Powertrain 2020, Challenges and Solutions from a suppliers perspective

Karsten Hofmann

Continental

Continental Corporation
Future of Electric Mobility from a Suppliers‘ Perspective

- **Continental at a glance**
- **Mobility outlook 2050**
- **Megatrends, legislation, technologies**
- **Patterns & challenges in e-mobility**
- **Continental e-mobility portfolio**

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Organization

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Dr. Elmar Degenhart CEO

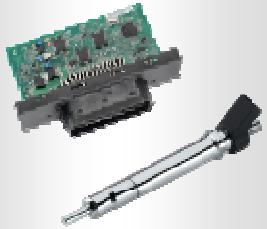
Automotive Group

Chassis & Safety

- Electronic Brake Systems
- Hydraulic Brake Systems
- Sensorics
- Passive Safety & ADAS
- Chassis Components

Powertrain

- Engine Systems
- Transmission
- Hybrid Electric Vehicle
- Sensors & Actuators
- Fuel Supply



Interior

- Instrumentation & Driver HMI
- Infotainment & Connectivity
- Body & Security
- Commercial Vehicles & Aftermarket

Rubber Group

Passenger and Light Truck Tires

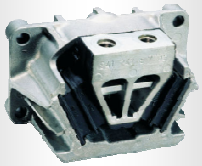
- Original Equipment
- Replacement Businesses Europe , Asia, Americas
- Two-Wheel

Commercial Vehicle Tires

- Truck Tires Europe
- Truck Tires Replacement Business The Americas
- Truck Tires Asia
- Industrial Tires

ContiTech

- Air Springs
- Benecke-Kaliko
- Conveyor Belts
- Elastomer Coatings
- Fluid Technology
- Power Trans-mission Group
- Vibration Control



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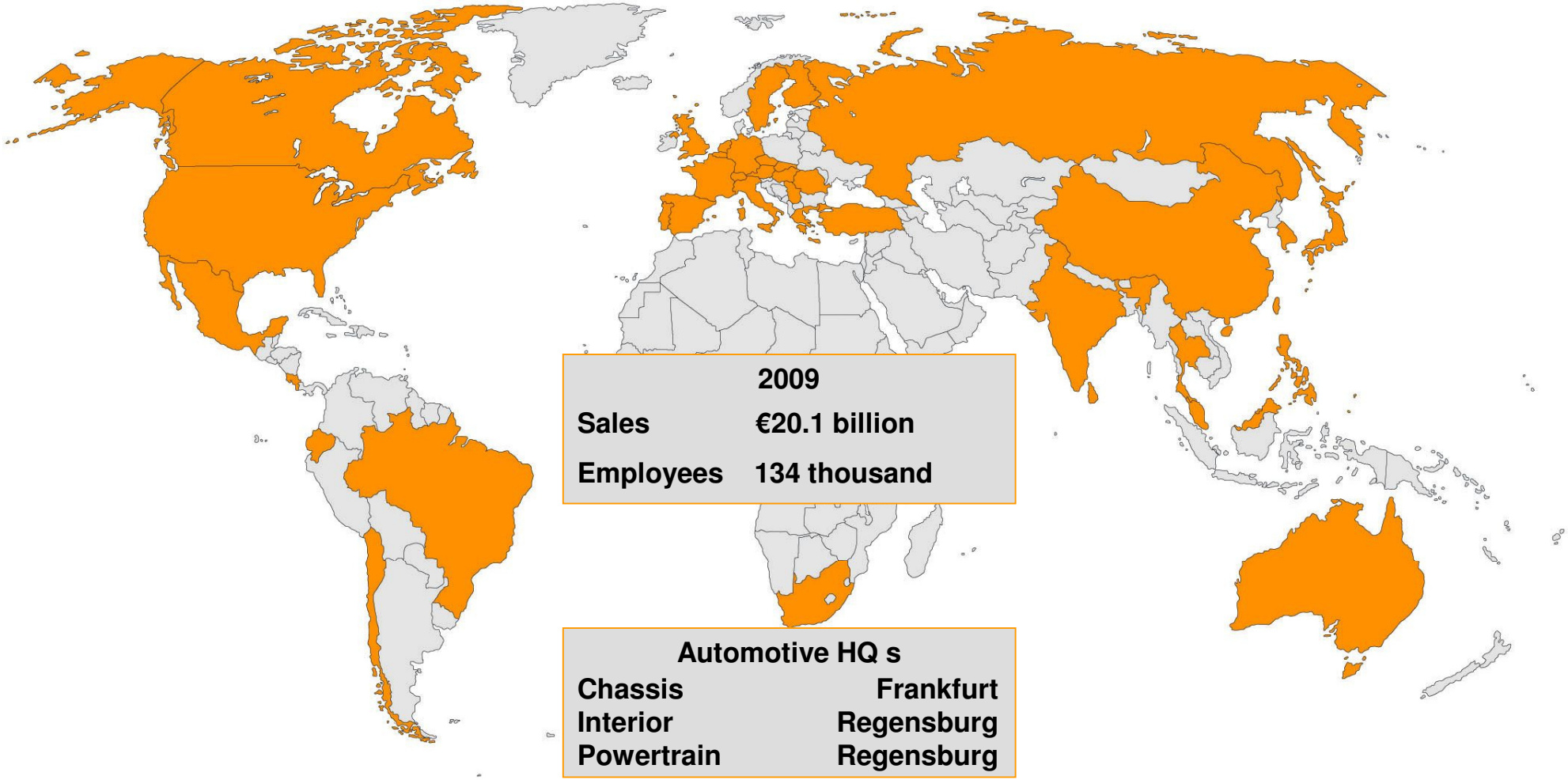
Worldwide Footprint

