

Capital Markets Day 2017

Horst Binnig, CEO Automotive

Rheinmetall AG, 21 November 2017

REVIEW 2016/17

Look back CMD 2016 in Düsseldorf:

Last Chart: Rheinmetall Automotive is well prepared

Markets and Customers:

- We expect a stable market with lower growth rates
- China will be the growth driver, Europe and NAFTA might weaken
- Brazil seems to have touched bottom line



Performance and Products:

- Mechatronics will be the growth driver in the next years
- Hardparts will streamline the global footprint to optimize assets and cost structure
- Aftermarket will return to former profitability after ramp up own production facilities



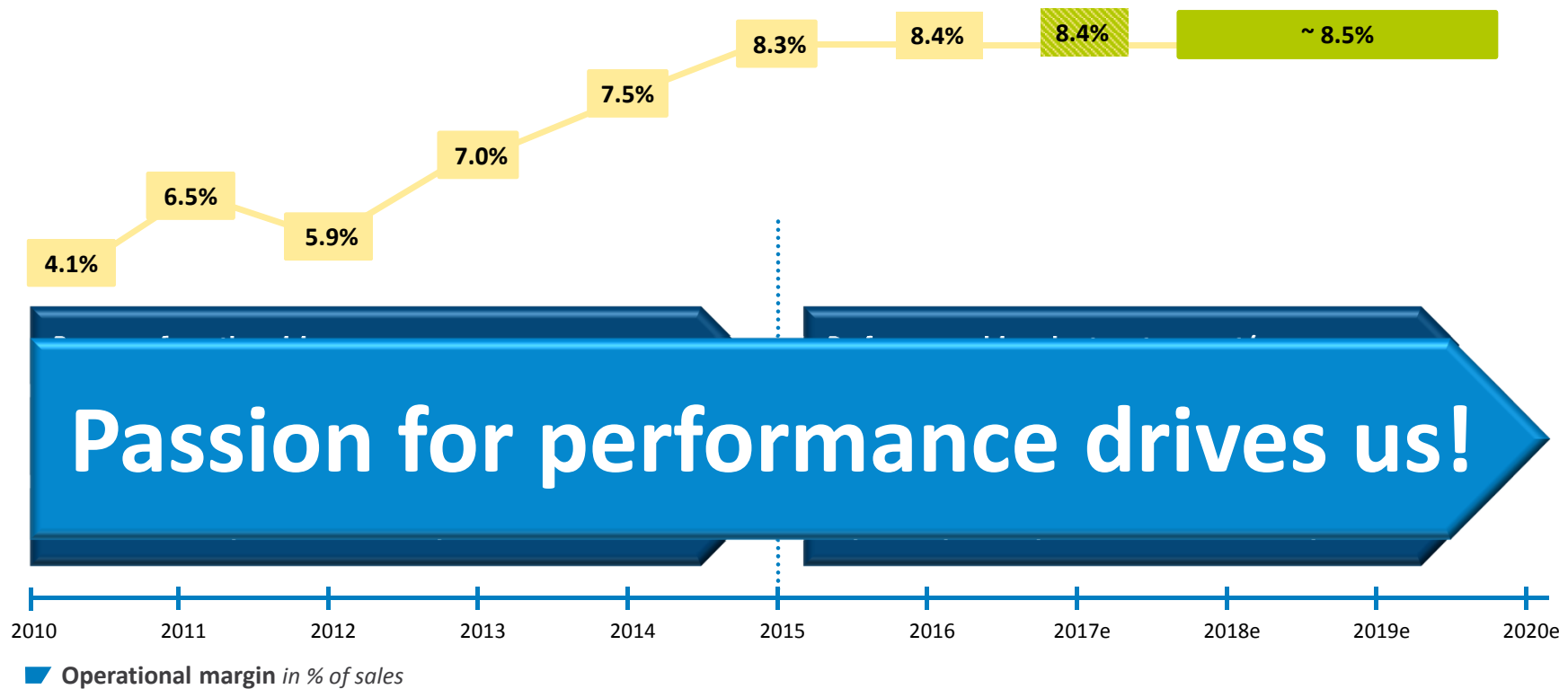
New Mobility Concepts:

- Hybrid cars and e-cars are offering chances for new products and higher content per car
- We have to refocus our R&D spendings to enlarge the product portfolio
- The product pipelines are filled for every type of power trains within the next years



Automotive in a ten year view

Achieving and maintaining the target margin level



MARKETINSIGHTS

Highlights Rheinmetall Automotive Q3 2017

Market outperformed, margin improved

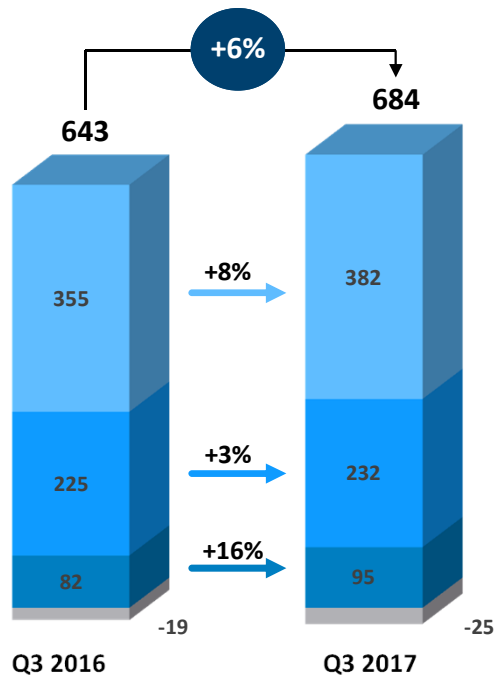


- **Q3: Sales rose** by 6% to **€684 m**, FX adjusted 7.3%
(9M: Sales rose by 8% to €2.150 m, FX adjusted 7.5%)
- **Q3: Operating result grew** by 12% to **€57 m**
(9M: Operating result grew by 14% to €186 m)
- **Q3: Operating margin increased** by 40bp to **8.3%**
(9M: Operating margin increased by 50bp to 8.7%)
- **Q3: Quarterly free cash flow improved** by €34 m to €81 m
(9M: Free cash flow improved by €73 m to €32 m)

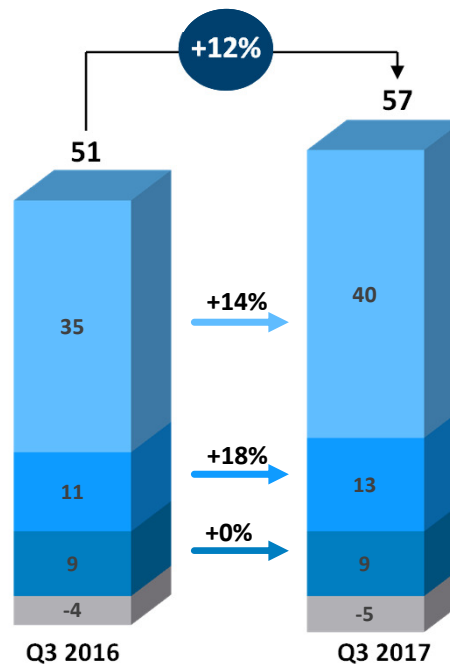
Operational leverage

Mechatronics and Hardparts drive the third quarter

Sales Automotive in EUR million



Operating result Automotive in EUR million



Reasons for result development

Mechatronics

- Strong demand for fuel optimization as main driver; emission reduction on solid level

Hardparts

- Higher demand for Large Bore Pistons and good development for European LV pistons

Aftermarket

- Recovery of sales in East European countries

Restatement of 2016 reported figures in Mechatronics and Aftermarkets related to change in plant assignment

Hardparts streamlined its global footprint

■ Financial impact

- One time cost of around €22 m:
 - €17 m for severance payments (cash-effect in 2018)
 - €5 m asset impairment (non-cash effect)

- Annual savings of around €10 m expected mid-term



Hardparts site

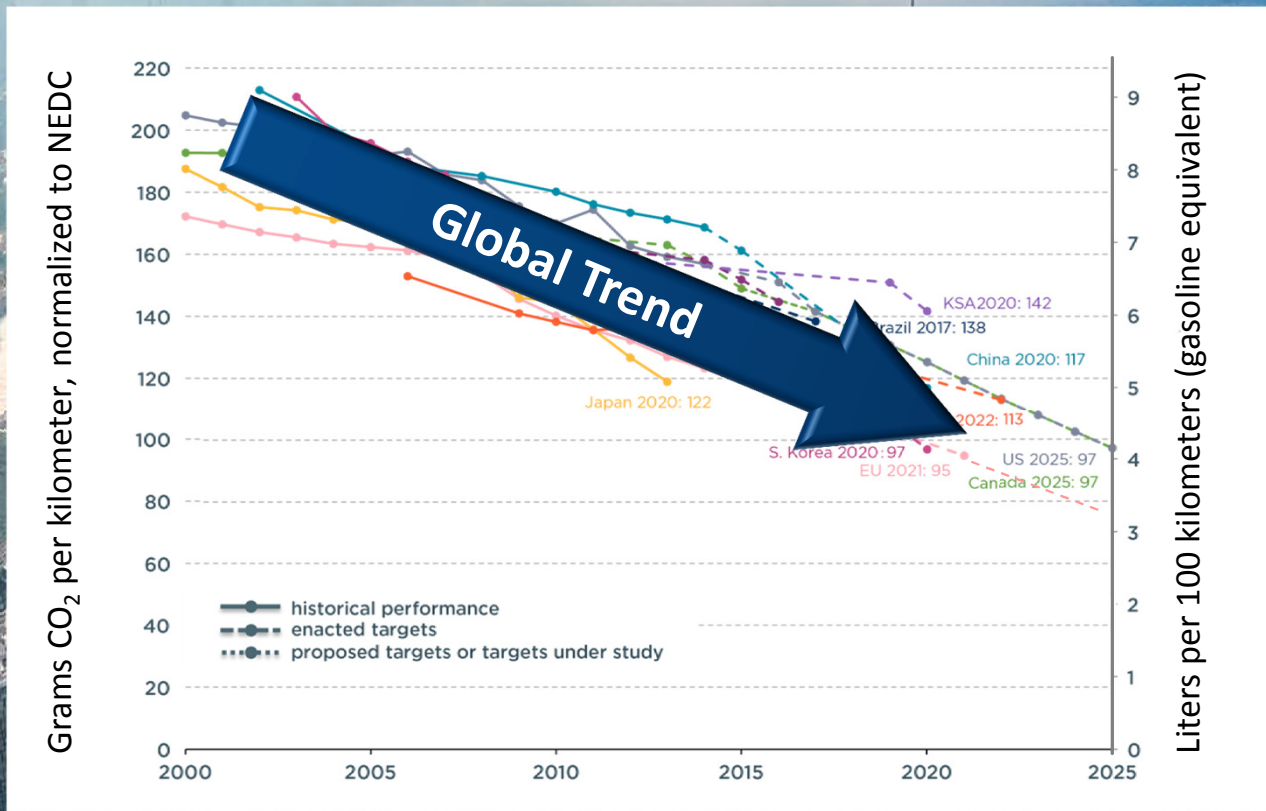
Global Mega Trends...



