Mercedes-Benz

FUSO

The Future in Motion

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Sales Engineering
Commercial Vehicles

Five steps towards the "Future in Motion"

Today

Tomorrow

Fuel Cell Vehicles

Hybrid & Electric Vehicles

CO2-neutral Bio Fuels

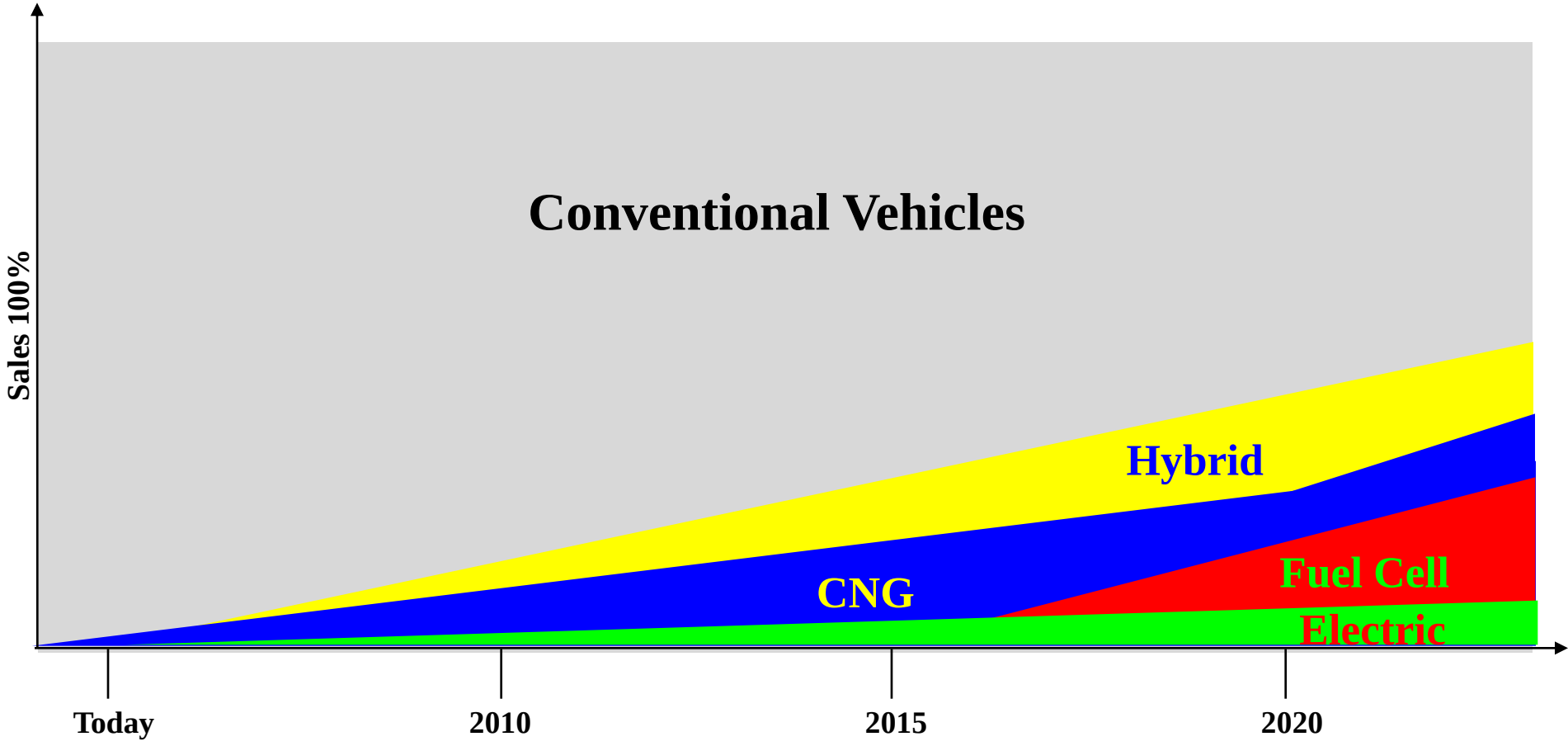
Improvement of Conventional Fuel
Natural Gas

