

Euro 6 – What's Next?

Ron Borsboom
DAF Trucks NV

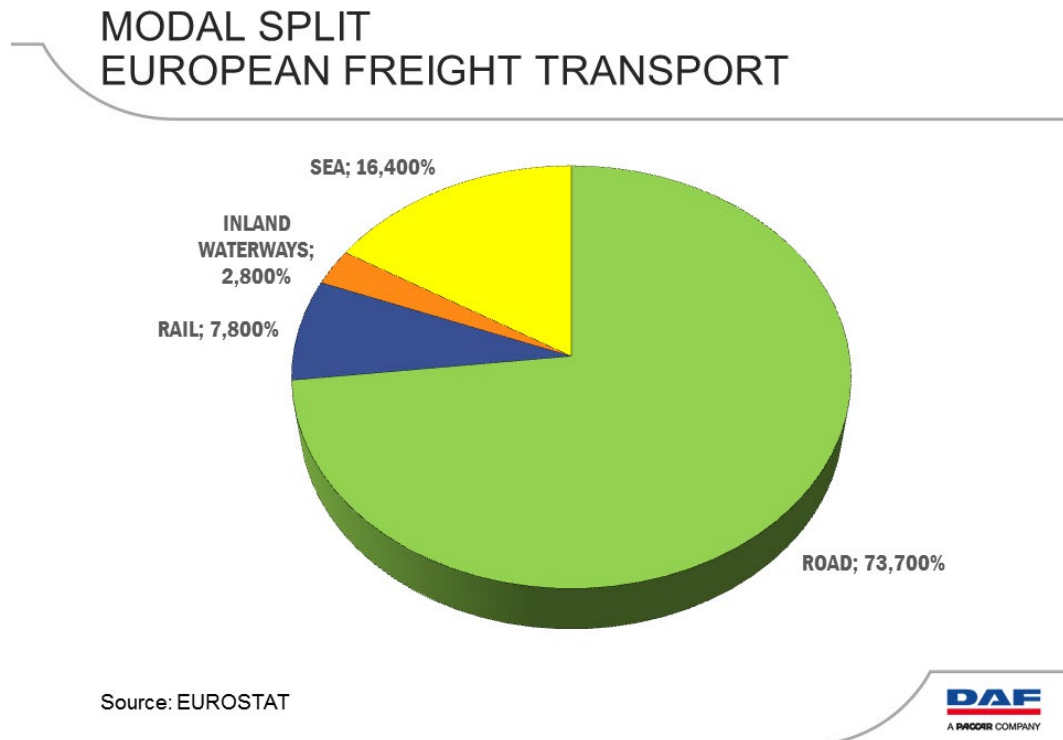


Fig. 1: Modal Split – European Freight Transport

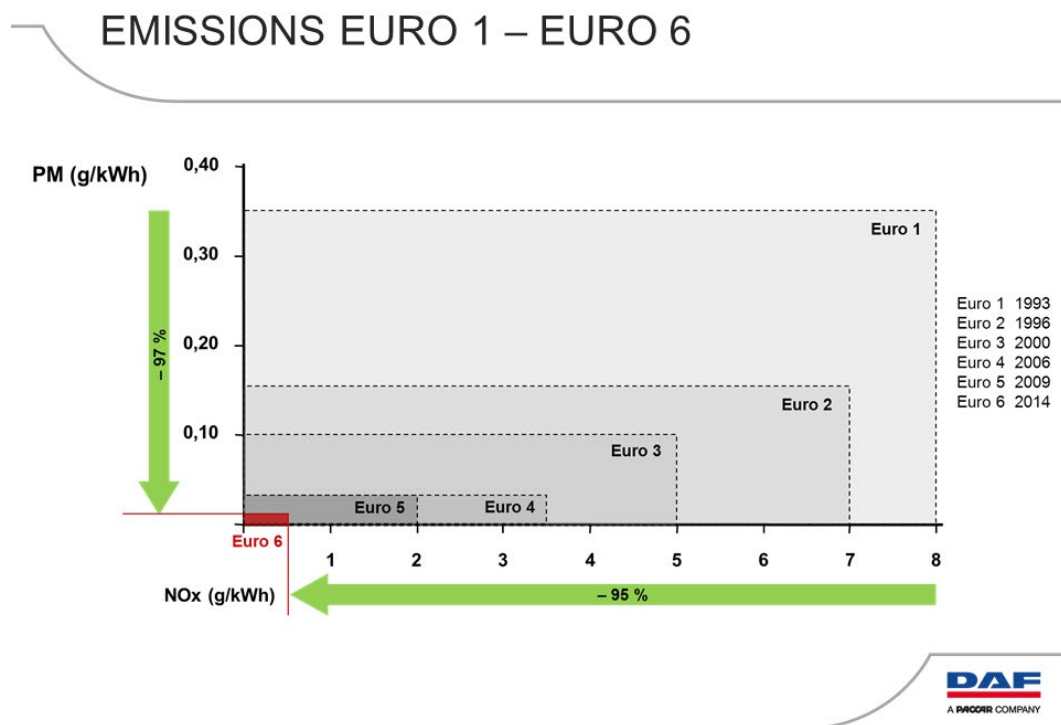


Fig. 2: Emissions Euro 1 – Euro 6



Fig. 3: DAF Truck

THE NEW EURO 6 – DAF XF

- Ultra low emissions
- Same low fuel consumption
- No weight impact
- All vehicle characteristics enhanced
- Prepared for the future




XF

DAF
A PACCAR COMPANY

Fig. 4: The New Euro 6 – DAF XF

EURO 6 – WHAT'S NEXT?

- NOx and PM levels almost at zero emission level
- Focus on CO₂ / GHG
 - Air quality requirements and market forces strengthen each other
 - CO₂ = fuel consumption
 - No legislation required
 - No one size fits all regulation
 - Work done principle
- Future shortage fossil fuels



DAF
A PACCAR COMPANY

Fig. 5: Euro 6 – What's Next?