...are still valid

Engine efficiency as a driver of growth

Around the globe, rules on CO₂ emissions are becoming more and more stringent

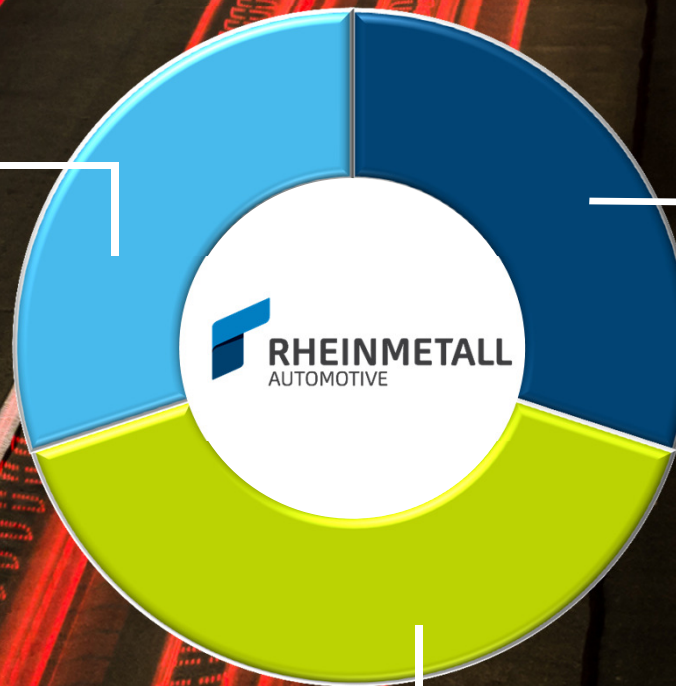


AUTOMOTIVESTRATEGY

Sales split Rheinmetall Automotive Vision 2025+

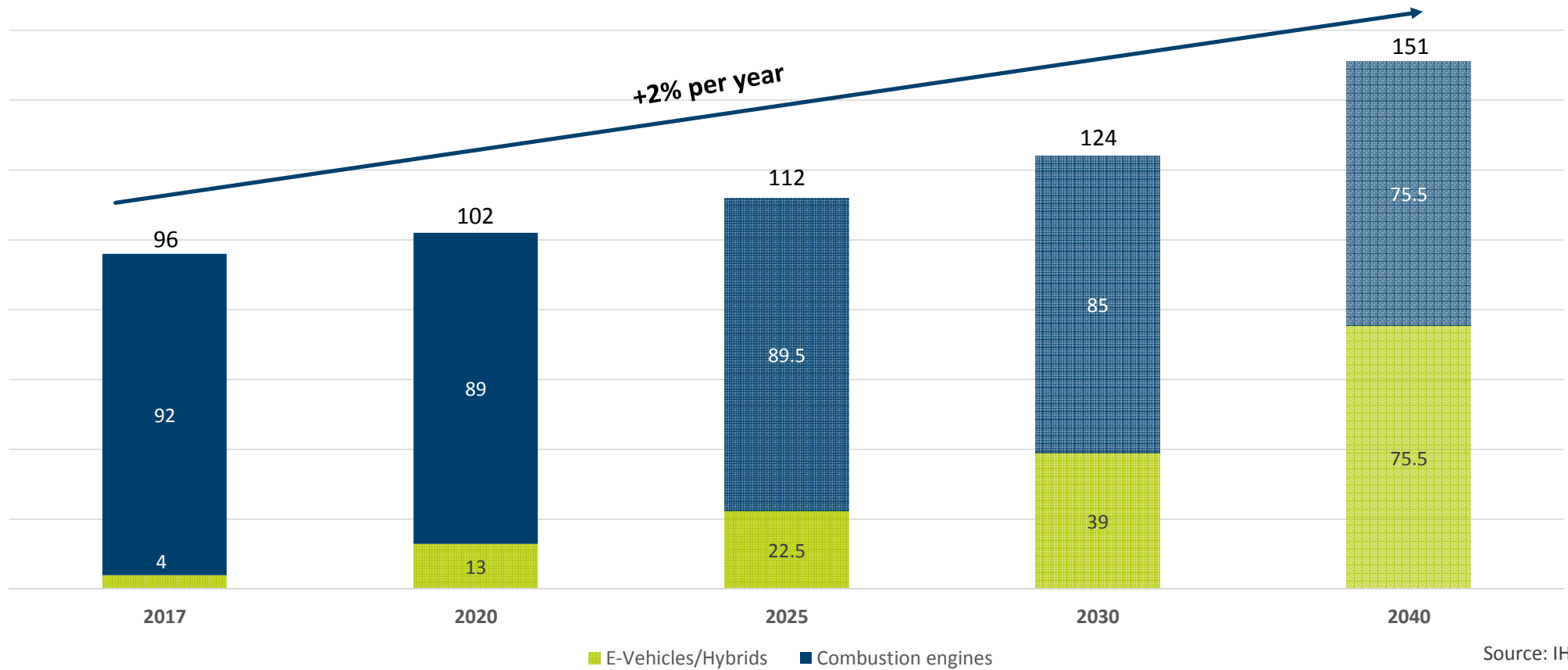
**Emissions
& Efficiency**

**New
Business**



E-Mobility

Growth of electric vehicles/hybrids Based on LV production worldwide (in m)



