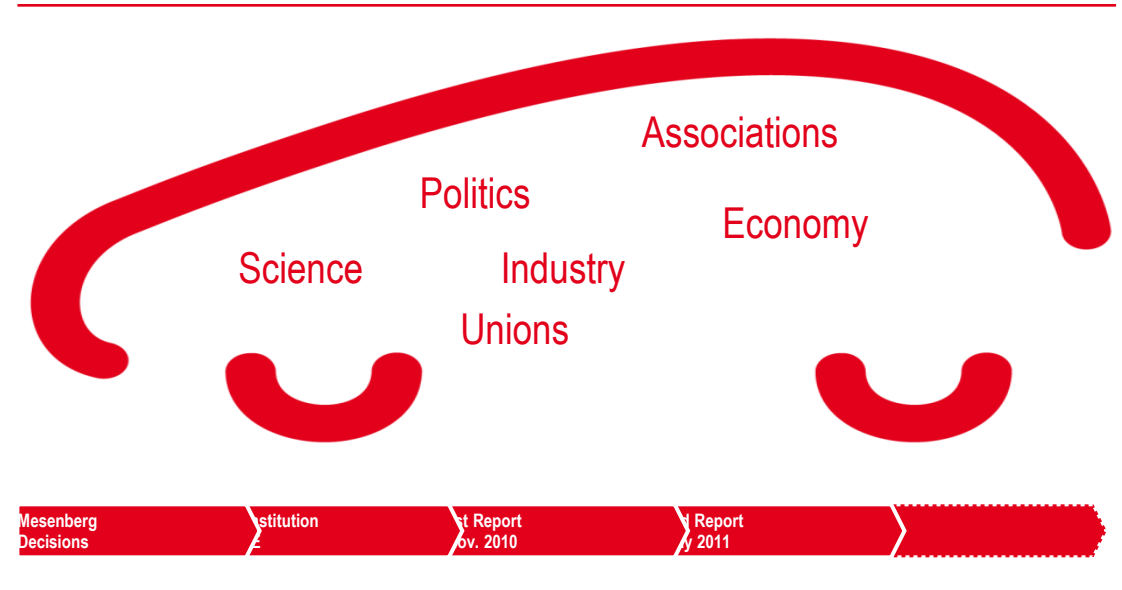
Acceptance by customers

Infrastructure

Merits and demerits

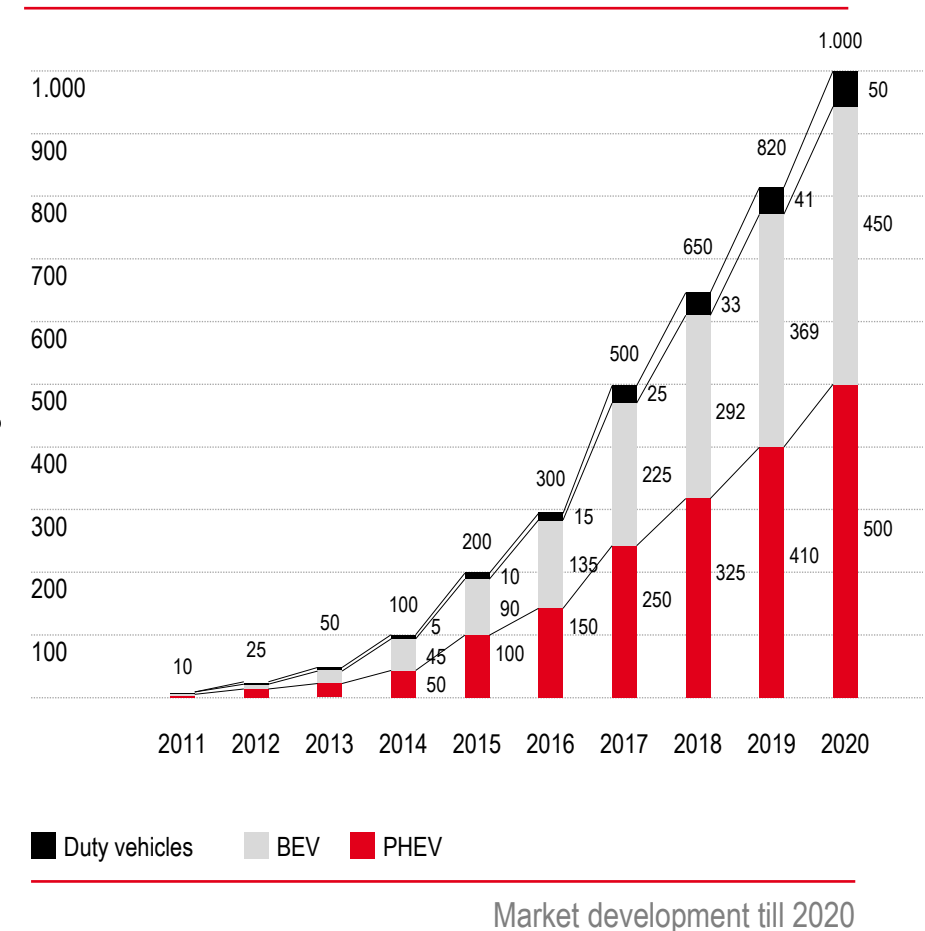
Source: BMW AG

- Unique Concentration of Industry, Science, Politics, Unions and Associations
- How: Activity oriented towards: Market and System Solutions – open for several technologies
