Euro 7
New proposal for vehicle emissions type approval in Europe

Presentation at GRPE 87

12/01/2023
Context
Wider context of Air Pollutant Emissions

- Air Quality Standards
- Roadworthiness
- Research
- Type Approval Framework
- Market Surveillance
- Competitiveness
- CO2 targets
- EURO 7
- RFF, Taxonomy, Next Generation EU, EU Semester
The need to act

• **Important health and environmental concerns**: ~70,000 premature deaths due to road transport emissions (NOx, particles…) in Europe each year

• **New Ambient Air Quality limits** proposed on 26 October

• Selective **Internal Combustion Engine (ICE) bans** from MS/cities and risk for single market

• Developments in key **world markets** (China, US)

• Only ZEV **sales** for cars/vans by 2035, but conventional vehicles will stay in circulation and brakes/tyres also emit

• Upcoming **CO₂ standards** for heavy-duty vehicles
A changing environment for the automotive industry

Sales of new vehicles:

LDV: 100% ZEV sold from 2035 on

HDV: only 61% ZEV sold in 2050

Vehicles on the roads:

LDV: 80% ZEV on the roads in 2050

HDV: 35% ZEV on the roads in 2050

*Based on EU Mix fit-for-55 Scenario 2021 reflecting the impact of the agreed CO₂ standards for cars and vans.
Tapping the remaining potential for combustion engines

- Previous Euro emissions legislation has significant benefits
- All passenger cars sold in Europe after 1 September 2019 are Real-Driving-Emissions (RDE) compliant
- But potential remains to improve it further through Euro 7, in particular for heavy-duty vehicles
Euro 7 Objectives

• Improve **air quality**

  • Limit pollutants at the source, with particular emphasis in urban areas and wider conditions of use ➔ **make a difference where it matters most**

  • Take account of new developments (electrification, digitalisation, batteries, brakes and tyres) ➔ **future proof legislation**

• Ensure proper **functioning of internal market**

  • Avoid obstacles (incl. market imbalance across the EU) ➔ **affordability, access restrictions, etc.**

  • Reduce complexity and compliance costs; take account of investment potential ➔ **look for synergies where they exist**

  • Ensure compliance throughout more representative lifetime of vehicle ➔ **second-hand markets**
Fuel- and technology-neutral emission limits: NOx, particles, hydrocarbons, CO, ammonia, ...

More representative on-road tests under wider driving conditions

Significant simplification of legislation and testing
Longer lifetime coverage
Digital monitoring of compliance
Brake particles and Microplastics from tyres

In-vehicle battery durability (complementing Battery Regulation)

EURO 6 for cars, vans
EURO VI for buses, lorries

ICE vehicles

Electric and H2 vehicles

Euro 7
for cars, vans, buses, lorries
Detailed features in Euro 7 proposal

Text and accompanying documents and reports can be found at:
Simplification

• Industry and Member States underline that Euro 6/VI is too complex and ask for simplification

• In 2005 Euro 4 with implementing rules was 180 pages long

• In 2021 Euro 6 with implementing rules is 860+ page long

• Streamline and merge into 1 single main legislation for both LDV and HDV

• Eliminate unnecessary tests and replace with declarations and checks if required (WLTP at 14°C, Crankcase, OBD)

• Reduce administrative burden where possible
**Emission limits**

**LDV**
- set at the lowest values in Euro 6 for all cars and vans
- Only underpowered vans get slightly higher limits
- **Proposed application date: 1 July 2025**

**HDV**
- Move away from engine testing to whole-vehicle testing
- Cold and hot emissions regulated separately to ensure good control of emissions
- **Proposed application date: 1 July 2027**

<table>
<thead>
<tr>
<th>Emission limits (mg/km)</th>
<th>Cars/Vans</th>
<th>Underpowered Vans</th>
<th>Small trips (below 10 km)</th>
<th>Lorries and buses – Cold emissions</th>
<th>Lorries and buses – Hot emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td>60</td>
<td>75</td>
<td>600</td>
<td>350</td>
<td>90</td>
</tr>
<tr>
<td>PM</td>
<td>4.5</td>
<td>4.5</td>
<td>45</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>PN (#/km)</td>
<td>6×10¹¹</td>
<td>6×10¹¹</td>
<td>6×10¹²</td>
<td>5×10¹¹</td>
<td>2×10¹¹</td>
</tr>
<tr>
<td>CO</td>
<td>500</td>
<td>630</td>
<td>5000</td>
<td>3500</td>
<td>200</td>
</tr>
<tr>
<td>NH₃</td>
<td>20</td>
<td>20</td>
<td>200</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td><strong>Brake emissions</strong></td>
<td>7 until 2035 / 3 after</td>
<td>7 until 2035 / 3 after</td>
<td>When method available</td>
<td>When method available</td>
<td>When method available</td>
</tr>
<tr>
<td><strong>Tyre emissions</strong></td>
<td>When method available</td>
<td>When method available</td>
<td>When method available</td>
<td>When method available</td>
<td>When method available</td>
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Better coverage of driving conditions in RDE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Euro 6e</th>
<th>Euro 7</th>
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<tbody>
<tr>
<td><strong>Parameter</strong></td>
<td>Normal</td>
<td>Extended</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 35°C</td>
<td>-7 to 0 or 35-38°C</td>
</tr>
<tr>
<td>Maximum altitude</td>
<td>700</td>
<td>1300</td>
</tr>
<tr>
<td>Maximum speed</td>
<td>145 km/h</td>
<td>up to 160 km/h for less than 3%</td>
</tr>
<tr>
<td>Trip composition</td>
<td>33% urban, 33% rural, 33% highway</td>
<td>-</td>
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</tbody>
</table>