Source: IHS

Sales by segment 2017

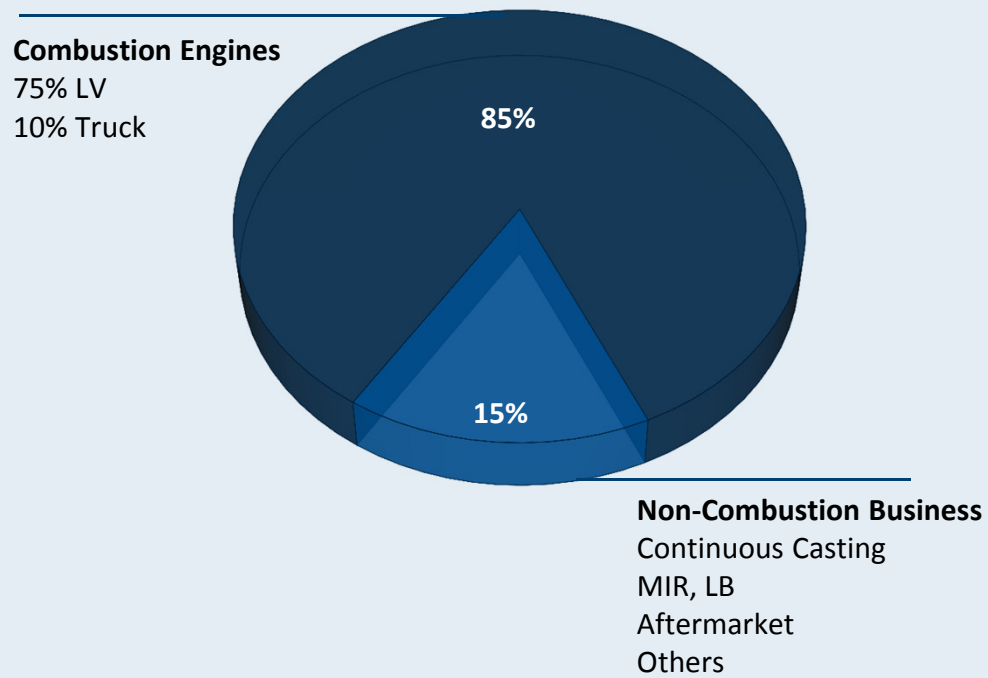


Image source Getty Images, Data based on fiscal 2016

Sales by segment 2040

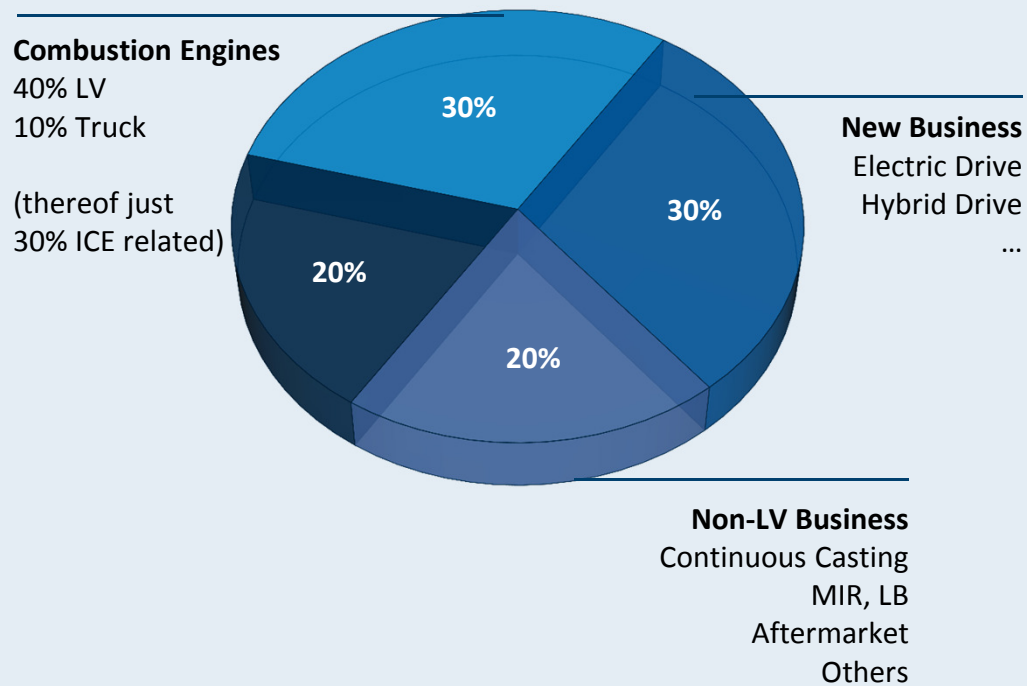
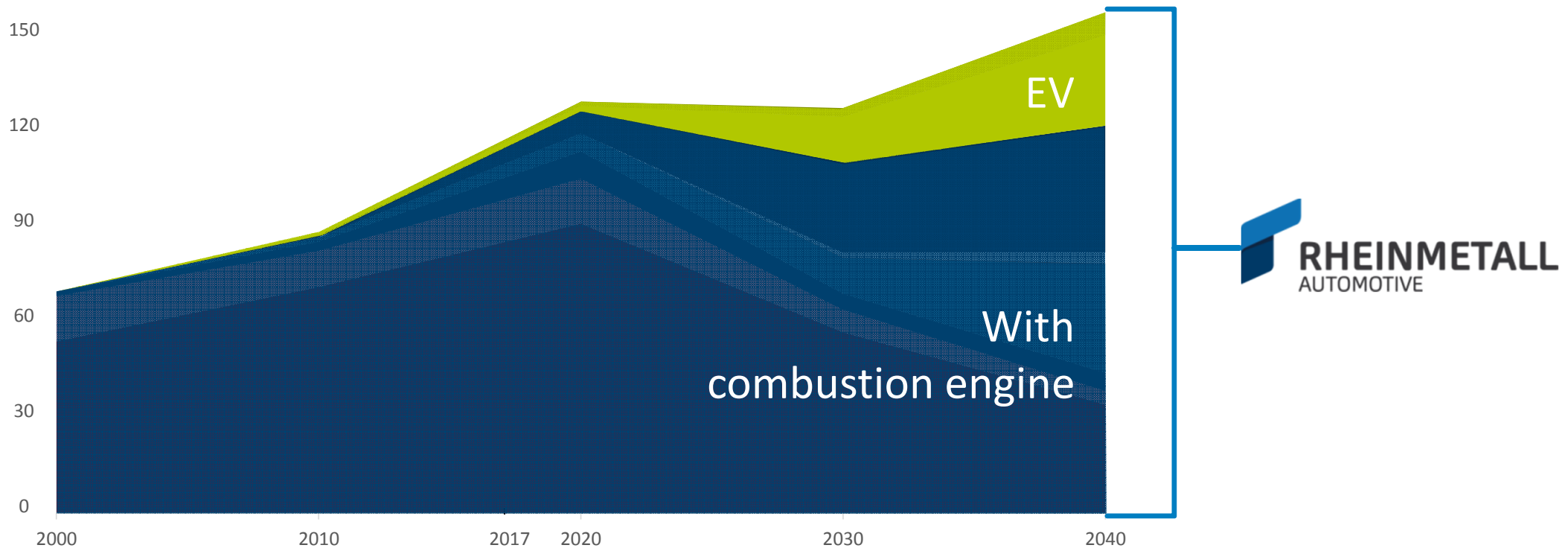


Image source Getty Images, Data based on fiscal 2016

Scenario 2040 vehicle production

The internal combustion engine isn't dying, but it now has competition



Rheinmetall Automotive worldwide: More than 40 locations with high focus on local needs

Germany
Tamm
Berlin
Dormagen
Hartha
Langenhagen
Neckarsulm (Headquarters)
Neuss
Neuenstadt
Papenburg
St. Leon-Rot
Walldürn

Czech Republic
Ústí n. L.
Chabarovice

Great Britain
Kirtlington

France
Lyon
Paris
Thionville

Spain
Abadiano

Italy
Lanciano
Livorno
Turin

USA
Auburn Hills
Greensburg
Greenville (Fountain Inn)
Marinette

Mexico
Celaya

Brazil
Nova Odessa

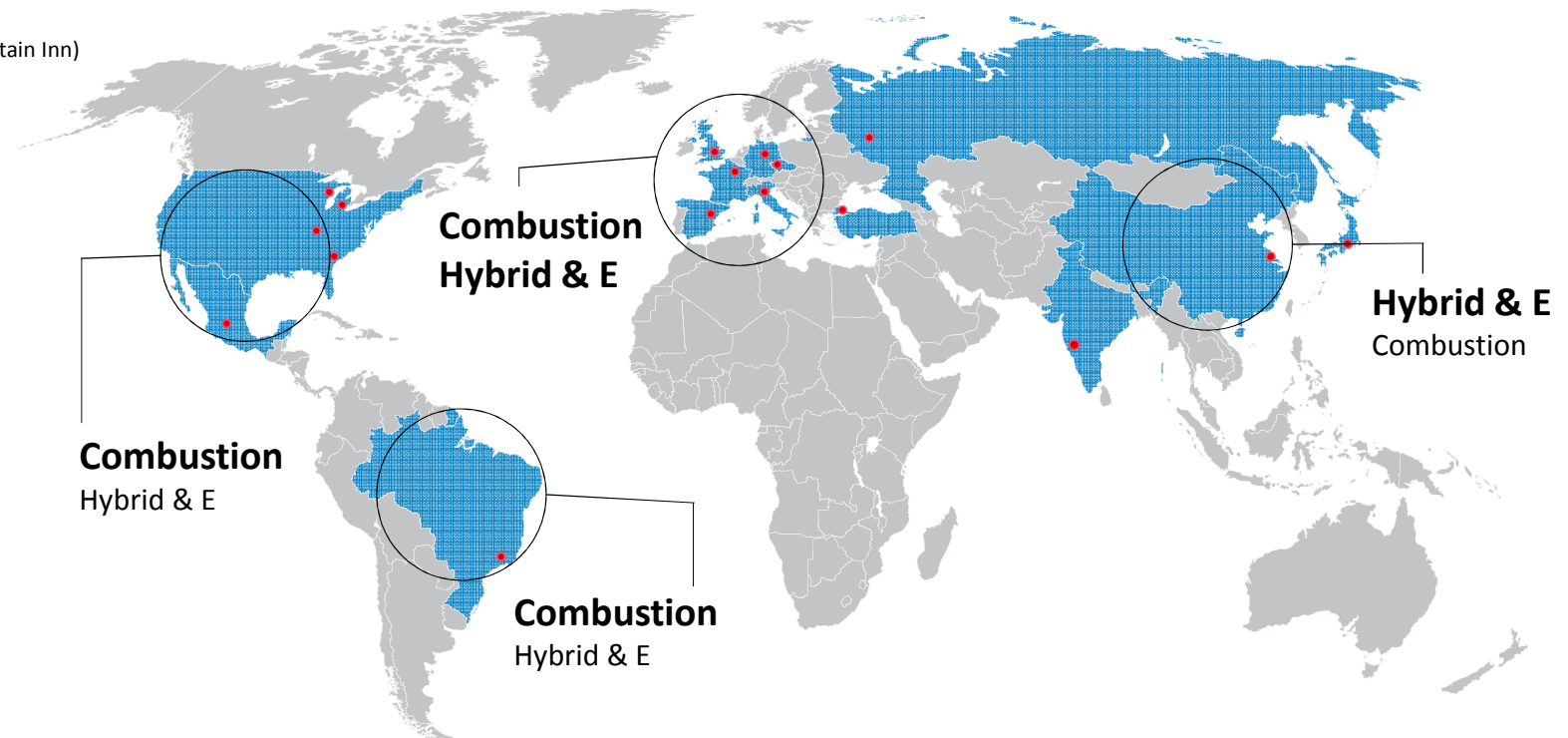
Japan
Hiroshima
Odawara
Tokyo

China
Shanghai (7)
Kunshan (2)
Yantai

India
Pune
New Delhi
Supa

Turkey
Istanbul

Russia
Moscow



Including JVs in Neckarsulm und Greensburg / Yantai / Shanghai / Tokyo as well as the stake in the New Delhi enterprise and the sales offices

E-mobility@Rheinmetall Automotive

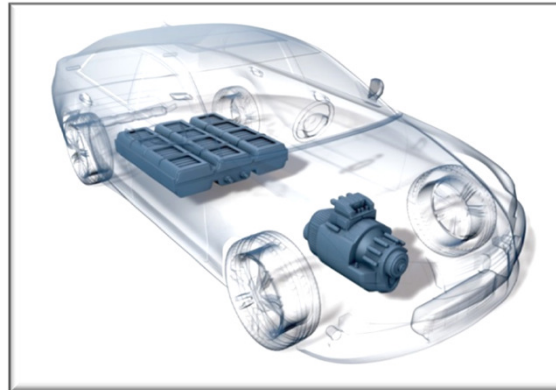
Electric vehicle orders close to €500 million