Optimization of Combustion Engines

Maximisation of efficiency, minimisation or elimination of emissions

Hybrid & Electric Vehicles

The Alternative Drivetrain Roadmap



Increasing market share of alternative propulsion systems

The Alternative Drivetrain Roadmap

Natural Gas Technology

Natural gas is considered an alternative to Gasoline and Diesel

Electric Drive Technology

Electric Drive technology delivers zero tail pipe emissions which can greatly enhance the air quality of cities.
Electricity production is not without it's own CO_2 emissions

Hybrid Drive Technology

Hybrid technology brings together unique benefits to the customer comfort & driving experience whilst meeting the high environmental standards of the future

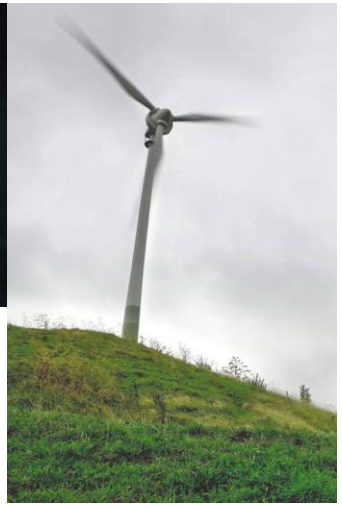
Fuel Cell Technology

Fuel cell technology can smooth the way into a new era of mobility with zero tail pipe emission vehicles

Benefits of battery-electric vehicles

Environmental

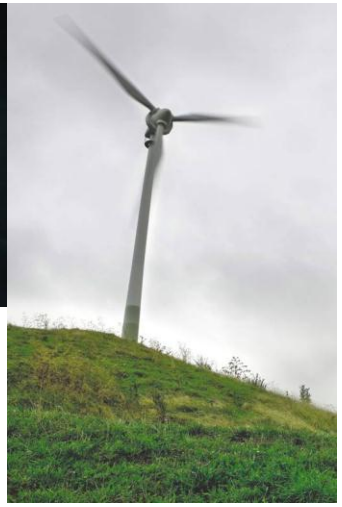
- Zero tail pipe emissions
- Low noise driving



Benefits of battery-electric vehicles

Technical

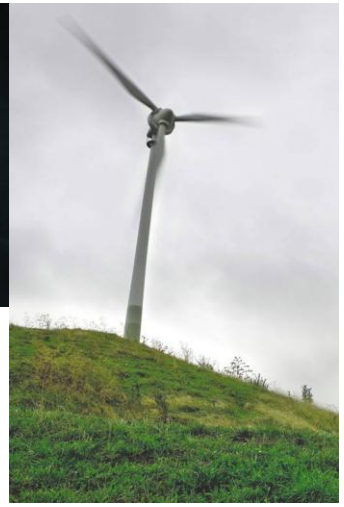
- Good dynamics
- Maximum torque, immediate and continuous availability
- High driving comfort - step-less transmission
- Constant linear acceleration



Benefits of battery-electric vehicles

Economic

- High cost savings in comparison to petrol or diesel through:
  - Better efficiency of the electrical transmission system
  - Recuperation (Regenerative Braking)



- Road Tax exemption
- Favourable vehicle insurance prices – in some instances
- Plug in Van Grant 20% of the cost of the vehicle up to a maximum of £8000

Vito E-CELL

Vito E-CELL

Intelligent Charging

Off Peak Charging

Vehicle with lowest charged battery charged first

Managed consumption within supply limits

Vito E-CELL – Product characteristics

Technical Details

- **BASIC VEHICLE**
- **Vito long wheelbase panel van**

- **Battery-electric drive**
- **Front-wheel drive**
- **1-Gear-Transmission**
- **LH- & RH-drive**
- **Payload ~900kg**

- **TRACTION BATTERY**
- **Energy content: >36 kWh**
- **Voltage: 250V - 380V (410 V peak)**

- **ELECTRIC MOTOR**
- **Power: 60 kW mech. (>peak 90 kW)**
- **Torque: 380 Nm (peak)**

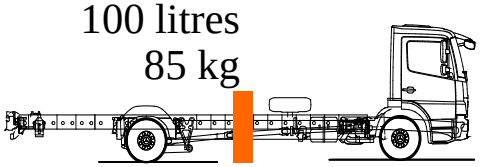
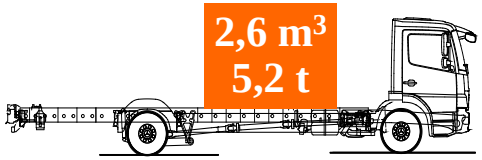
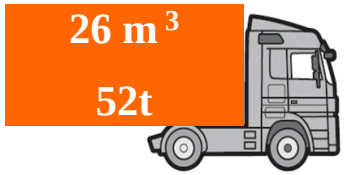
- **CHARGE PLUG IN**
- **Power: 6,6 kW**
- **16A / 400V, AC/ DC**