Nearly 190 sites for production and R&D in 39 countries. Corporate headquarters in Hanover, Germany.



	2009
Sales	€20.1 billion
Employees	134 thousand

Automotive HQ s	
Chassis	Frankfurt
Interior	Regensburg
Powertrain	Regensburg

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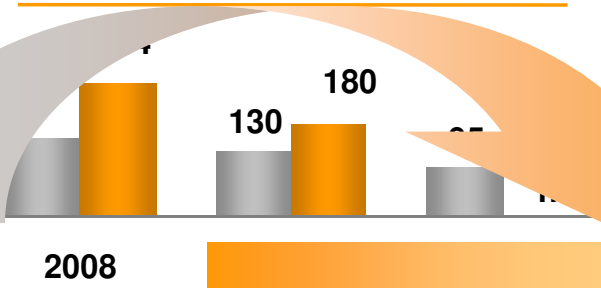
Focus on the Megatrends

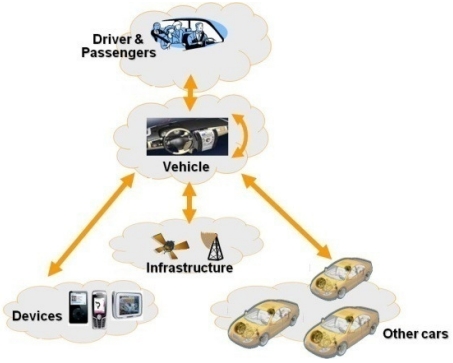
Environment – Zero Emissions

CO_2 targets EU & US (g/km)



EU figures refer to p
passengers cars an

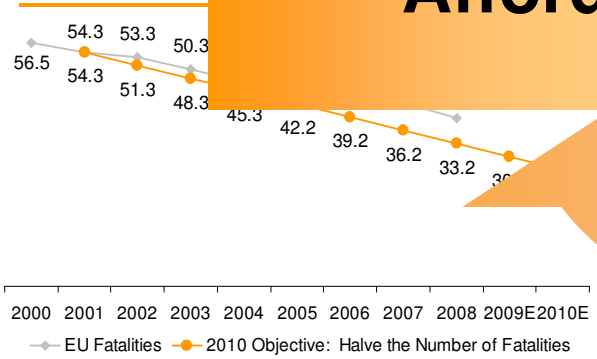
Information – Always on



Zero Emissions & Affordability

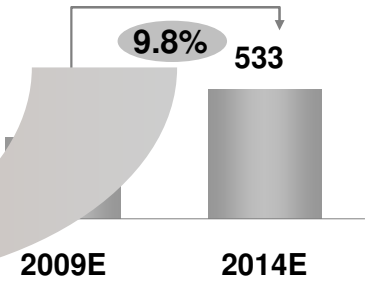
Safety – Zero Accidents

Evolution 2
EU 27 road



obility for Everyone

Dacia – Sandero
09E-14E (k units)