- Common Goal: Lead supplier and lead Market in 2020 (1 mio. vehicles on the road)
- Electromobility made in Germany:
 - Systemic Solutions
 - Climate and Resource Protection Activities
 - Value Chain E-Mobility in Germany
 - Create Employment



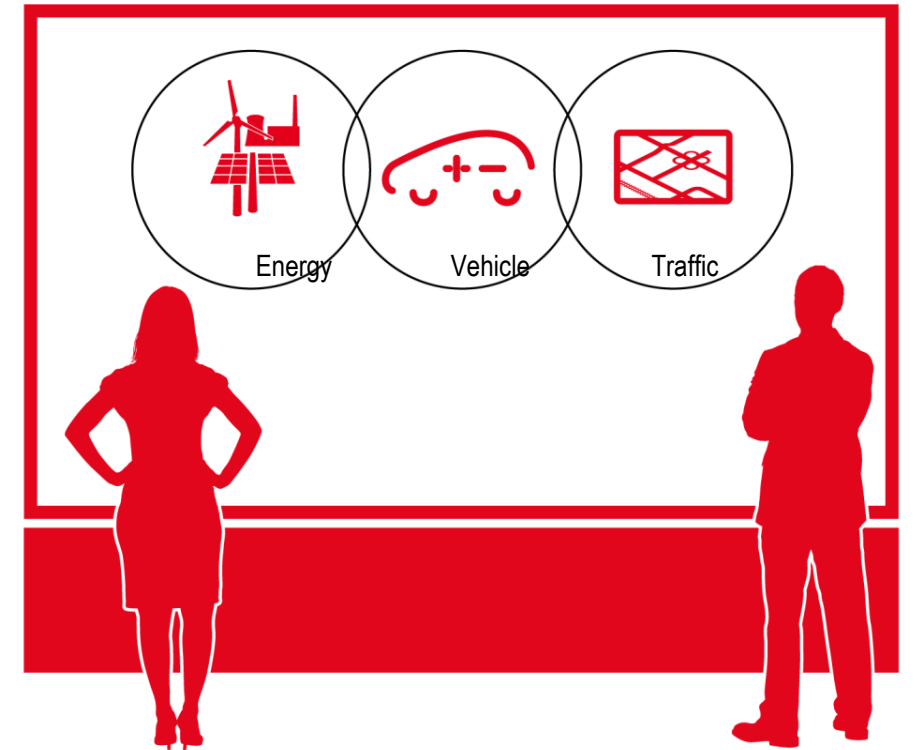
Market development of electric vehicles until 2020