Vehicle properties

Max. speed	**80 km/h**
Range NEDC	**130km**
Range in customer cycle	**~ up to 80km**
Consumption NEDC /100km	**22 kWh (~106g CO_2/km EU mix)**
Gross vehicle weight	**2940 kg**
Charging time 0-100% (400V,16A)	**~ 6 hours**

Why not purely electric for all vehicles?

Battery technology is not sufficiently advanced to drive long distance trucks under electric power alone!

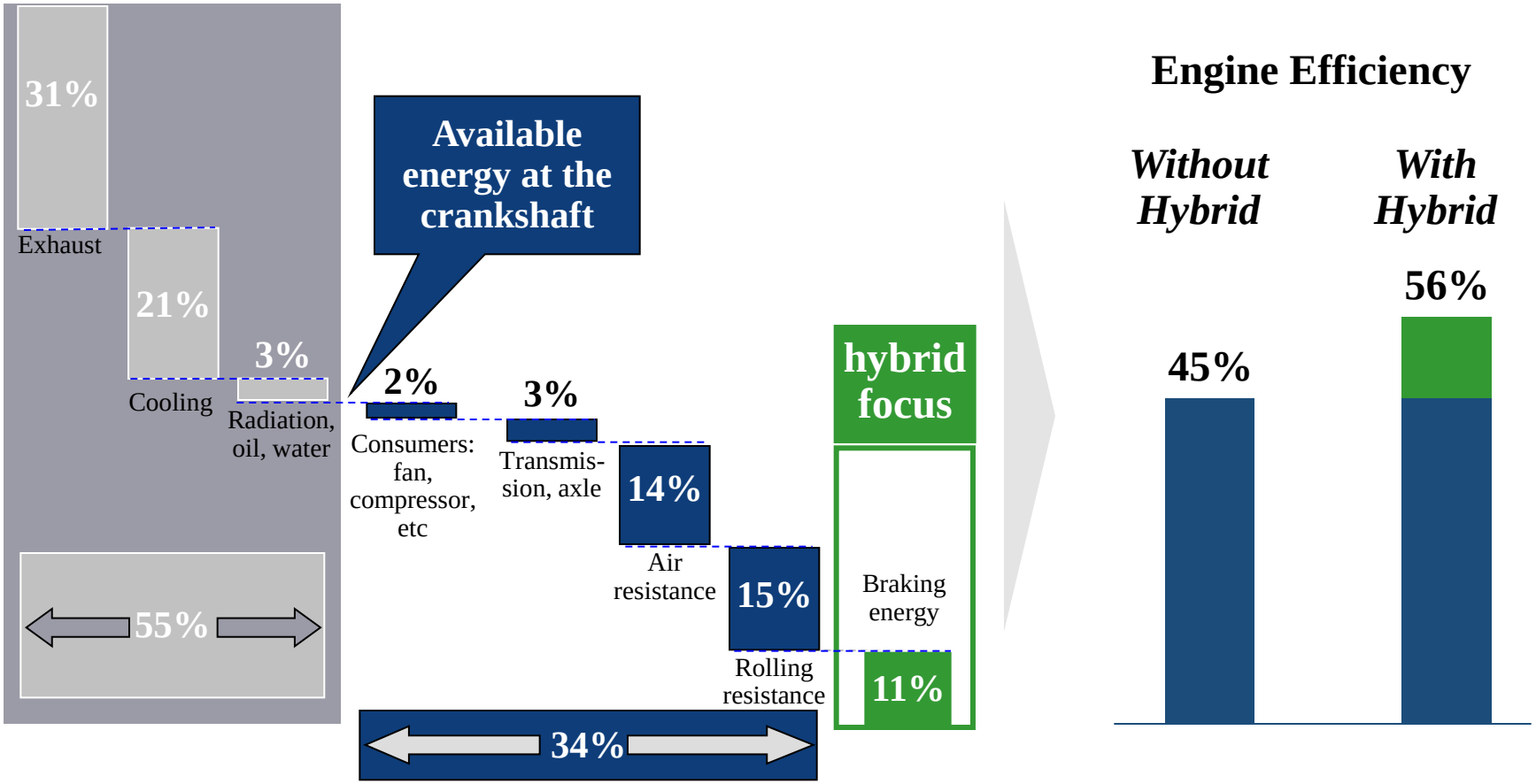
Range	Diesel	100% electric with Li-Ion battery
500 km 12-tonne distribution operations	100 litres 85 kg 	2,6 m³ 5,2 t 
3000 km 40-tonne long distance operations	990 litres 836 kg 	26 m³ 52t 