E-Taxis in London



Pump technology for
pure electric taxis

Battery cell boxes



Aluminum battery boxes for
German premium OEM

Electric engine housing

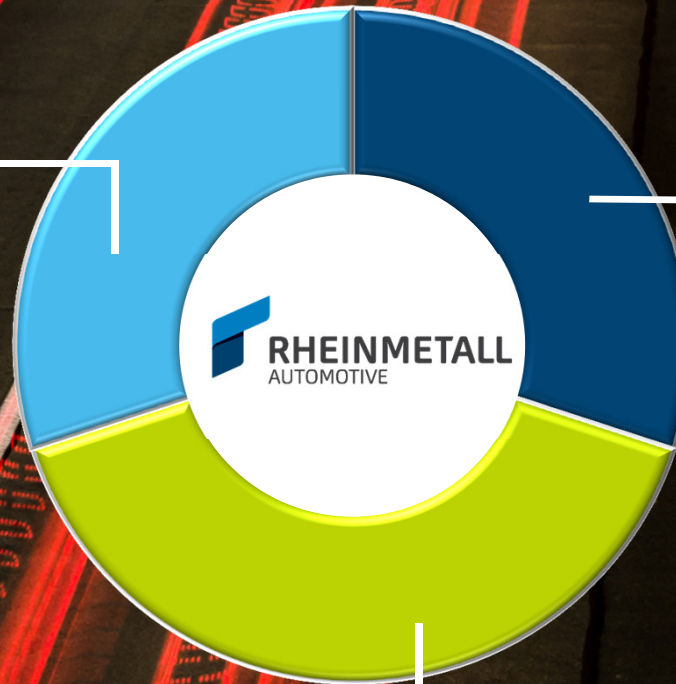


Electric engine housing for
German premium OEM to
serve the Chinese market

Sales split Rheinmetall Automotive Vision 2025+

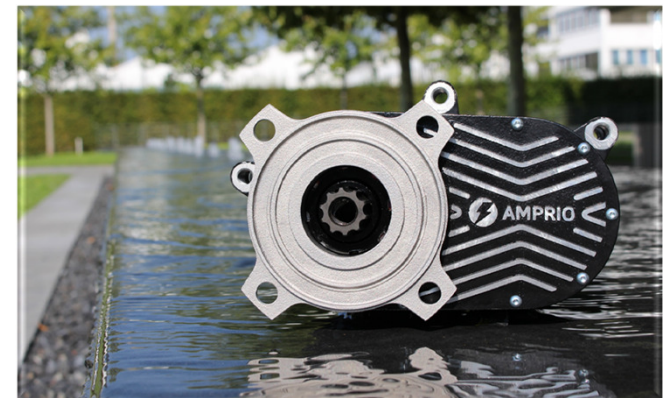
**Emissions
& Efficiency**

**New
Business**



E-Mobility

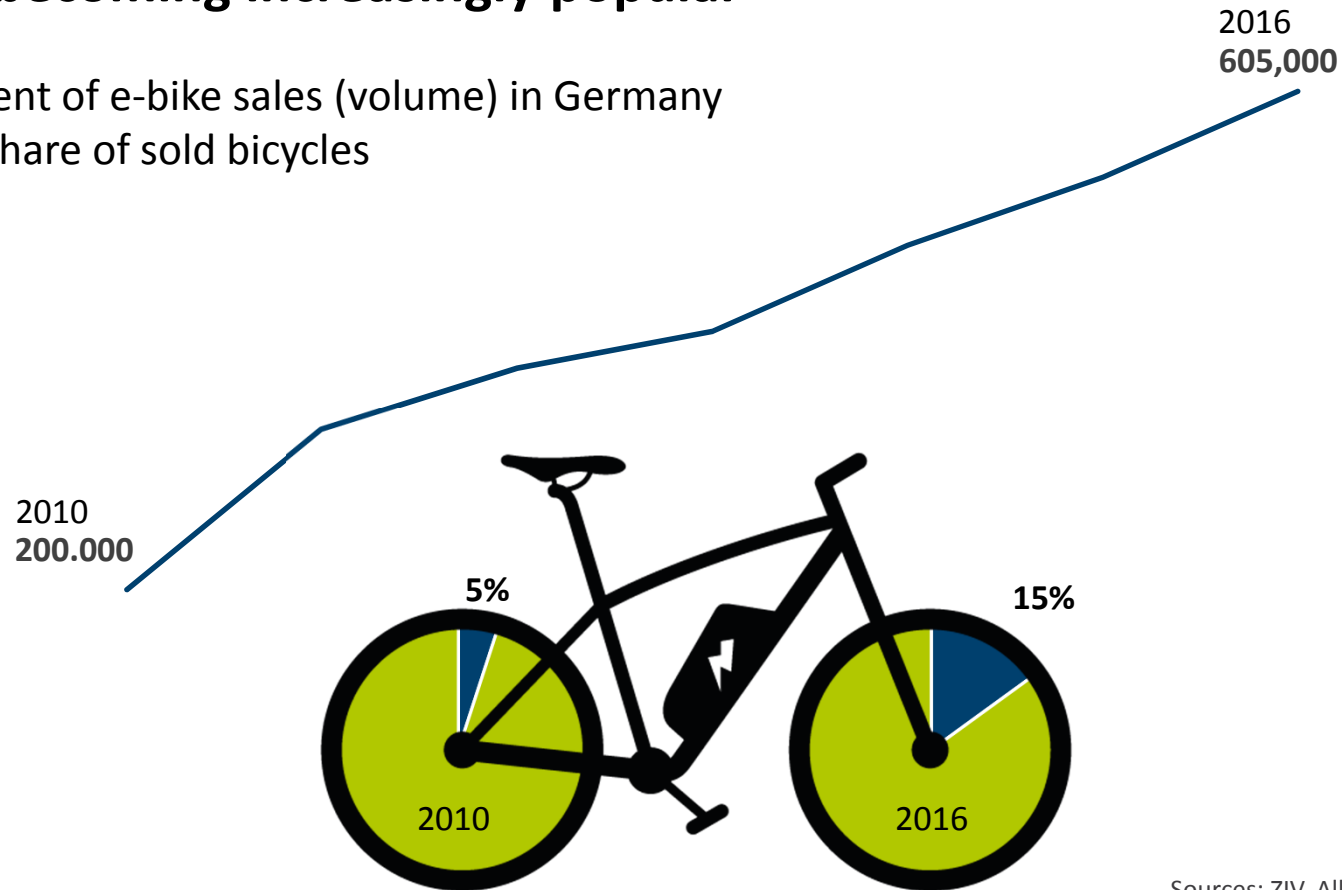
AMPRIO
New Business:



AMPRIO

E-bikes becoming increasingly popular

Development of e-bike sales (volume) in Germany and their share of sold bicycles

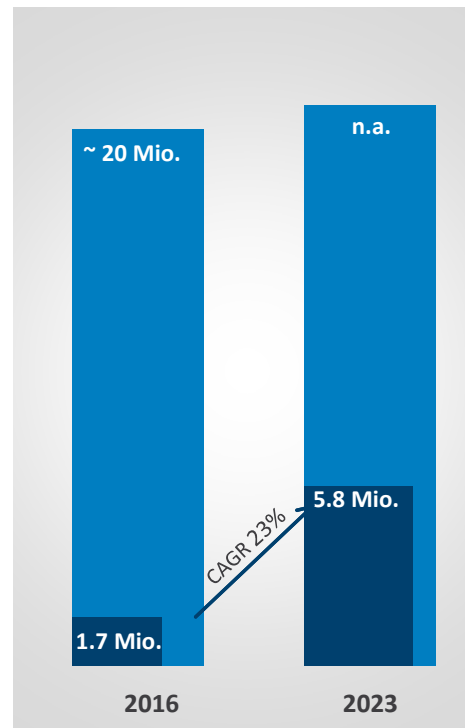


Sources: ZIV, Allianz (Germany) and Cycling News Industry (ww)

AMPRIO

Market Potential of Bicycles and Pedelecs (units)

EU 28



Update 10/2017, Sources: ZIV, Allianz (Germany) and Cycling News Industry (ww)

Summary

Markets and Customers:

Markets in better shape than anticipated, global LV production will grow by >2%
Our global production and technology footprint will follow local needs
Rheinmetall Automotive intends to outperform markets in future, too

Performance and Products:

Sales growth at Mechatronics will follow the high demand for fuel-optimization products
Hardparts will continue to optimize its global footprint, with the focus on generating cash
Aftermarket: back on track with a new strategy, now set to return to former profitability

New Mobility Concepts:

Trend to more efficiency and emission reduction promises higher content per car
Electrification brings additional business and sales growth
Product pipelines are still filled with innovations for every type of power trains

Not too early ...

Not too late ...

Just right!



EMISSIONS & EFFICIENCY

Capital Markets Day 2017

Heinrich Dismon, CTO Automotive

Stricter Emission and Fuel Consumption Standards

Emissions and Efficiency



Euro 6 c,d

- New regulation of PM emissions for gasoline engines
- Introduction of WLTP and RDE



WLTP

- Increased duration, speed and acceleration compared to NEDC
- Lab testing



RDE

- Real driver behavior
- Real ambient conditions including low temperatures operation

Stricter Emission and Fuel Consumption Standards

Emissions and Efficiency



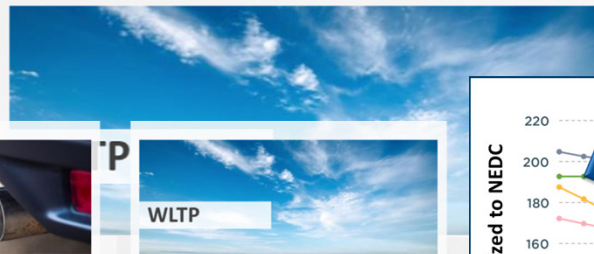
Euro 6 c,d

■ New regulation of PM emissions for gasoline engines



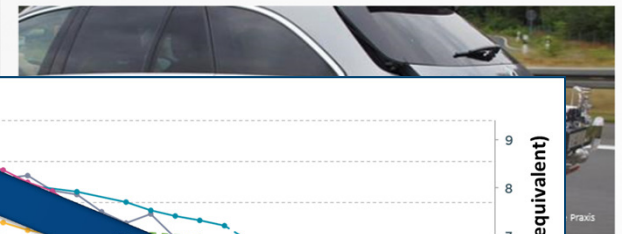
Euro 6 c,d

■ New regulation of PM emissions for gasoline engines

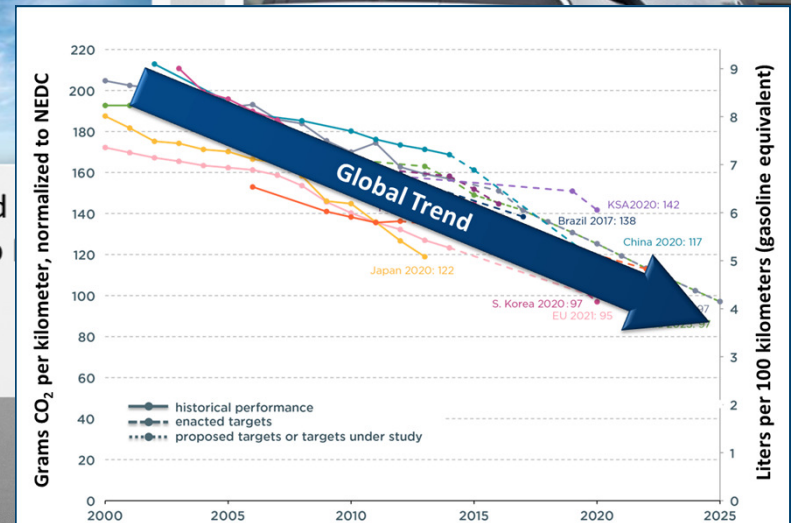


WLTP

■ Increased duration, speed and acceleration compared to NEDC



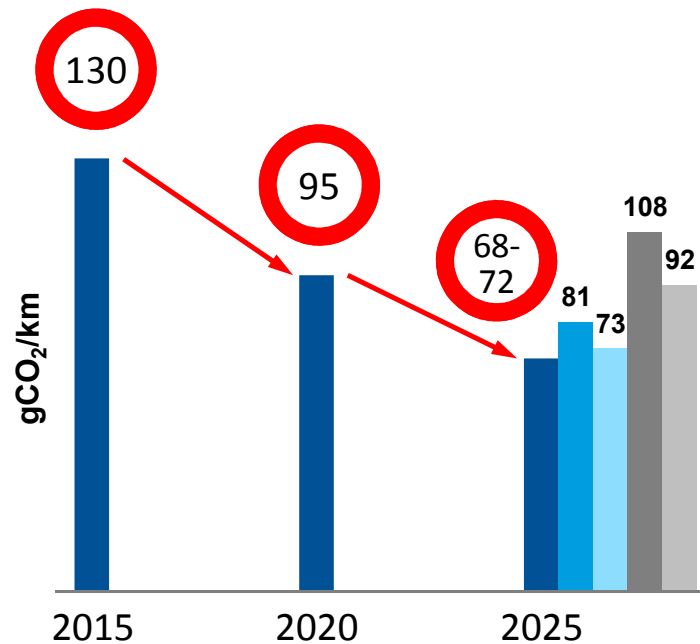
Emission Compliance – A Basic Requirement of the Market!