Emissions in extended driving conditions are allowed to be higher (60% for LDV, 100% for HDV)
Emissions Saved

- Euro 7 will save more than 80% of NOx emissions for car/vans and lorries/buses by 2035 compared to 2018
Durability

- Vehicles and emission control systems deteriorate as any mechanical or chemical system
- 200,000 km or 10 years for LDV and 375,000 to 875,000 km for HDV
- But durability multiplier to account for deterioration (20% higher emission limits for gaseous pollutants after 160,000 km or 8 years and up to 200,000 km or 10 years for LDV)
Digital ambition for emissions

On-board monitoring so data can be transferred over the air and this will:

- Simplify checking compliance with type-approval rules
- Allow tampering protection
- Simplify periodic technical inspection
- Allow geo-fencing for Plugin Hybrids (PHEV)
Brake and Tyre wear particles

• Contribution of **brake** and **tyres** to PM2.5 will soon be higher than from exhaust sources

• Tyres are biggest source of unintentional release of **microplastics** in environment (heavier particles to water and soil)

• **Brake measurement method** developed for cars and vans (GTR on brakes), under development on HDV

• **Tyre abrasion method** in development in GRBP/GRPE TF/TA
Battery Durability

• Based on new **Global Technical Regulation 22**

• Introduces **monitors of state of health for batteries** installed in vehicles

• Minimum performance requirements for battery durability introduced for cars/vans reflecting current market situation

<table>
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<tr>
<th>Vehicle age/usage</th>
<th>PHEV</th>
<th>BEV</th>
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<tr>
<td>Until 5 years/100.000 km</td>
<td>80%</td>
<td>80%</td>
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<tr>
<td>Up to 8 years/160.000 km</td>
<td>70%</td>
<td>70%</td>
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• Work ongoing for lorries/buses (less data available, more complex)
Estimated Impacts of Euro 7 proposal
## Estimated impact of Euro 7 in 2035 (compared with Euro 6/VI)

<table>
<thead>
<tr>
<th>Impact Area</th>
<th>Cars and Vans</th>
<th>Buses and Lorries</th>
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<tbody>
<tr>
<td>Reduction of NOx emissions</td>
<td>35%</td>
<td>56%</td>
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<tr>
<td>Reduction of particles from the tailpipe</td>
<td>13%</td>
<td>39%</td>
</tr>
<tr>
<td>Reduction of particles from the brakes</td>
<td>27%</td>
<td></td>
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<tr>
<td>Low impact on consumers</td>
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<tr>
<td>These emission reductions are expected to be achieved with existing technologies. A moderate impact on the costs of cars - between €90 and €150 - and on the cost of buses and lorries - around €2600 - is expected.</td>
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<td>Big benefit for health and environment</td>
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<td>For each euro spent on technologies for Euro 7, more than 5 euros are saved on health and environment.</td>
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Conclusions

• The proposal is based on whole-vehicle testing on the road on typical use, including short trips, larger boundaries and larger durability resulting in significant emission savings.

• The finally selected option is a balanced proposal which has significant net benefits for the EU: €145.4 billion between 2025-2050.

• It requires minimal changes to cars and vans (mostly calibration of the engine, OBM for ICE and cleaner brakes for all).

• It requires technologies already used for buses and lorries (i.e. double SCR, slightly better particle filter, OBM for ICE).
Next Steps

• Co-decision means that the proposal is now discussed between Parliament and Council to reach an agreement

• Co-decision process may take time and final rules will only be known at the end

• Regular meetings of expert group AGVES to discuss implementing measures

• Aim to have most of the implementing measures ready by the time the co-decision ends (at least for light duty vehicles)

• Appropriate lead time will be built in the final rule
Thank you