Source: Global Insight 3Q09

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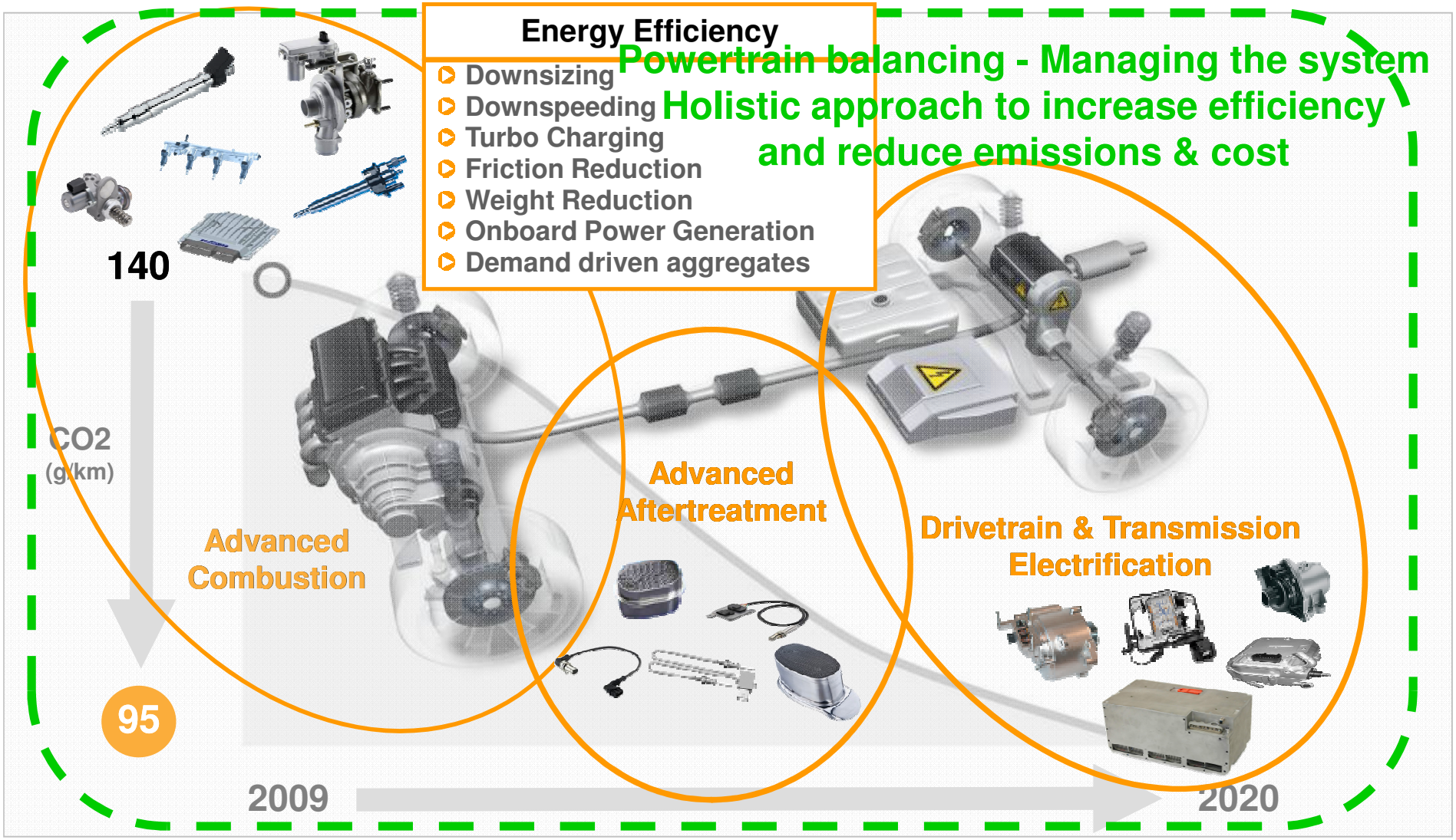
EU 7 – Challenges Ahead