Fig. 6: No One Size Fits All

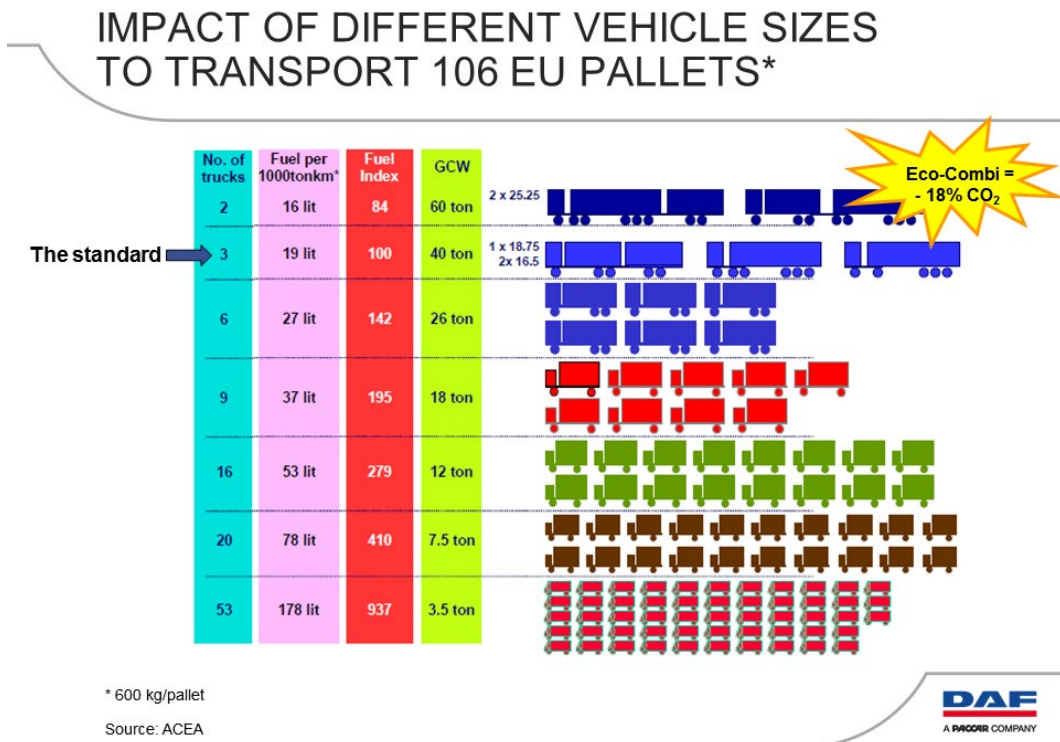


Fig. 7: Impact of Different Vehicle Sizes to Transport 106 EU Pallets

IMPACT OF DIFFERENT VEHICLE SIZES TO TRANSPORT 106 EU PALLETS*

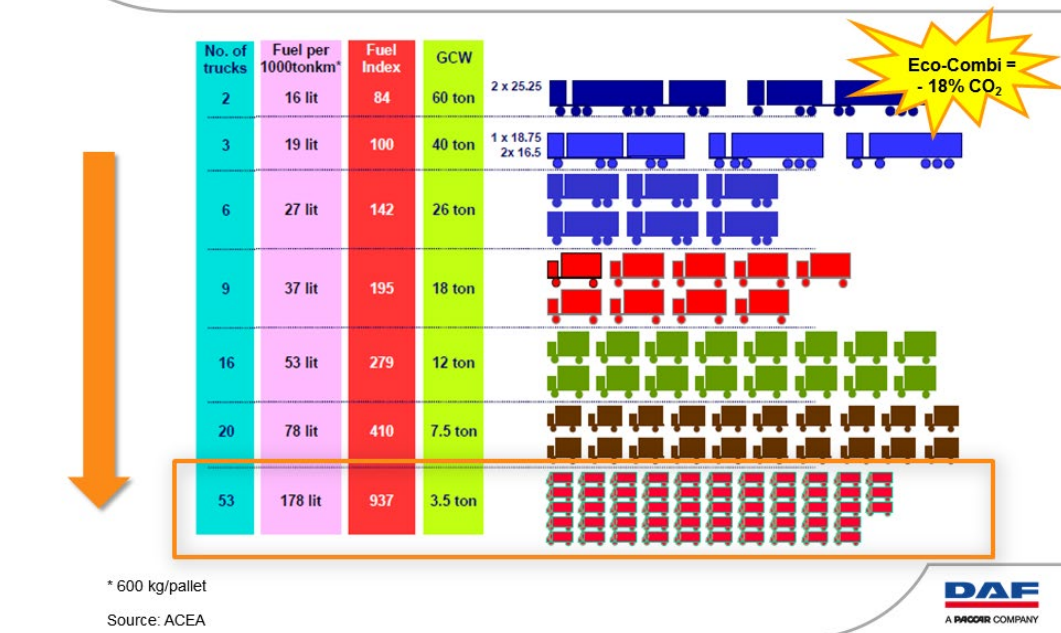


Fig. 8: Impact of Different Vehicle Sizes to Transport 106 EU Pallets

IMPACT OF DIFFERENT VEHICLE SIZES TO TRANSPORT 106 EU PALLETS*

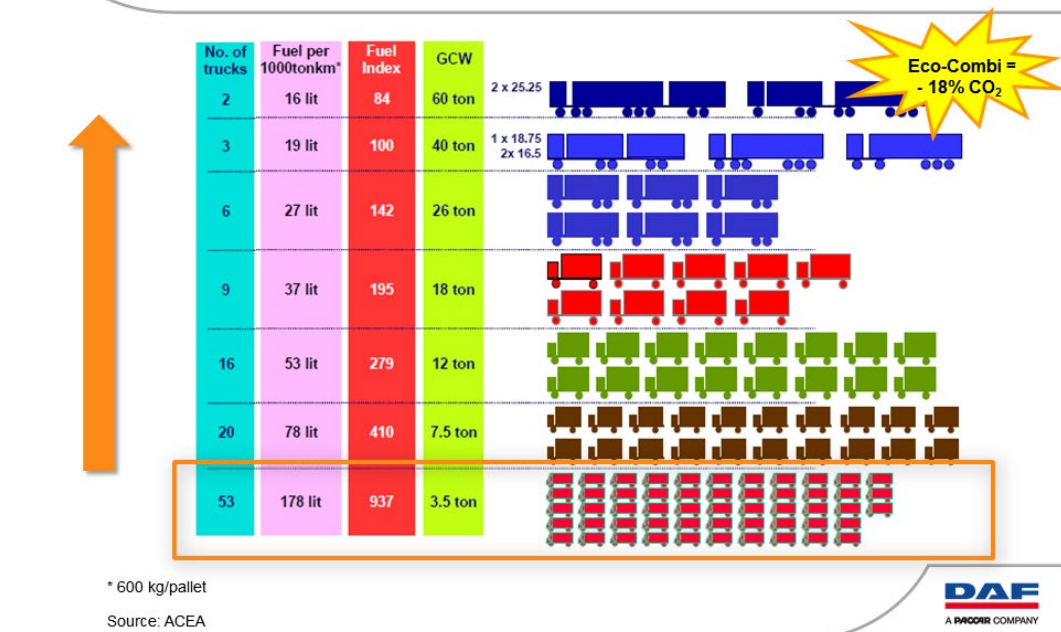


Fig. 9: Impact of Different Vehicle Sizes to Transport 106 EU Pallets

EURO 6 – WHAT'S NEXT?

- Industry continues to further reduce fuel consumption
- Enhanced engine efficiency
 - Down speeding
 - Down sizing
 - Reduced parasitics
- Energy management
 - Waste heat recovery
 - Hybridization
 - Electrification



DAF
A PACCAR COMPANY

Fig. 10: Euro 6 – What's Next?

EURO 6 – WHAT'S NEXT? NEW AND EMERGING TECHNOLOGIES

Engine	Vehicle
Dual Fuel Systems	Low rolling resistance tyres
Variable flow / Electric water pump	Single Wide Tyres
Variable speed Oil pump	Automatic Tyre Pressure Adjustment
Hydrogen Fuel Cells	Spray Reduction Mud Flaps
Electric Vehicles	Aerodynamic Trailers
Stop/Start Hybrid	Aerodynamic Fairings (Cab, Chassis, Body & Trailer)
Hydraulic Hybrid	Active Aero
Flywheel Hybrid	Lightweight Materials
Pneumatic Booster System – Air Hybrid	Alternative Fuel Bodies
Mechanical Turbocompound	ITS/ICT
Electrical Turbocompound	Predictive Cruise Control
Bottoming Cycles	Vehicle Platooning
Controllable Air Compressor	Green Zone Indicator
Electric Engine Accessories	Smart Alternator, Battery Sensor & AGM Battery
Driveline	Acceleration Control
Automated Transmission	Governing Speed Control – Progressive Shift
Full hybrid	Eco Roll – Freewheel Function

Source: AEA study European Union

DAF
A PACCAR COMPANY

Fig. 11: New and Emerging Technologies

EURO 6 – WHAT'S NEXT? THE INTEGRATED APPROACH



- Vehicle weights and dimensions
 - Eco combi's
 - Enhanced aerodynamics
 - Productivity or efficiency?