Calculation: consumption: 20 l/100 km /33 l/100 km, efficiency: diesel engine = 40%, electric motor = 80%, energy content: diesel = 11.8 kWh/kg, Li-Ion battery = 0.19 kWh/kg, weight: diesel = 0.845 kg/l, Li-Ion battery = 2 kg/l

Atego Parallel EcoHybrid

Hybrid technology increases the engine efficiency

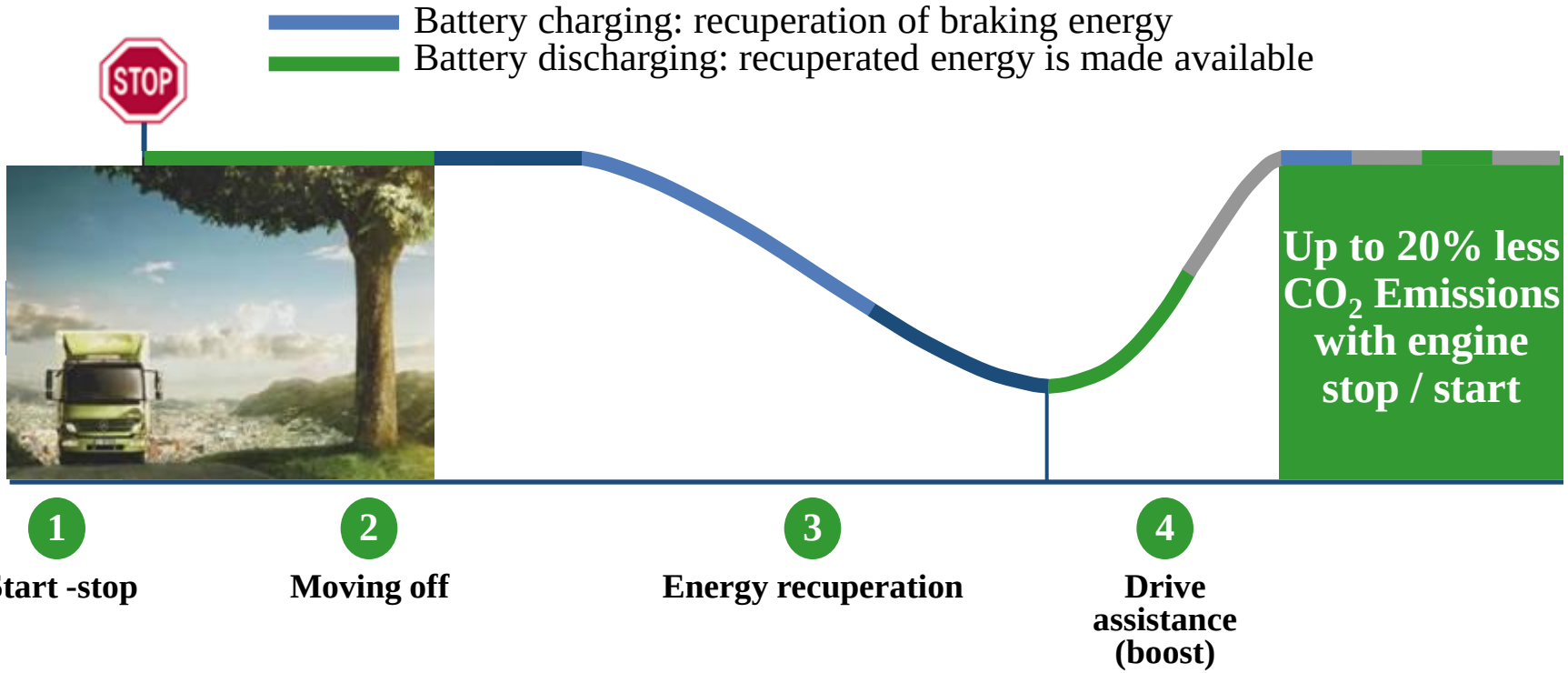
- Use of one Litre of Diesel and Improvement of engine efficiency