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Megatrend Environment - The Way to Zero Emissions

100 %

Vehicle Production

0 %

Industry and supply chain impact

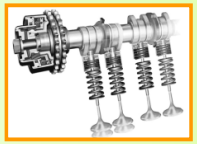
1

Combustion Vehicle

Improve efficiency of conventional powertrain (short and mid term)

Software

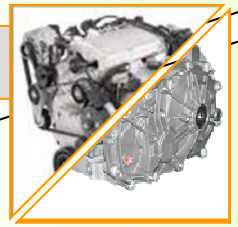
Mechatronics



Fossil Fuels

Renewable Fuels

2

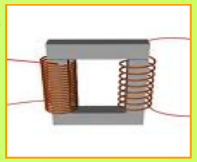


Hybrid Vehicle

Back up combustion engine by electric motor (mid term)

Charging infrastructure by plug

or inductive



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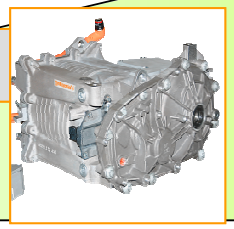

EV

Emission free electric vehicles (long term)

Time

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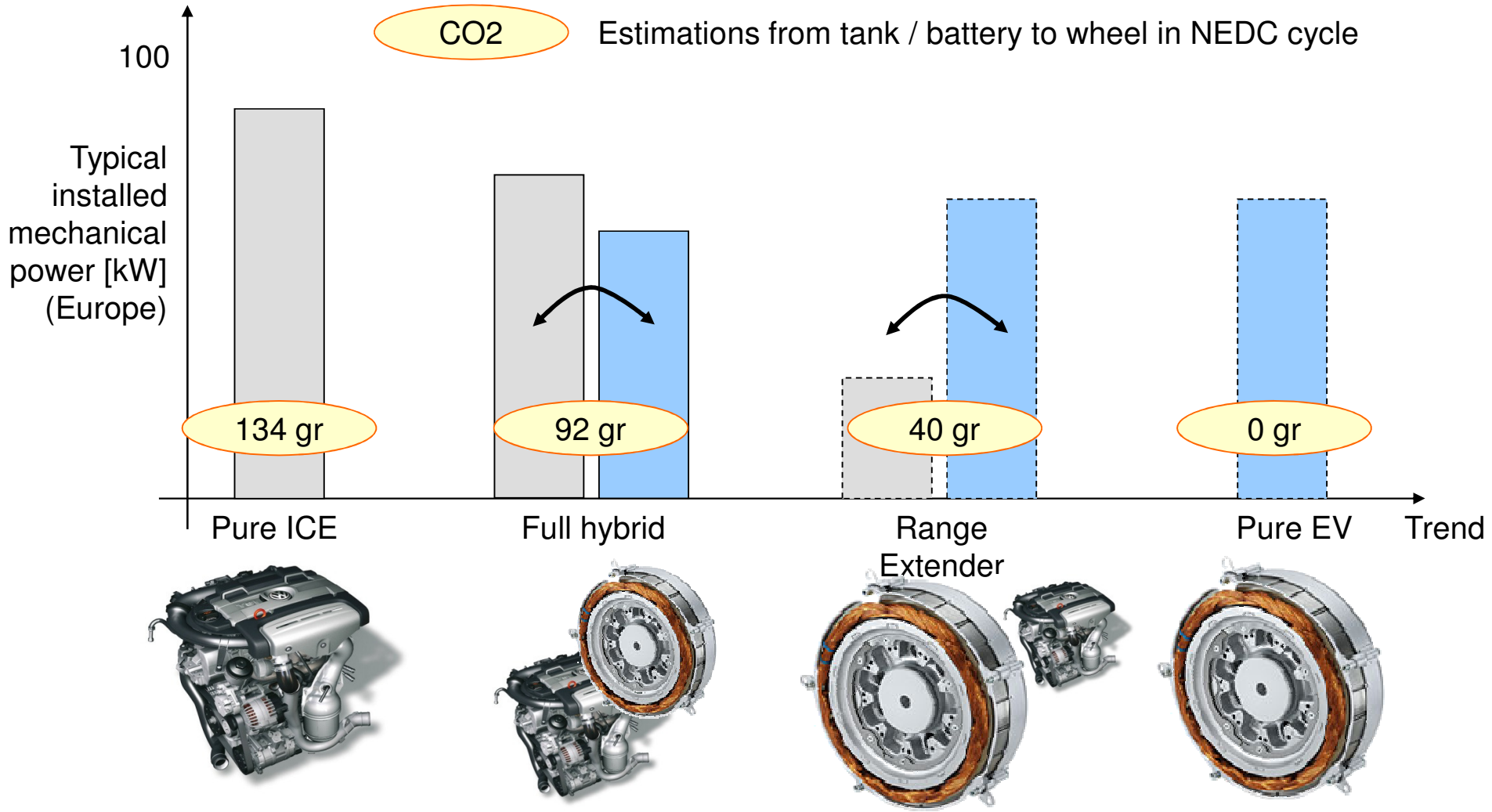
Split of installed power in medium size vehicle