- Milestones towards the Goal:
 - 2014: 100.000 Electric Vehicles on German Roads
 - 2017: 500.000 Electric Vehicles on German Roads
 - 2020: 1 Mio. Electric Vehicles on German Roads
- Assumptions for new registrations is based on today's user footprint:
 - 40 Percent private customers
 - 30 Percent pure commercial customers
 - 30 Percent commercial customers with private usage (company car user)



Bundle Resources and create Visibility

- Mega Show Cases consolidate technological progress and solutions and merge them in a visionary overall concept for Electric Mobility
- Within the show cases assumptions and measurements will be judged
- The show cases will be selected in a transparent process
- Lead Supplier: Show cases give the opportunity to demonstrate innovative German e-Mobility solutions under realistic conditions and prepare global commercialization
- Lead Market: Show cases build up acceptance by all potential customers and users for the system E-Mobility, they do stimulate the demand locally and globally

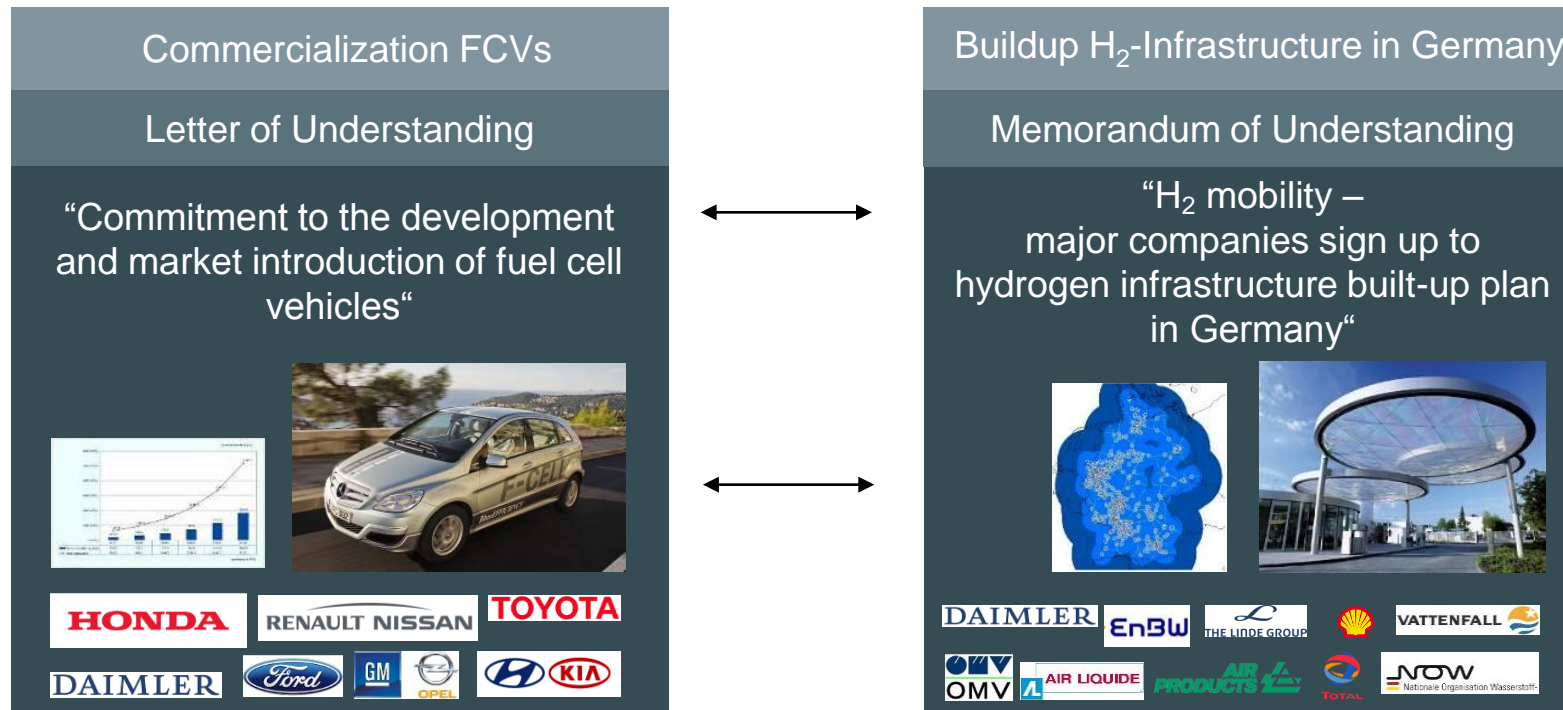


Mega Show Cases demonstrate the entire system of Electric Mobility

Fuel Cell Vehicles

Clean Energy Partnership (CEP)

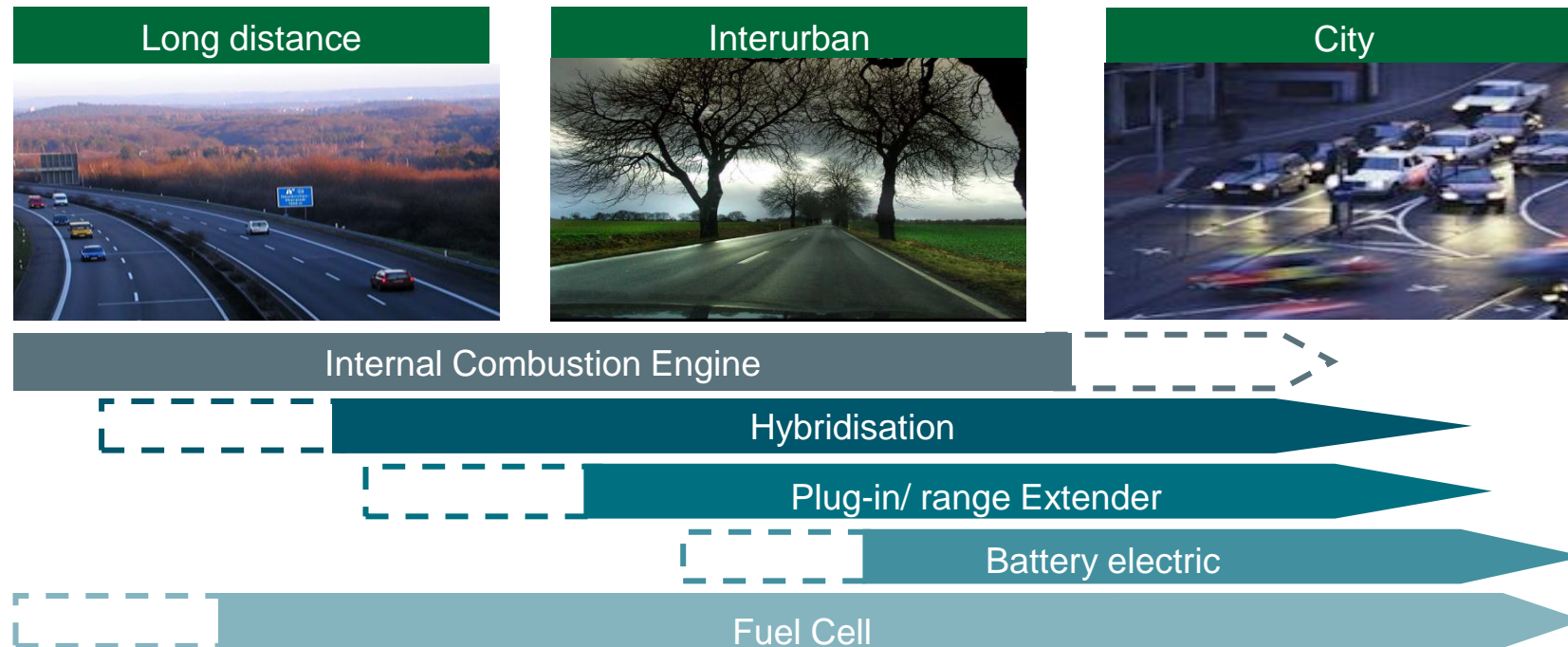
- Since 2008 in phase II (until 2011) with about 60 mill. Euros (50% NIP)
- Starting from cluster of Berlin and Hamburg
- More than 40 H₂ vehicles, H₂ busses, several H₂ stations



