EVOLUTION OF FUN-TO-DRIVE
What is Fun-to-Drive?
SCALING DYNAMICS AND CO$_2$
Vehicle Dynamics Today

- Coupling
- Rear Drive Unit
- Power Takeoff Unit with Disconnect Unit
E-Motor – the Key for Scaling Efficiency and Power

- Reduced complexity
- Scalable functions
- Diversified OEM branding
- Package advantage
- High re-use of content

Scalability shifts from ICE to e-motor

Modular & Scalable Platform

Transmission Systems

HV Plug-in Hybrid – AWD
48V Mild Hybrid – AWD

Driveline Systems

Capabilities

- DCT family
- HDT family
- DHT

Capabilities

Full AWD/4WD portfolio e-drives

OEM Benefit

- Reduced complexity
- Scalable functions
- Diversified OEM branding
- Package advantage
- High re-use of content
Base Architecture Conventional ICE DCT
Hybrid Scalability: 48V HDT P2.5+P4
Hybrid Scalability: PHEV HDT 85 kW P2.5
Hybrid Scalability: PHEV HDT 85 kW P2.5 + 80 kW P4
Hybrid Scalability: PHEV HDT 85 kW P2.5 + 140 kW P4 TV
SCALING THE VEHICLE “DNA”
Scalability Approach

CONVENTIONAL ICE
Conventional Combustion Engine
Front-Wheel Drive

48V MILD HYBRID
48V Mild Hybrid – Front-Wheel Drive
48V Mild Hybrid – All-Wheel Drive

HV HYBRID
HV Plug-in Hybrid – Front-Wheel Drive
HV Plug-in Hybrid – All-Wheel Drive

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Scalable Modules for Scalable Dynamics and Functions

- Shifting System
- Gearsets & Differentials
- Synchros
- Clutches & Decoupling
- Oil
- Electric Drive
- Parklock
- Control HW & Actuation
- Hydraulics
- Housing & Covers
- Mechanical Actuation

SW & Control Algorithms
Scalable Modules for Scalable Dynamics and Functions

Scalability means:

• Scalable functions on the entire vehicle
• Scalable powertrain functions
• Scalable software functionality
• Scalable components performance
Future Vehicle Dynamics

Hybrid Dual Clutch Transmission
High Voltage

Highly Integrated eDrive Mid Torque Vectoring
HV Plug in Hybrid All-Wheel Drive Lateral Dynamics

Video

HV Plug in Hybrid All-Wheel Drive

Rear Open Differential
Rear Torque Vectoring, Mode DRIFT
Rear Torque Vectoring, Mode AUTO
Outlook

- CO2 reduction and high driving dynamics are not mutually exclusive
- “Fun to Drive” is driving dynamics and handling - but not only …
- Electrification adds comfort, safety, and customizability
- New opportunities for brand and model differentiation by scaling performance and functions
- Besides AWD competence we need integration expertise for the entire electrified powertrain

A huge challenge, but also an opportunity