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Enabling factors for E-mobility

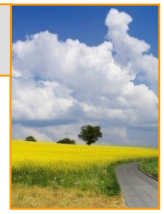
Urban mobility

Oil prices

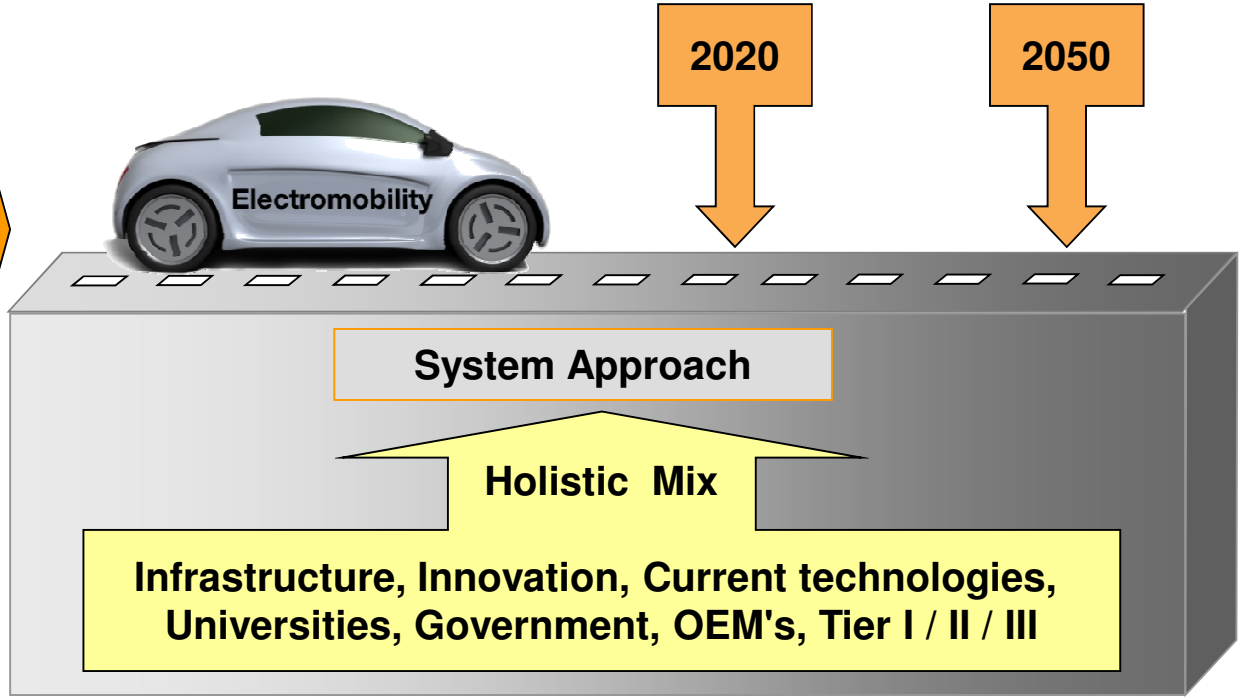
State fundings

Storage technology

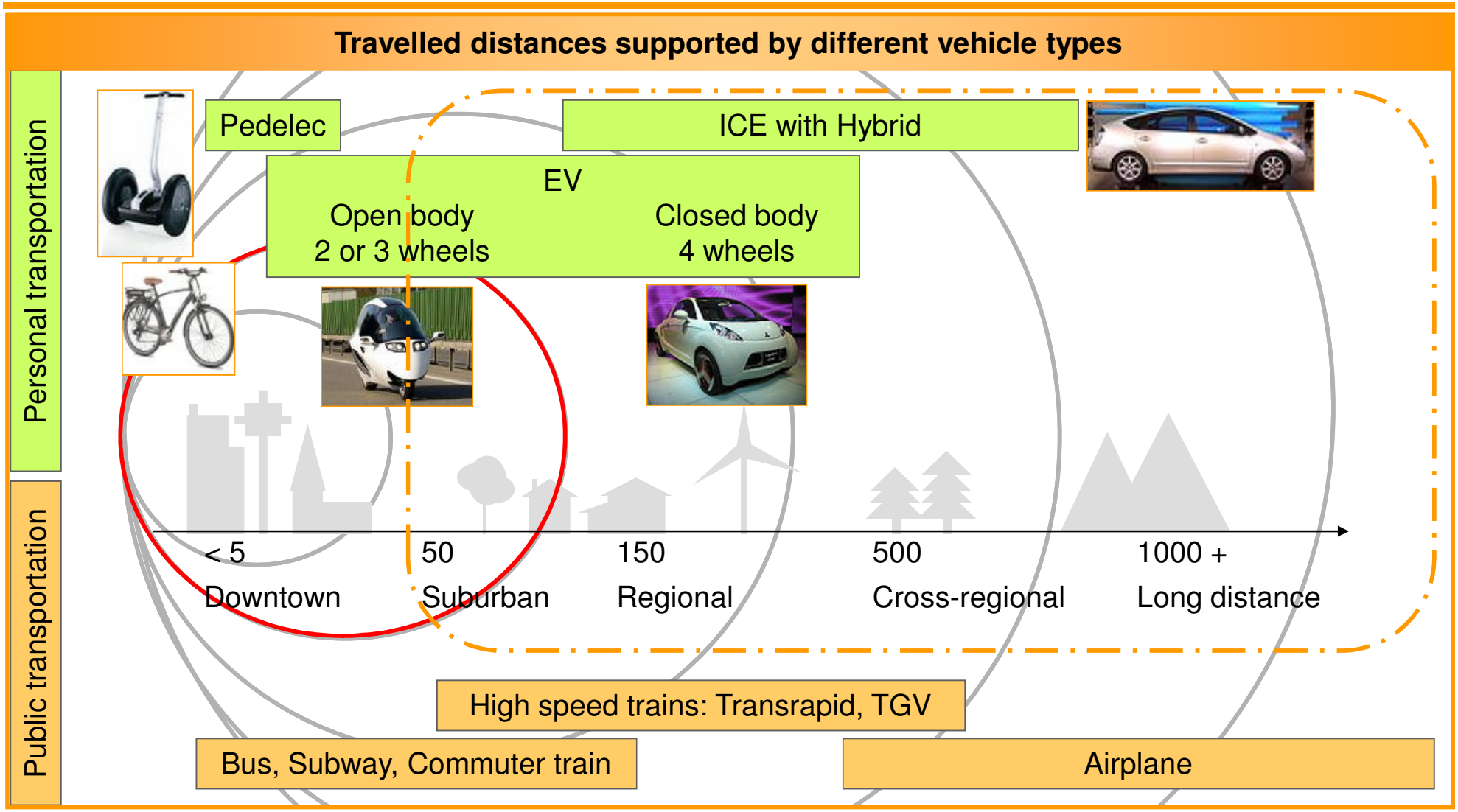
Emission legislation



End user acceptance



Future Mobility Patterns



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Mainstream EV development

Generation 2010 – 2015	Following generations > 2012	Beyond > 2015
Based on existing C-class combustion platforms **Range = 100 km**	Derived platforms with electric vehicle specific requirements **Range = 300 km**	Radically deviating automobile concepts for EV only **Range = 50 + X km**

