Analyzing Europe’s CO₂ standards proposal for trucks and buses

Eamonn Mulholland
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Europe’s new heavy-duty CO₂ standards

The European Commission’s new proposal

Original standards
What’s covered

Covered under the original standards

- Heavy trucks (6x2 and 4x2)
- Heavy trucks (6x4 and 8x4)
- Medium trucks (4x2)
- Heavy-trucks (4x2)
- Coaches
- Buses
- Trailers

Newly added vehicles

- Heavy trucks (6x4 and 8x4)
- Medium trucks (4x2)
- Coach
- Buses
- Trailers

Annual emissions (2020)

- Heavy trucks (6x2 and 4x2)
- Heavy trucks (6x4 and 8x4)
- Medium trucks (4x2)
- Heavy-trucks (4x2)
- Coaches
- Buses
- Trailers

- 69%
- 5%
- 2%
- 5%
- 5%
- 5%
- 10%
- n.a.
What’s not covered

- Light trucks (4x2)
  - 3.5t-5t
  - All weights

- Heavy trucks (4x4)
  - All weights

- Vocational vehicles

- Heavy trucks (6x6)
  - All weights

- Heavy trucks (4* and 5 axles)
  - All weights

*excluding 8x4

Annual emissions (2020) 4%
The new targets

<table>
<thead>
<tr>
<th></th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trucks</td>
<td>43%</td>
<td>64%</td>
<td>90%</td>
</tr>
<tr>
<td>Coaches</td>
<td>43%</td>
<td>64%</td>
<td>90%</td>
</tr>
<tr>
<td>Buses</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Semi-trailers</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Drawbar trailers</td>
<td>7.5%</td>
<td>7.5%</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

Reference periods:
- Previously regulated trucks – 2019/2020
- All newly added vehicles – 2024/2025
Compliance

Zero-and low-emissions (ZLEV) factor

Manufacturer's average emissions based on actual performance in g/t-km

Manufacturer's fleet average specific CO₂ emissions in g/t-km

Compliance?
Credits/Debts?

Manufacturer's CO₂ emissions target in g/t-km

Mandated CO₂ emissions reduction (i.e., 0.57 for a 43% target)

Reference emissions based on baseline emissions in g/t-km

Compliance is measured separately for:
(i) Freight vehicles (trucks and trailers)
(ii) Passenger vehicles (buses and coaches)

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Annual mileage (km)</th>
<th>Payload (t)</th>
<th>MPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;16t</td>
<td>4-LH</td>
<td>98,000</td>
<td>7.42</td>
</tr>
<tr>
<td>5t-7.4t</td>
<td>53</td>
<td>58,000</td>
<td>1.15</td>
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</table>

Manufacturer's average emissions based on actual performance in g/t-km

Weighted by MPW

Credits/Debts?
Flexibilities – the ZLEV incentive

From 2019 – 2024
Super-credits phase:

• No minimum sales requirement

• Zero emission vehicles are *double* counted

• ZLEV factor reduces fleet emissions by up to 3%

From 2025 – 2029
Benchmark phase:

• Minimum ZLEV share of 2%

• Zero emission vehicles are *single* counted

• ZLEV factor reduces fleet emissions by up to 3% (with a share of up to 5%)
Flexibilities – The credit and debt system

- Credits can only be used for compliance up to 2025
- Credits can only be used for compliance up to 2040

Reduction trajectory line

Baseline

No credits or debts

Debts

Non-compliance

No credit/debt system
Flexibilities – vehicle trading

Conventional vehicles

- Manufacturer 1
- Manufacturer 2
- Manufacturer 3

Economically connected manufacturers

Allowed to trade vehicles

Non-connected manufacturers

Not allowed to trade vehicles

Zero-emission vehicles

- Manufacturer 1
- Manufacturer 2
- Manufacturer 3

Allowed to trade vehicles
Changes in definition: Zero-emission vehicles

Currently: \[ \leq 1\text{gCO}_2/\text{vkm} \]
(0.1\% of the emissions of a standard tractor-trailer)

Proposal: \[ \leq 5\text{gCO}_2/\text{tkm} \]
(10\% of the emissions of a standard tractor-trailer)
Changes in definitions: Long-haul vehicles

<table>
<thead>
<tr>
<th>Cab type</th>
<th>Engine power</th>
<th>Operational range</th>
<th>Sub-group</th>
<th>MPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day cab</td>
<td>All</td>
<td>All</td>
<td>Regional delivery</td>
<td>0.45</td>
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<tr>
<td>Sleeper cab</td>
<td>&lt;265kW</td>
<td>&lt;350km</td>
<td>Long-haul</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>≥265kW</td>
<td>≥350km</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Change in penalties

From 2025-2030:
Vehicles sold x €4,250 per gCO₂/tkm over

After 2030:
Vehicles sold x €6,800 per gCO₂/tkm

Missing target by 1% (for a manufacturer that sells 25,000 vehicles)

2025: €57 million

2030: €92 million
Change in penalties

**From 2025:**
Vehicles sold x €4,250 per gCO$_2$/tkm over

**After 2030:**
Vehicles sold x €6,800 per gCO$_2$/tkm

**Missing target by 1%**
(for a manufacturer that sells 25,000 vehicles)

2025: €57 million

2030: €57 million
Summary

- **ZLEV phased out from 2030**
- **Max credit life has increased**
  - 5 years → 15 years
- **Higher emission threshold for ZEVs**
  - 1 gCO₂/vkm → 5 gCO₂/tkm
- **Lower penalties**
  - €6,800 per vehicle → €4,250 per vehicle
- Manufacturers can trade vehicles

90% by 2040

100% by 2030

Lower penalties

Higher emission threshold for ZEVs

Max credit life has increased

ZLEV phased out from 2030

Manufacturers can trade vehicles
Projected emission reductions

- **Buses and coaches**
- **Medium trucks**
- **Heavy trucks**

**Increase by 2050 due to activity**:
- +60 Mt

**Decrease due to current standards**:
- -60 Mt
- -36 Mt
- -9 Mt
- -95 Mt

**Decrease due to proposed standards**:
- -77% rel.

- Tailpipe emissions (Mt CO₂)

- 2020
- 2050

-77% rel. 2020
Questions?
Contact e.mulholland@theicct.org