Source: Mercedes Benz-Trucks - Actros 1844 LS; 40 t EURO 5, G211-12KL/14.93-1.0, HL6 Axle i=2.846, Route: Stuttgart-Hamburg-Stuttgart 1.517 km, Average speed v=83.2 km/h

The ECO HYBRID makes best use of all driving situations and achieves fuel savings of 10 to 20%

- ECO HYBRID in operation



Benefits of Hybrid Technology

Hybrid technology brings together unique benefits to the customer and meets the high environmental standards of the future

- Reduction in fuel consumption = increase in range
- Regeneration (recharging the battery using regenerative braking)
- Possibility of electric only operation Urban traffic, Manoeuvring, Parking, etc)
- No emissions when stationary (if stop start fitted)
- Quick response immediate starting torque
- Continuous, smooth torque characteristics
- Option of connecting internal/external electrical loads (extra air conditioning when stationary)
- Boost function Short term torque increase (overtaking)

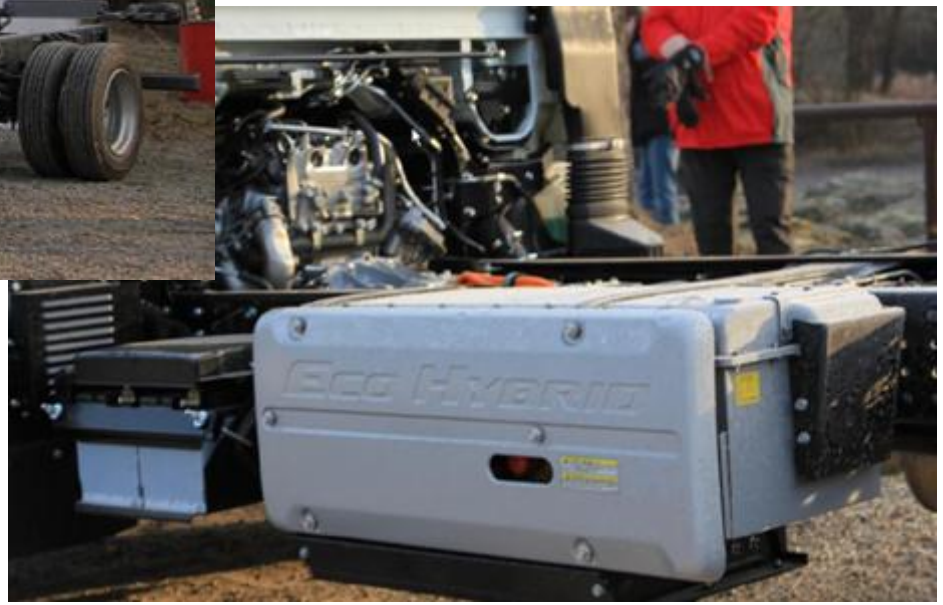






-10 Canter Eco Hybrid(Euro4) for London