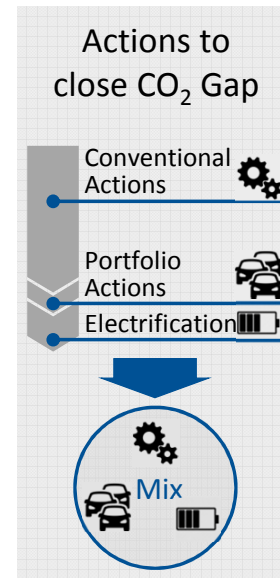
More or Better Fuel Efficiency – Leads to Differentiation in the Market!

A Simulation Approach based on CO₂ Emission Legislation (EU)

The ICE – Challenges & Potentials to Close the CO₂ Gap

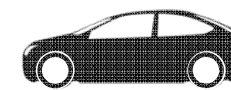


- CO₂ Target
- Vehicle Segment B Gasoline
- Vehicle Segment B Diesel
- Vehicle Segment D/E Gasoline
- Vehicle Segment D/E Diesel



Assumptions:

- Cycle NEDC
- Steady state ICE operation @ bsfc, opt.
- Recuperation, 85%
- Vehicle mass:
Segment B 1250 kg,
Segment D/E 1470/1810 kg
- bsfc_{opt, Diesel} = 180 g/kWh
- bsfc_{opt, Gasoline} = 210 g/kWh



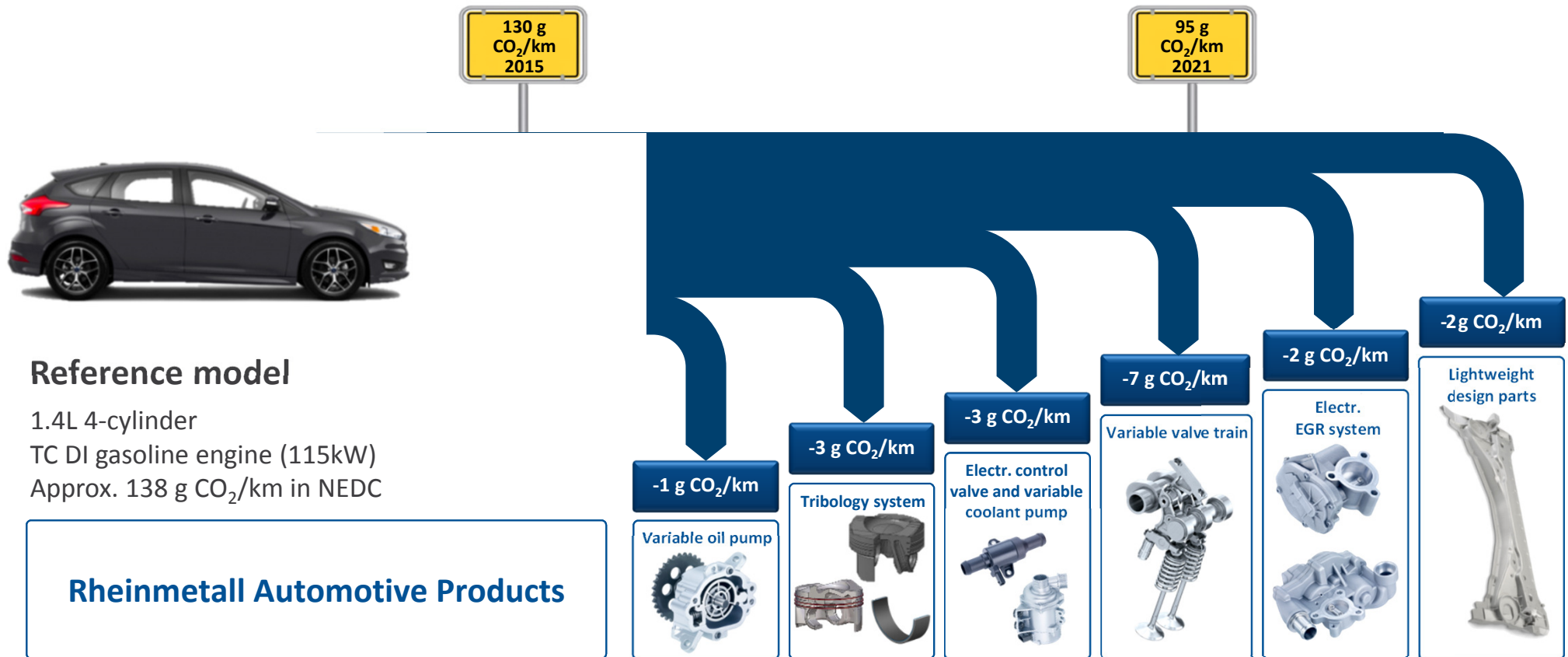
Vehicle Segment B (Example)



Vehicle Segment D/E (Example)

Efficiency

CO2 Reduction with Automotive Products – Gasoline Engine Vehicle

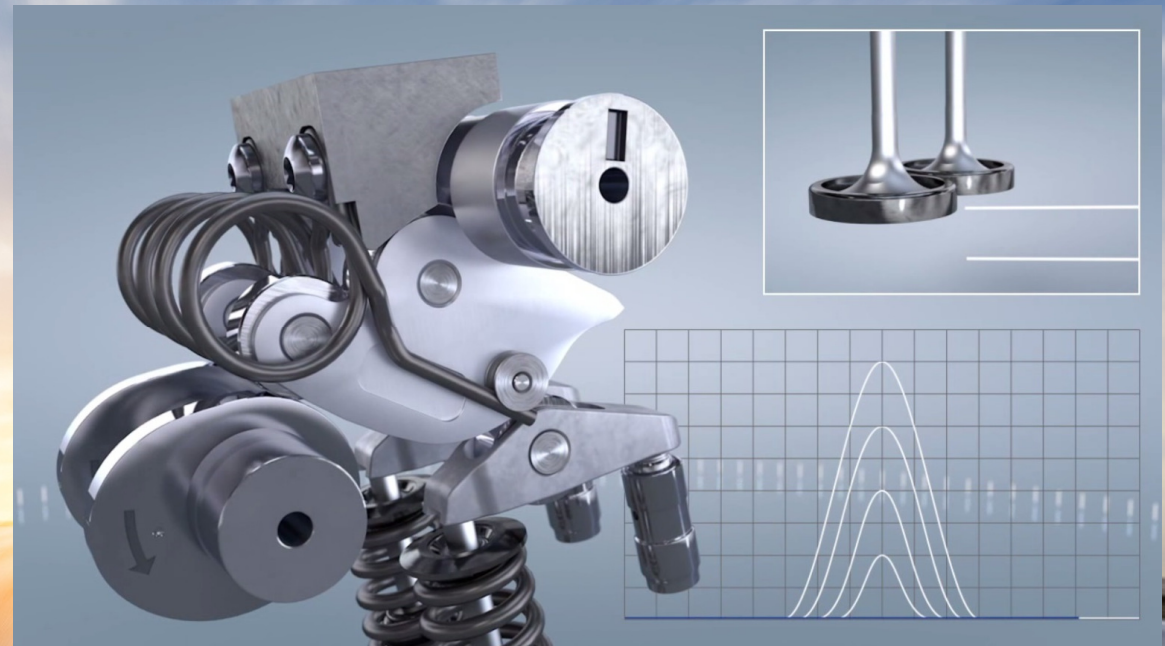


Efficiency

Variable Valve Train – UpValve

Function and Application

- Fully variable mechatronic valve system (CVVL)
- Applicable to engine intake and exhaust especially for future-oriented gasoline engines
- Robust to high engine speeds
- Fuel savings by de-throttling and combustion process optimization of approx. 4-5% (NEDC)



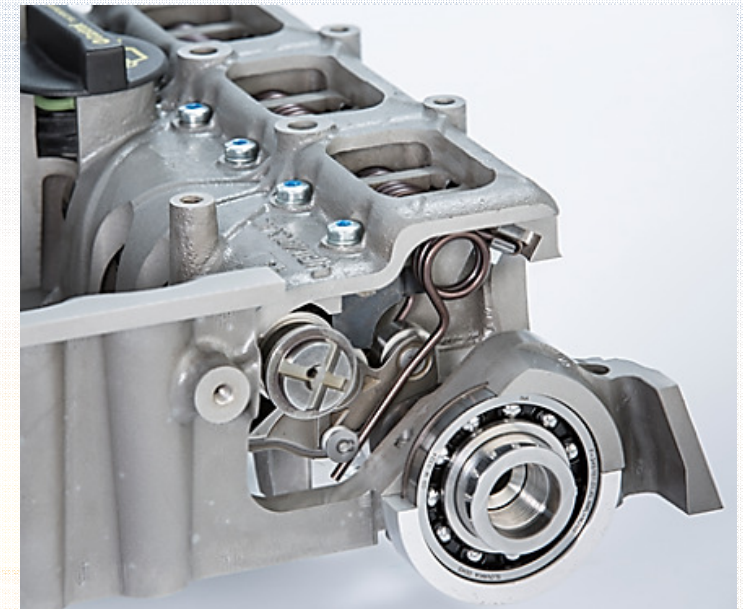
Efficiency

Variable Valve Train – UpValve

Booked business for series production

Asian customer – SOP 2020

4-cyl.-4V-turbo gasoline engine



UpValve System Integrated in Gasoline Cylinder Head

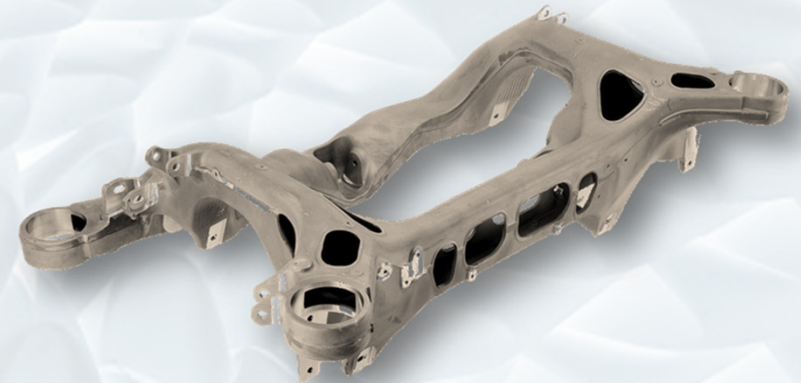
Efficiency

Lightweight Design Parts – Valuable for all Vehicle and Powertrain Concepts

Function and Application

- Structural parts and chassis assemblies for conventional and new vehicle concepts (passenger cars)
- Components for new energy vehicles (NEV)
- Aluminum processing with various casting techniques
- Ready-to-use, including machining and finish