Source: Daimler AG

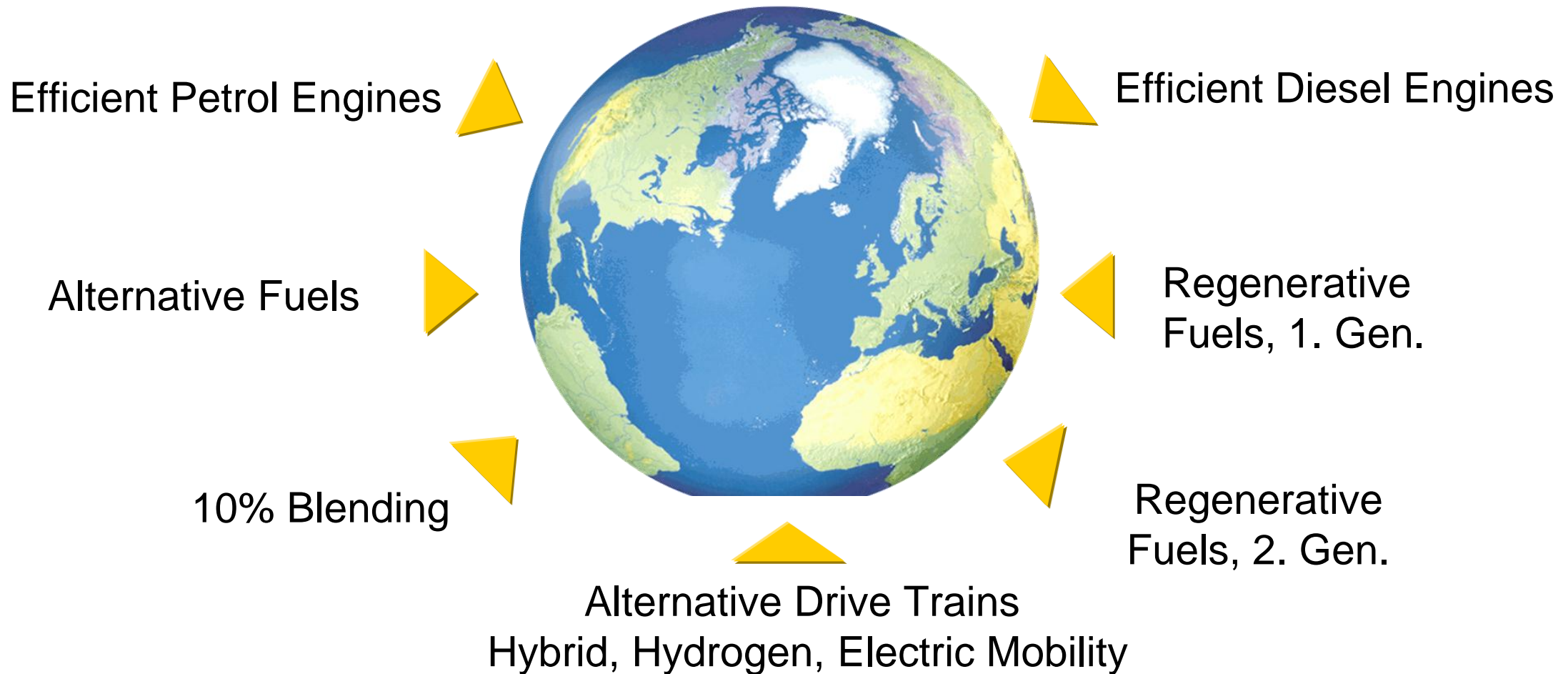
Future Drive Trains

Tailored solutions on the market:



Quelle: Daimler AG

Alternative Drive Trains are an integral part of the German Automobile Industry's strategy



Vielen Dank für Ihre Aufmerksamkeit
Many Thanks for Your Kind Attention