Continental Heading into the Future of E-Mobility

Jörg Grotendorst
Hanover, December 15, 2011
We Shape the Megatrends in the Automotive Industry
Safety, Environment, Information, Affordable Cars
Powertrain ‘Clean Power’
Global Trends for Continental Powertrain

- Market: Limited Fuels, Increasing Traffic
- Legislation: Emission, Urbanization
- Social Trends: Growing Population
- Propulsion: Combustion, E-Mobility
- Complexity: From Component to System, Increasing Vehicle Applications

Powertrain Drivers

Powertrain ‘Clean Power’

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Jörg Grotendorst (Strategy & Technology, Powertrain Division)
Legislation
Focus on CO₂ and Emission Reduction

Global vehicle requirements for CO₂ reduction
CO₂ fleet emission targets [g/km]; normalized to NEDC


* Interpolated from 2025 proposal

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Jörg Grotendorst (Strategy & Technology, Powertrain Division)
Propulsion
Combustion Engines Dominant, Clear Trend towards Electrification

Source: Continental Automotive view based on Key Account Organisation, Powertrain Business Units and PS&T under consideration of external sources; Status May 2011
### Challenges for E-Mobility Today

**Focus on Technical and Economical Aspects**

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- **Battery costs** are expected to drop by almost 60% in the next 10 years.
- **Combustion engines** remain the most affordable solution for the next 20 years.
- **Alternative fuels** may replace fossil fuels to make internal combustion CO$_2$ neutral.

**Dec. 15, 2011**
Full Potential of Combustion Engine Still to Be Realized
Key Technologies for Reduction of CO2 Emissions in NEDC

**Diesel engine**
- Common Rail (CR) Diesel
- Diesel engine
- 1.4 t vehicle with 4-cyl. 1.6 l gasoline MPI naturally-aspirated (155 g CO$_2$/km = 100%)
- CO$_2$ emissions [%]

**Naturally-aspirated gasoline engine**
- MPI downsized
- + Thermal management
- + Two step valve lift
- + SDI / Cam phasing
- + Dual clutch transmission
- + Stop/Start
- + NOx Aftertreatment
- + Stop/Start
- + Hybrid electric drive
- + Hybrid electric drive

Reference: 1.4 t vehicle with 4-cyl. 1.6 l gasoline MPI naturally-aspirated (155 g CO$_2$/km = 100%)

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Safe, Efficient and Comfortable E-Mobility: Extensive Continental Portfolio (product selection)

- Global network of some 1,600 specialists
- 2009-2013 some 90 series projects at 17 manufacturers worldwide
- evSAT Sensor (Switching off of high-voltage battery in the event of an accident)

- Power electronic 2nd generation
- Separately excited synchronous motor
- Smart charging app (Charge level can be seen at all times in Smartphone)
- Electro-hydraulic brake MK C1
- Conti.eContact
- Lithium-ion battery
Outlook
Comprehensive Energy Management Thanks to System Integration

Today
Dedicated interfaces

Powertrain
Torque management
Aftertreatment

Chassis & Safety
Brakes
Driving dynamics

Interior
Information
Connectivity

Tomorrow
Overall system integration & optimization

Powertrain

Integrated Powertrain Management

Interior

Chassis & Safety

Combustion
E-mobility

Energy Management
Thank you for your attention!

Jörg Grotendorst
Hanover, December 15, 2011