▸ Exchange of the powertrain
▸ Conventional components
▸ Efficiency problems:
  ▸ Conventional losses (example: hydraulics)
  ▸ Energy loss of heating
	▸ Weight savings
	▸ New electric architecture
	▸ Energy optimized components
	▸ Thermal isolation
	▸ New heat & climate concept
		▸ New constructional approaches
		▸ New applications
		▸ Predictive active / passive safety
		▸ Wheel hub motor

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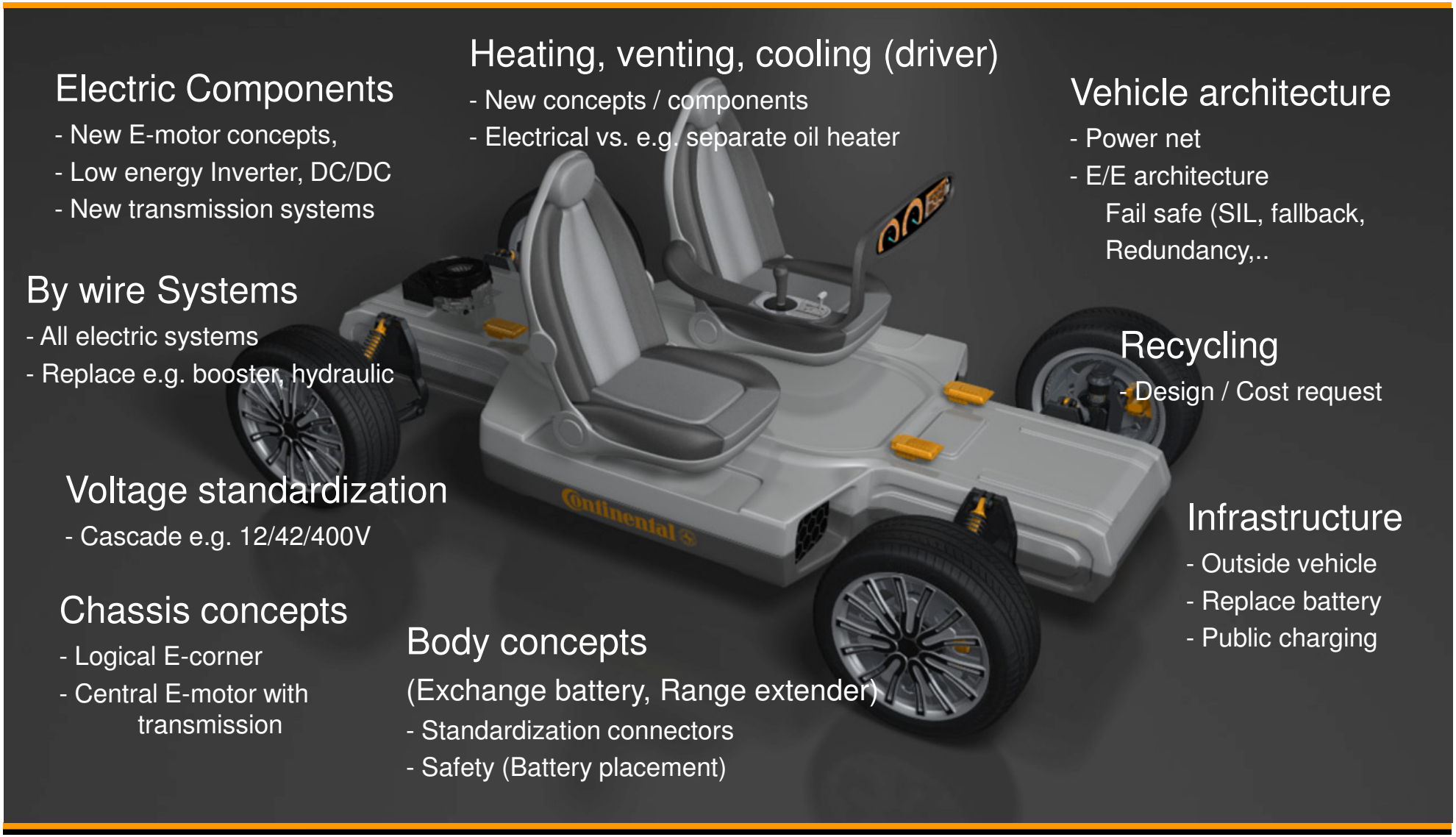
Technical challenges for EVs