- Technologies to avoid empty kilometers



Fig. 12: The Integrated Approach

EURO 6 – WHAT'S NEXT? SMART MOBILITY

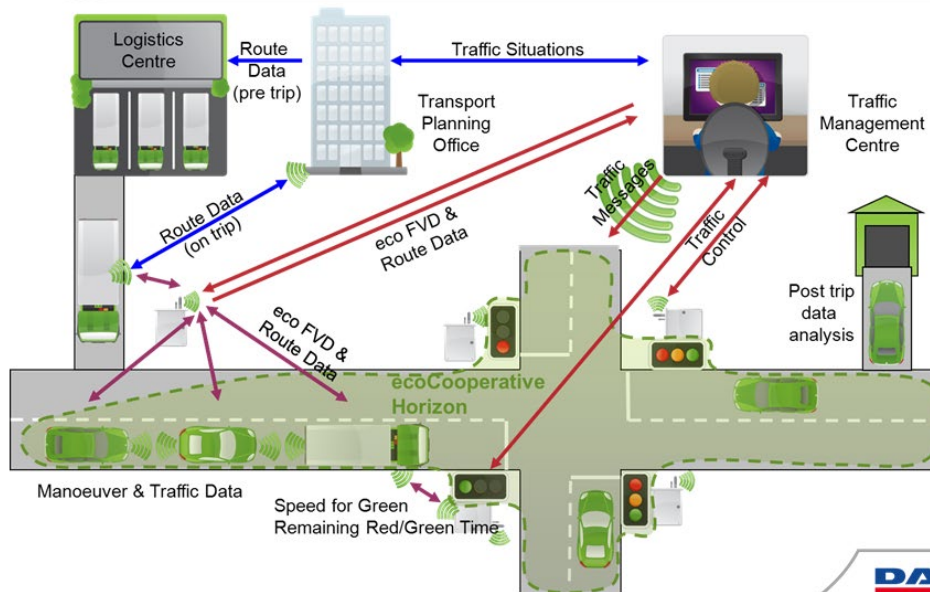


Fig. 13: Smart Mobility

EURO 6 – WHAT’S NEXT?

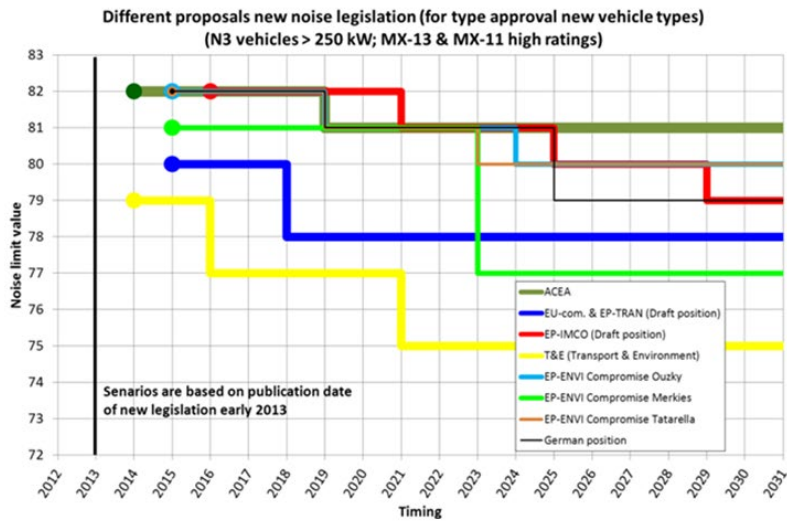


Fig. 14: Euro 6 – What’s Next?

EURO 6 – WHAT’S NEXT? SHORTAGE OF RESOURCES

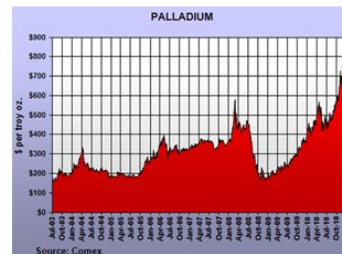
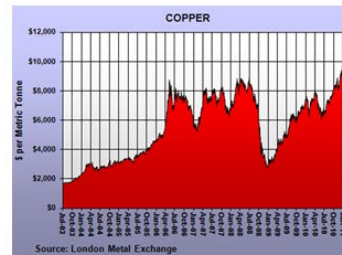
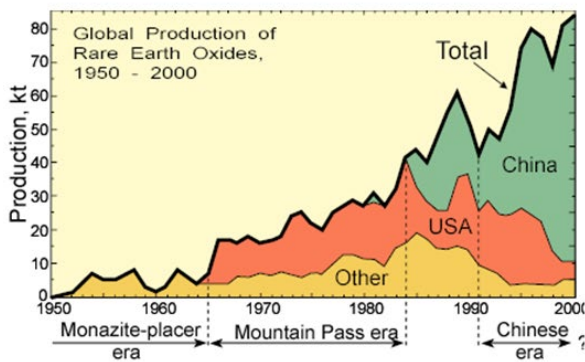