- 8 customers
- 3 years

The new FUSO Canter Parallel Eco Hybrid



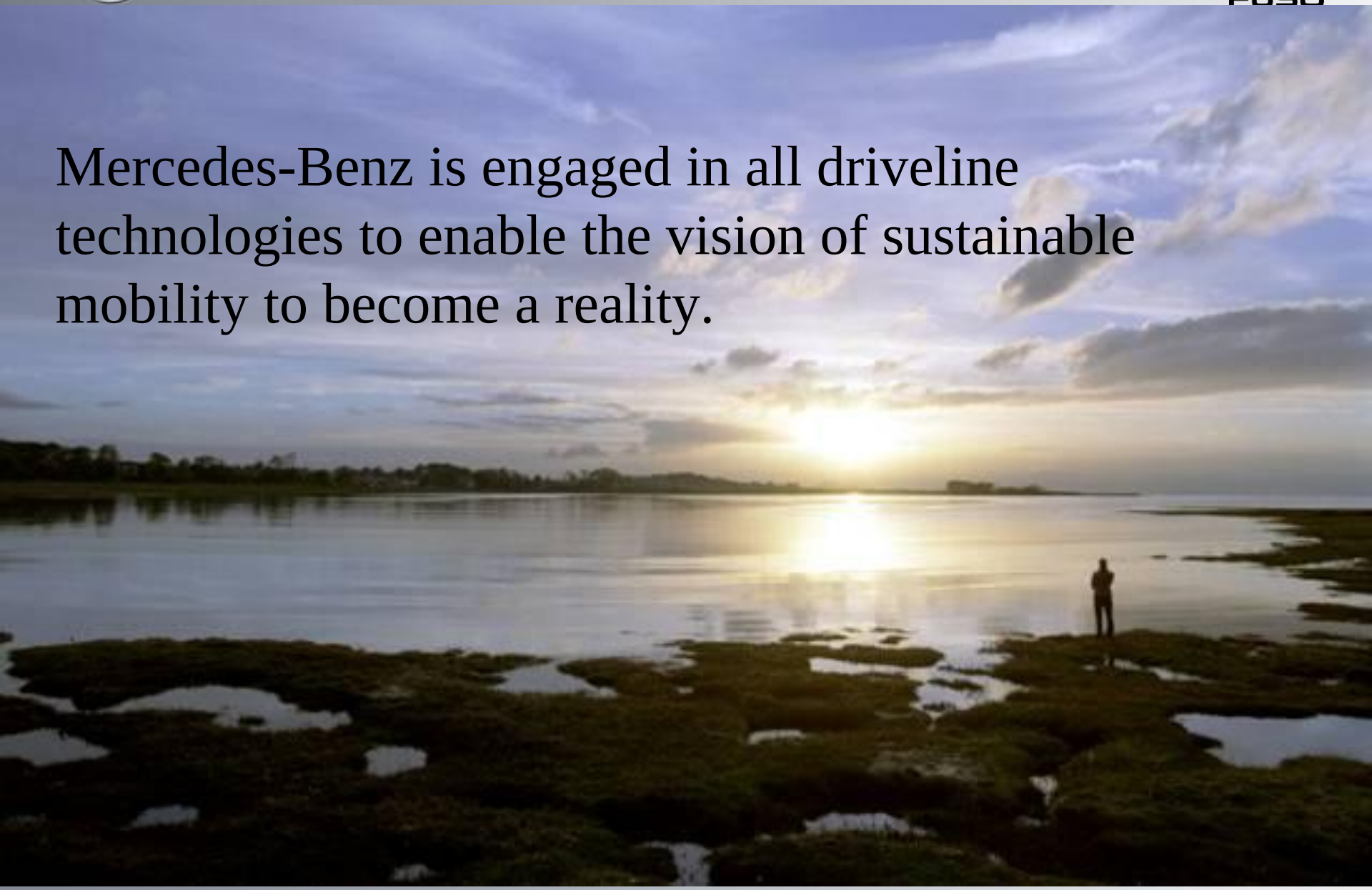
First prototype with hybrid drive for long-distance haulage

OM 926 7.2 litre Engine
Output 240 kW (326 hp) - Torque1300 Nm.
Electric motor peak power output of 44 kW and torque of 420 Nm. Mercedes PowerShift twelve-speed fully automatic transmission.
Weighing only 155 kg more
The vehicle starts off solely in electric mode.
The diesel engine idles to provide drive for the power take-offs.
Start/stop system.

No plans to build - yet

Summary

Weight Tonnes	Range	Long distance	Extra Urban	Inner city
Electric Drive				
<3.5t	✓	✓ ✓ ✓	✓	✓ ✓ ✓
3.5 – 7.5 t	✓	✓ ✓ ✓	✓	✓ ✓
7.5 – 18 t	✓	✓ ✓ ✓	✓	✓
>18 t	✓	✓ ✓ ✓	✓	✓
Artic	✓	✓ ✓ ✓	✓	✓
Hybrid Drive				
<3.5t	✓ ✓ ✓	✓	✓ ✓	✓ ✓ ✓
3.5 – 7.5 t	✓ ✓ ✓	✓	✓ ✓	✓ ✓ ✓
7.5 – 18 t	✓ ✓ ✓	✓	✓ ✓	✓ ✓ ✓
>18 t	✓ ✓ ✓	✓	✓ ✓	✓ ✓ ✓
Artic	✓ ✓ ✓	✓	✓	✓


Mercedes-Benz is engaged in all driveline technologies to enable the vision of sustainable mobility to become a reality.