Rear Axle Subframe
LP Process



Weight: 18kg
SOP: 01/2017

Efficiency

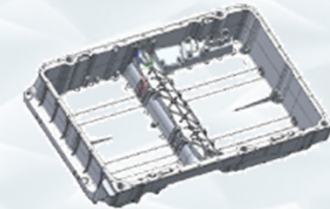
Lightweight Design Parts – Valuable for all Vehicle and Powertrain Concepts

Function and Application

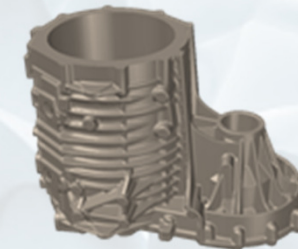
- Structural parts and chassis assemblies for conventional and new vehicle concepts (passenger cars)
- Components for new energy vehicles (NEV)
- Aluminum processing with various casting techniques
- Ready-to-use, including machining and finish



Battery Box
Weight: 8kg
SOP: 2018



Battery Box
Weight: 17kg
SOP: 2018



Housing for e-Engine
Weight: 20kg
SOP: 2018

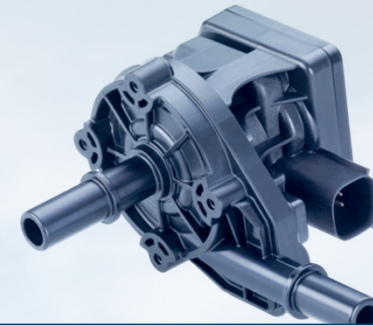
Emissions and Efficiency

Additional New Products at a Glance



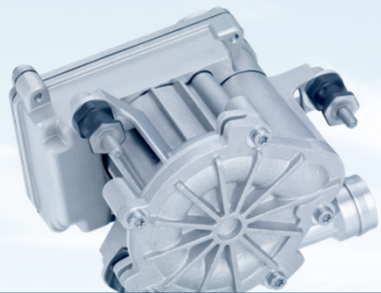
Electrical Vacuum Pump
EVP 40

**Booked business for series production
→ SOP 2017!**



Electrical Vapor
Pump

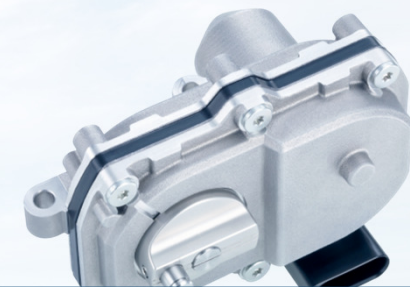
**Booked business for series production
→ SOP 2018!**



New Side-Channel
Secondary Air Pump

Customer presentation

Wastegate Actuators
Gasoline Engine



Customer presentation

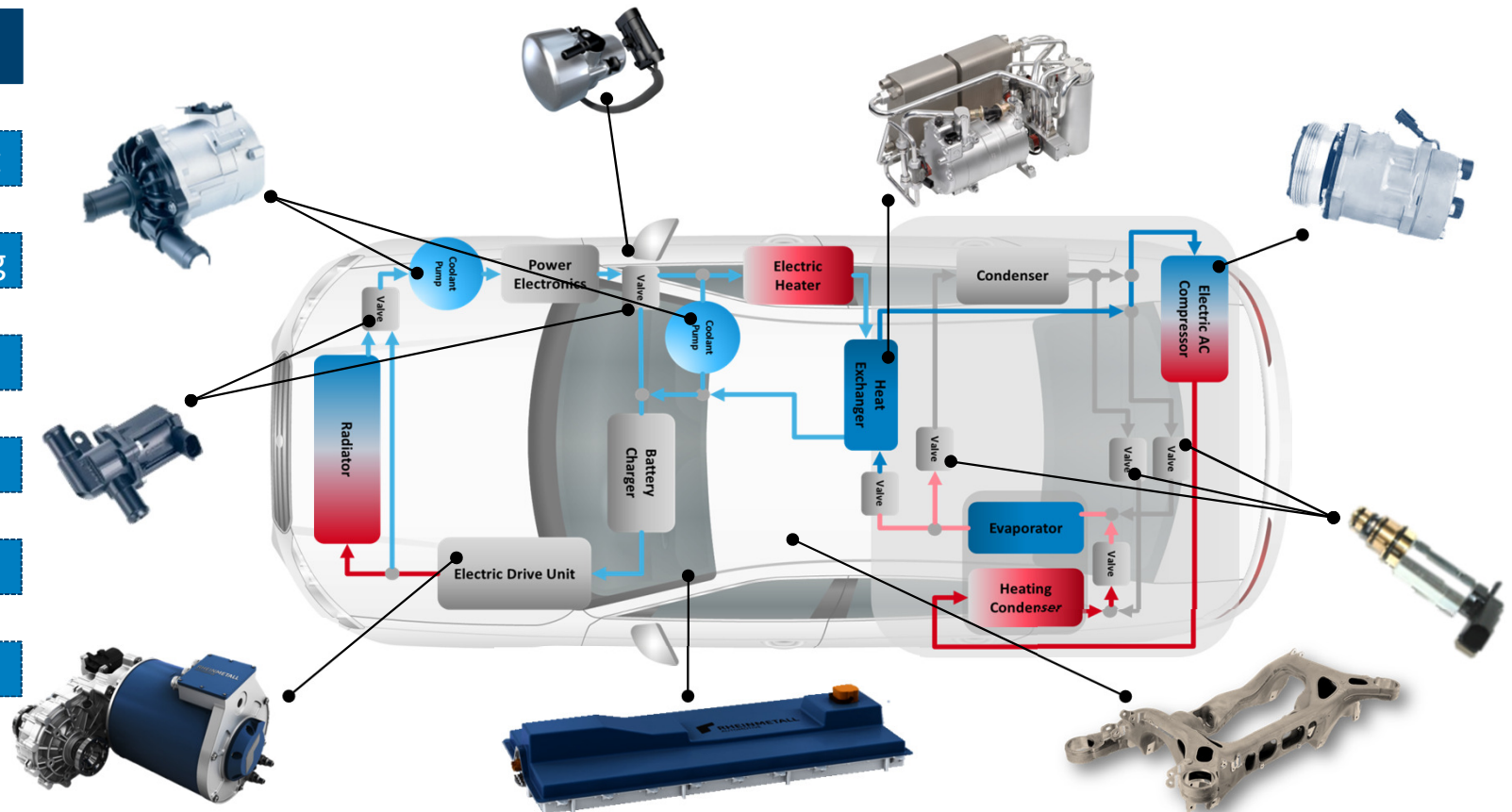
E-MOBILITY

Electrification

Opportunities for all Types of Electrification (Hybrid – BEV – FCEV)

Technology Fields

- > Thermal Management
- > Heating / Conditioning
- > Comfort and Safety
- > Energy Storage
- > Propulsion System
- > Lightweight Design



Example: Automotive Heat-Pump Installed in EVEX 910e **Energy Efficiency**

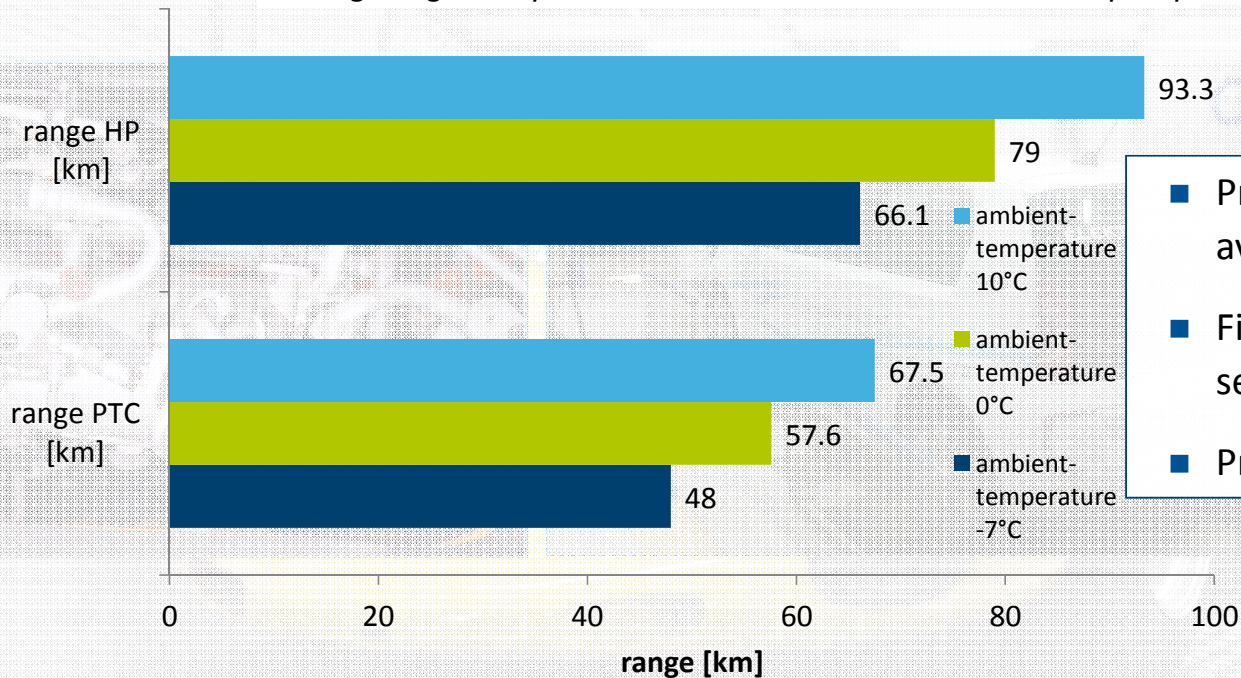
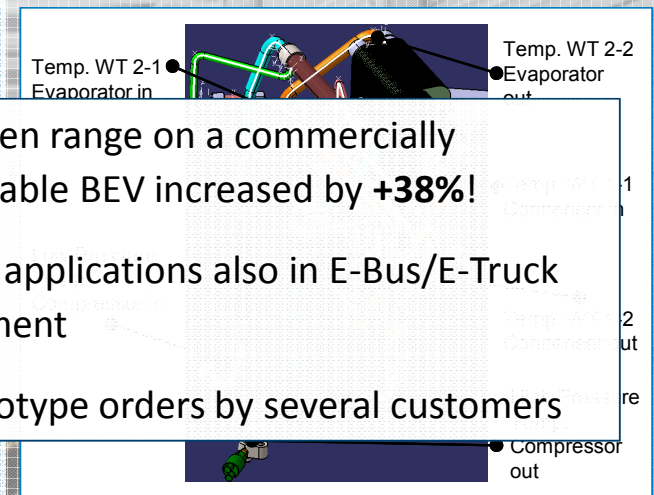