Electric Components
- New E-motor concepts,
- Low energy Inverter, DC/DC
- New transmission systems

Heating, venting, cooling (driver)
- New concepts / components
- Electrical vs. e.g. separate oil heater

Vehicle architecture
- Power net
- E/E architecture
  Fail safe (SIL, fallback, Redundancy,..

By wire Systems
- All electric systems
- Replace e.g. booster, hydraulic

Recycling
- Design / Cost request

Voltage standardization
- Cascade e.g. 12/42/400V

Infrastructure
- Outside vehicle
- Replace battery
- Public charging

Chassis concepts
- Logical E-corner
- Central E-motor with transmission

Body concepts
(Exchange battery, Range extender)
- Standardization connectors
- Safety (Battery placement)

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EV system challenges

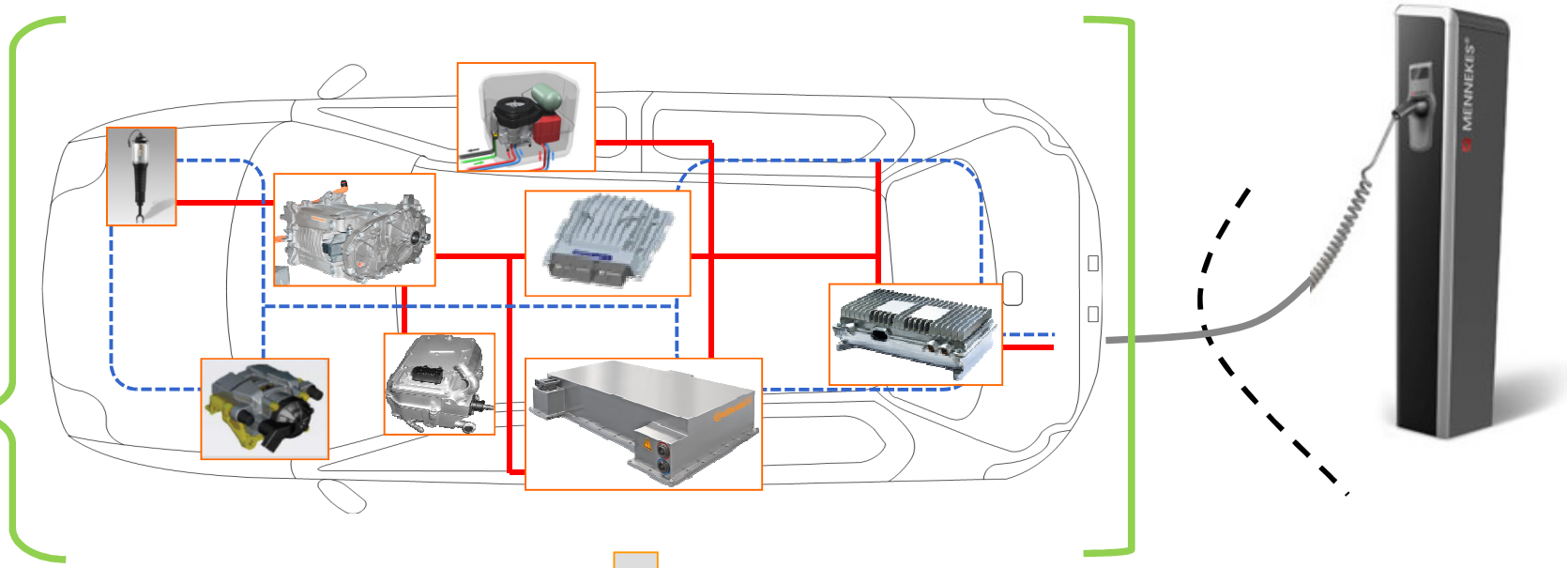
Holistic challenge

EV system efficiency

Architectures

Components

System Integration



System balancing

Thank you for your Attention