Fig. 15: Shortage of Resources

EURO 6 – WHAT'S NEXT? SHORTAGE OF ENGINEERS



Fig. 16: Shortage of Engineers

EURO 6 – WHAT'S NEXT? TRUE GLOBAL HARMONIZATION

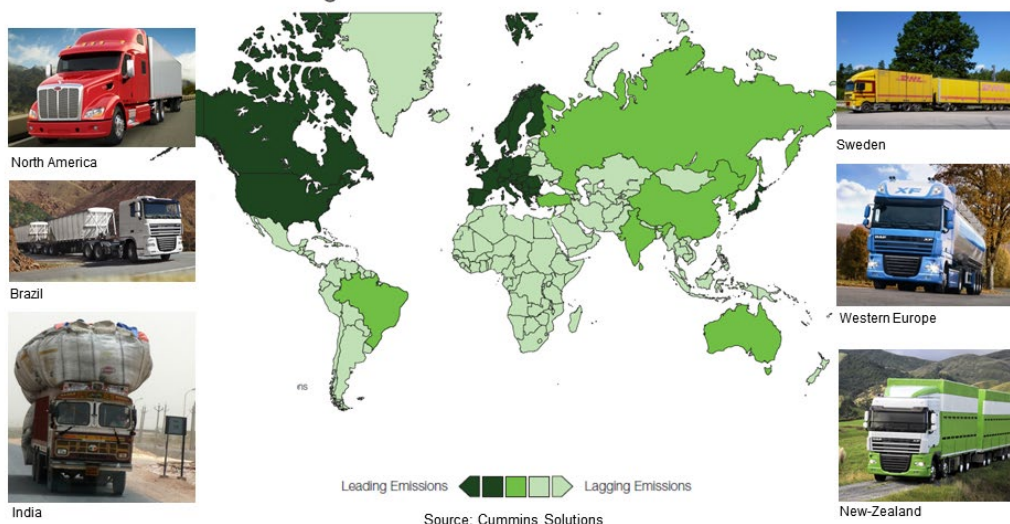


Fig. 17: True Global Harmonization

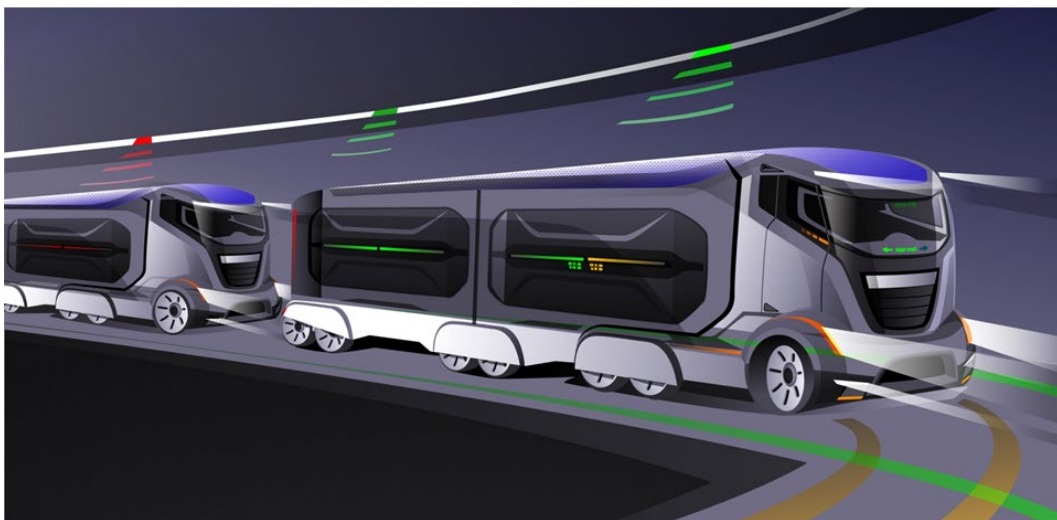
EURO 6 – WHAT'S NEXT? RELIABILITY IS KEY



DAF
A PACCAR COMPANY

Fig. 18: Reliability is Key

EURO 6 – WHAT'S NEXT? INTERESTING CHALLENGES AHEAD



DAF
A PACCAR COMPANY

Fig. 19: Interesting Challenges Ahead



Fig. 20: DAF Truck