POWERTRAIN OF THE FUTURE
MEETING THE INDUSTRY’S CHALLENGES WITH SCALABLE FUNCTIONS AND A MODULAR PLATFORM

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Magna Powertrain
transformation in the last 60 years
Today’s Buzz is All About

- Smart Vehicles, Cities, Factories
- Autonomy Electrification
- AI Big Data Biometrics
- Mobility as a Service
Electrification  Autonomy  New Mobility
What will happen if...

The end consumer looks for further differentiation?

Legislation will change?

The end consumer is not willing to pay for fulfilling legislation?
• Scalable CO$_2$ benefits
• Scalable lateral dynamics
• Scalable longitudinal dynamics
• Scalable All-Wheel Drive
• Scalability SW functions to support diversified OEM branding
1+1 = 3

Transmission Systems

Capabilities
• DCT family
• HDT family
• Best-in-class transmission technology

Driveline Systems

Capabilities
• Full AWD/4WD portfolio
• Electrification with mature products

• Scalability optimization and reduction of variants
• Driveability optimization
• SW functions to support diversified OEM branding
• Highly integrated mechanical/electric components
• Reduced complexity for ICE and transmission
• “bolt on“/ “low integration effort“ solutions with high platform (re-use) content
Base Architecture Conventional ICE DCT

- eMotor Power
- Acceleration 0-100 kph
- Vehicle Dynamics
- CO₂ Improvement
- Gradeability

ICE Power

ICE 100 kW

12 V Battery

7DCT300

Fuel tank

Conventional ICE
Hybrid Scalability: 48V Mild Hybrid HDT 25 kW P2.5

- **eMotor Power**
  - ICE Power
  - 48V Mild Hybrid

- **Acceleration 0-100 kph**
  - Conventional ICE
  - 48V Mild Hybrid

- **CO₂ Improvement**
  - Conventional ICE
  - 48V Mild Hybrid

- **Vehicle Dynamics**
  - Conventional ICE
  - 48V Mild Hybrid

- **Hybrid Scalability**
  - icing 100 kW
  - 7HDT300
  - 12 V Battery
  - Inverter
  - Converter
  - Fuel tank
  - 48 V Battery

- **Conventional ICE**
- **48V Mild Hybrid**
Hybrid Scalability: Performance MHEV P2.5+P4

- eMotor Power
- Acceleration 0-100 kph
- CO₂ Improvement
- Vehicle Dynamics
- Gradeability

Conventional ICE
48V Mild Hybrid
PHEV 25 kW P2.5+P4 25 kW
Hybrid Scalability: PHEV HDT 85 kW P2.5

- eMotor Power
- Acceleration 0-100 kph
- CO₂ Improvement
- Vehicle Dynamics
- Gradeability

- Conventional ICE
- 48V Mild Hybrid
- PHEV 25 kW P2.5+P4 25 kW
- PHEV 85 kW

Inverter
Converter
Plug-In
Battery
12 V
ICe 100 kW
85 kW 7HDT300
High Voltage (HV) Battery
Fuel tank
BCM
Hybrid Scalability: Performance PHEV P4

- eMotor Power
- Acceleration 0-100 kph
- CO₂ Improvement
- Gradeability

**Vehicle Dynamics:**

- ICE Power
- eMotor Power

**Gradeability:**

- ICE 100 kW
- 7DCT300
- P0 10 kW
- 78 kW

**High Voltage (HV) Battery**

**Conventional ICE**

**48V Mild Hybrid**

**PHEV 25 kW P2.5+P4 25 kW**

**PHEV 85 kW**

**PHEV 78 kW P4**
Hybrid Scalability: Performance PHEV P2.5+P4

- eMotor Power
- Acceleration 0-100 kph
- CO₂ Improvement
- Gradeability

- ICE Power
- CO₂ Improvement
- Gradeability

- eMotor Power (PHEV 85 kW)
- Acceleration 0-100 kph (PHEV 85 kW)
- Gradeability (PHEV 85 kW)

- ICE 100 kW
- 7HDT300
- Plug-In
- Inverter
- Converter
- 12 V Battery
- ICE 100 kW
- 7HDT300
- Plug-In
- Inverter
- Converter
- 12 V Battery

- High Voltage (HV) Battery
- Fuel tank 78 kW
- BCM

- Conventional ICE
- 48V Mild Hybrid
- PHEV 25 kW P2.5+P4 25 kW
- PHEV 85 kW
- PHEV 78 kW P4
- PHEV 85 kW P2.5+P4 78 kW
Hybrid Scalability: Differentiation by Software Application

- **eMotor Power**
- **Acceleration 0-100 kph**
- **CO₂ Improvement**
- **Gradeability**

- **ICE Power**
- **PHEV P2.5+P4 Eco**
- **PHEV P2.5+P4 Auto**
- **PHEV P2.5+P4 Sport**

- **ICE 100 kW**
- **7HDT300**
- **12 V Battery**
- **Plug-In Inverter Converter**
- **High Voltage (HV) Battery**
- **Fuel tank**
- **BCM**

- **Hybrid Scalability: Differentiation by Software Application**

- **BCM**
- **High Voltage (HV) Battery**
- **Fuel tank**
- **7HDT300**
- **12 V Battery**
- **Plug-In Inverter Converter**

- **85 kW**
- **78 kW**
CO\textsubscript{2} Savings
Acceleration
Traction Snow
Costs

Scalable functions on modular platform architectures
Scalability Approach

ICE Start/Stop 12V
Low Power eMachine 48V
2x Low Power eMachine 48V
Medium Power eMachine HV
2x Medium Power eMachine HV

Mild Hybrid 48V
Plug-in Hybrid 400V

additional variants under investigation
From scalable ICE power to scalable ePower.
eRAD 48V P4

Performance comparison
- ICE 2WD
- 48V P4 traction assist
- HV P4 eAWD

screenshot from earlier video, approx. 4 sec after drive off

benefit of 48V P4 traction assist functionality
We deliver a scalable modular platform for driving performance and CO\textsubscript{2} reduction.