Source: WIRED; 07.04.2017

Automotive Heat-Pump Energy Efficiency

Automotive heat-pump unit results

Driving range comparison PTC-Heater – Automotive heat-pump

- Proven range on a commercially available BEV increased by **+38%**!
- First applications also in E-Bus/E-Truck segment
- Prototype orders by several customers

E-Mobility @ Rheinmetall Automotive

Established Product Portfolio

E-Mobility Competence Demonstrator

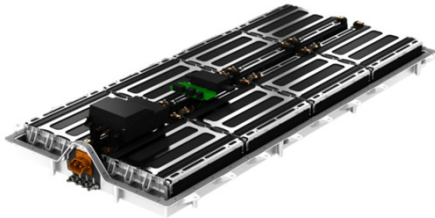


Expanded Product Portfolio

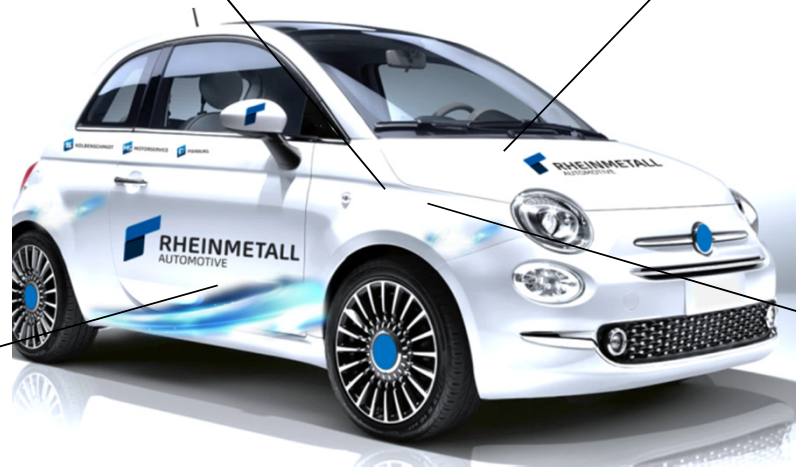
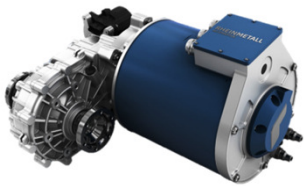
- Electrical Coolant Pumps
 - Electrical Vacuum Pumps
 - Electrical Oil Pumps
 - Electrical A/C Compressor
 - Heat-Pump Module
 - Electrical Coolant Valves/Systems
 - Castings for E-motor-housings
 - Battery Boxes (Castings)
 - Lightweight Components
-
- Battery Pack (Body, TM,...)
 - BMS
 - E-Traction Motors (HV)
 - Power Electronics

E-Mobility @ Rheinmetall Automotive

Battery Pack



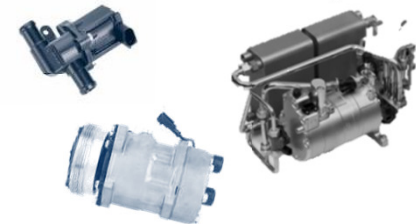
E-Traction Motor



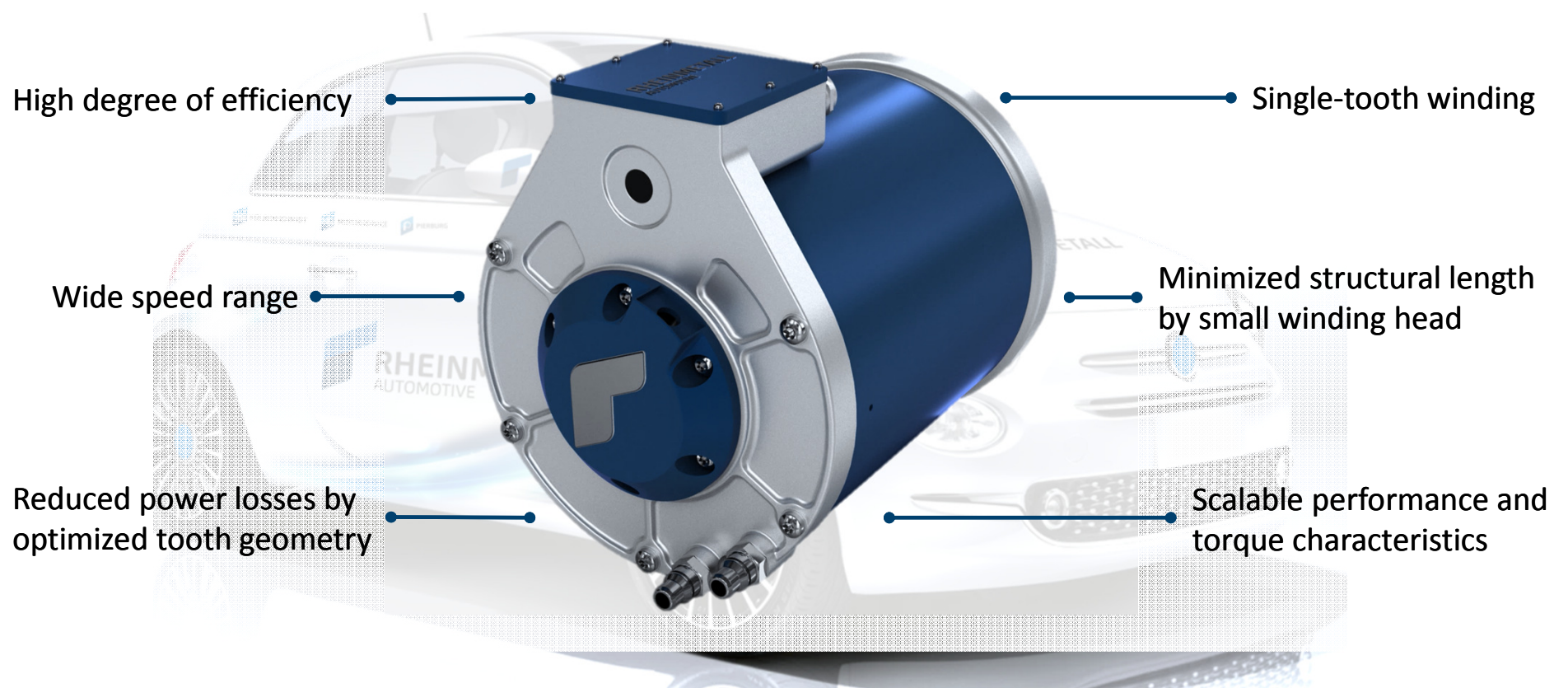
Various electr. Auxiliaries

- Electr. Coolant Pumps & Valves
- Electr. Oil Pumps
- Electr. A/C Compressor
- Electr. Vacuum Pumps
- Electr. Air Blower for Batt.-TM
- ...

Thermal Management Components & Systems



E-Traction Motor



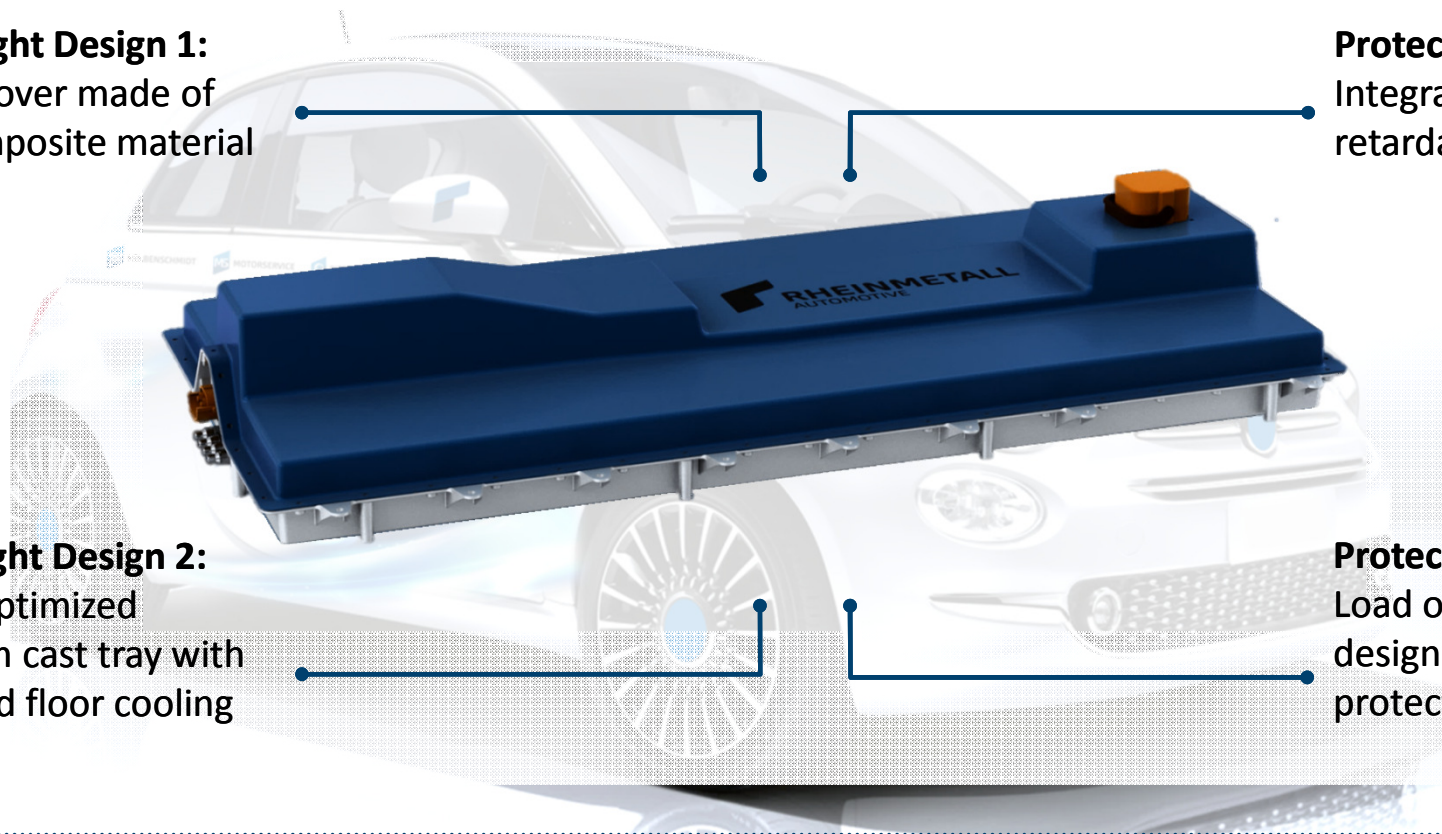
Battery Pack

Lightweight Design 1:
Battery cover made of
fiber composite material

Protection System 1:
Integrated flame
retardants

Lightweight Design 2:
Weight optimized
aluminum cast tray with
integrated floor cooling

Protection System 2:
Load optimized lightweight
design as underfloor
protection



Battery Pack

Safety:

3P12S cell configuration
Module voltage < 60 V

Thermal Conditioning:

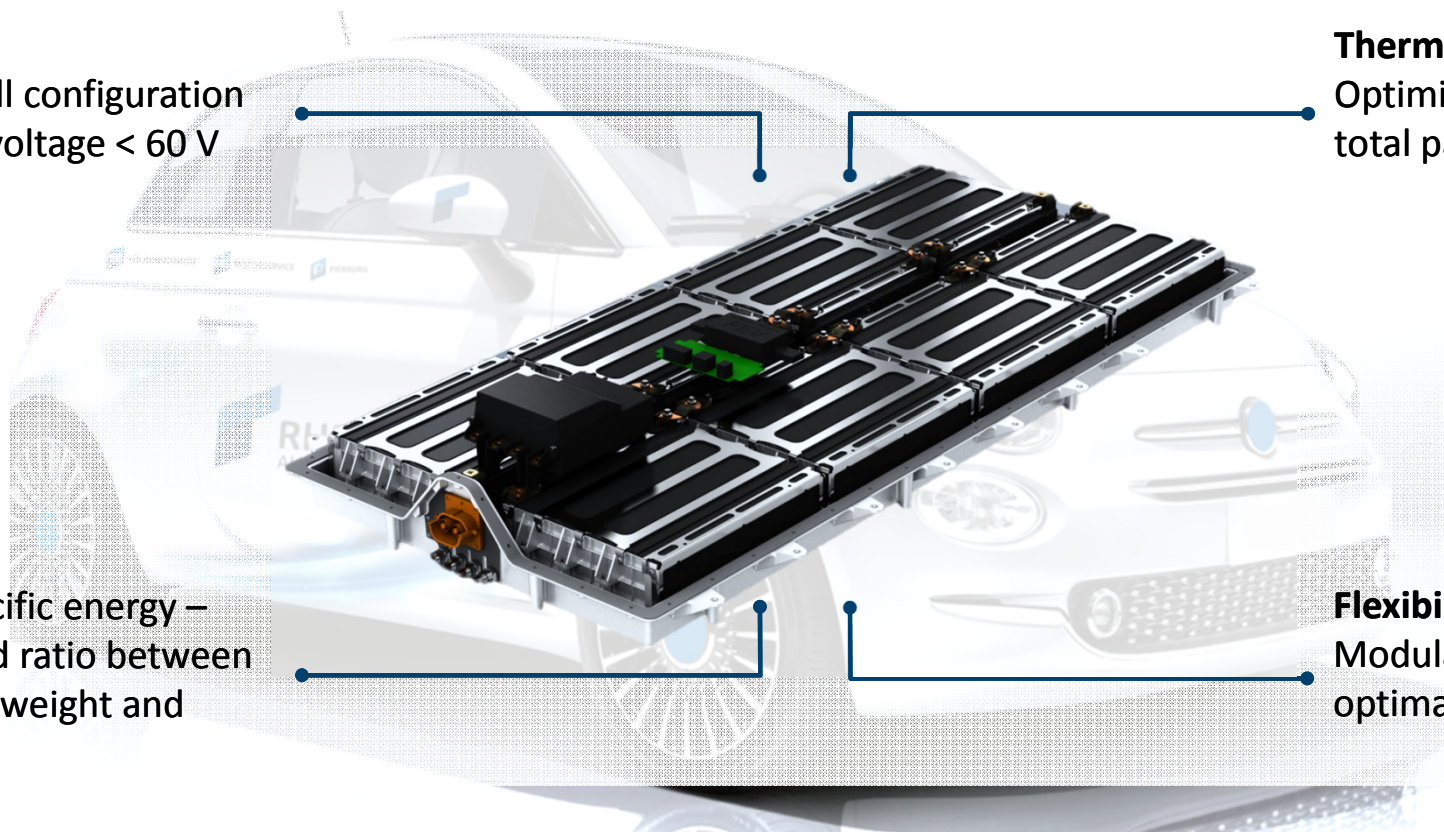
Optimization of the total pack

Power:

High specific energy –
optimized ratio between
package, weight and
capacity

Flexibility:

Modular design for
optimal customizing



NEWBUSINESS

Capital Markets Day 2017

Heinrich Dismon, CTO Automotive

AMPRIO SYSTEM OVERVIEW



Remote Control Unit +
Smartphone App
Optional Display



Battery Pack
(incl. Recharger)
On Tube Battery or
In Tube Battery

+ Open Modular System

- Complete system (e-motor, battery, display)
- or*
- Single drive unit



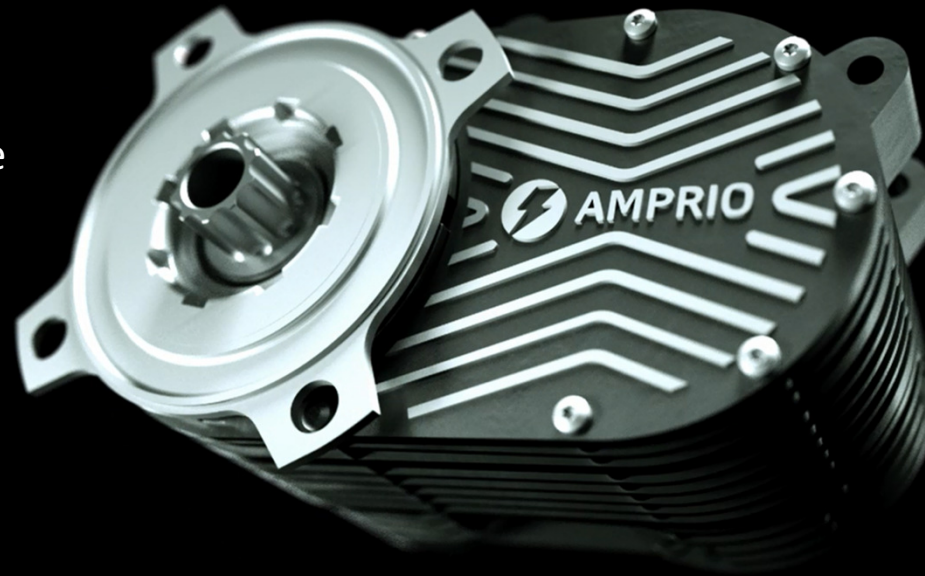
PRODUCT FEATURES* DRIVE UNIT



- + Very high power density (W/kg)
 - 250W/650W at 2,8kg

- + Specific characteristic curve
 - Bike-Segment characteristic
 - Parameterizable
 - Gliding operation mode

- + Optimal integration
 - Smallest package
 - Optimal connecting points
 - Q-factor bottom bracket (128 mm = Norm)



- + Lightest drive
 - 10% benefit (total 2.8kg)

- + Trendsetting 48V operating voltage
 - Performance scaling
 - Cost efficient electronics

- + Efficient drive
 - Efficiency-optimized high-speed concept

- + Ideal torque
 - 80 Nm at chain ring
 - OEM-Optimum achieved

* Status Market / Eurobike 2017

MOBILITY. SECURITY. PASSION.

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In particular, such forward-looking statements include the financial guidance contained in the outlook for 2017.

Forward-looking statements are sometimes, but not always, identified by their use of a date in the future or such words as “will”, “anticipates”, “aims”, “could”, “may”, “should”, “expects”, “believes”, “intends”, “plans” or “targets”. By their nature, forward-looking statements are inherently predictive, speculative and involve risk and uncertainty because they relate to events and depend on circumstances that will occur in the future. There are a number of factors that could cause actual results and developments to differ materially from those expressed or implied by these forward-looking statements. In particular, such factors may have a material adverse effect on the costs and revenue development of Rheinmetall. Further, the economic downturn in Rheinmetall’s markets, and changes in interest and currency exchange rates, may also have an impact on Rheinmetall’s business development and the availability of financing on favorable conditions. The factors that could affect Rheinmetall’s future financial results are discussed more fully in Rheinmetall’s most recent annual and quarterly reports which can be found on its website at www.rheinmetall.com.

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Capital Markets Day 2017, Bremen