The CO$_2$ standard required for trucks and buses for Europe to meet its climate targets

Eamonn Mulholland
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A very brief overview of HDVs in Europe

![Diagram showing CO₂ emissions and vehicle stock in Europe. CO₂ Emissions and Vehicle Stock are represented in pie charts. CO₂ Standard indicates projected standards for 2025, 2030, 2035, and 2040, with a decrease in CO₂ emissions by 15% and 30%. The graph on the right shows projected increase by the European Commission with road freight activity (tkm), passenger car activity (pkm), and bus and coach activity (pkm) from 1995 to 2050.]
HDV emissions are on track to rise

Tailpipe CO\textsubscript{2} emissions from trucks and buses (MtCO\textsubscript{2}e)
EU Transport emission reduction targets

The European Green Deal COM(2019) 640 final:
“To achieve climate neutrality, a 90% reduction in transport emissions is needed by 2050”

Sustainable and Smart Mobility Strategy:
“By 2050 nearly all cars, vans, (...) will be zero emission” COM(2020) 789 final

Fit for 55 Proposal:
“(…) renewable and low carbon fuels should represent between 6% and 9% of the international maritime transport fuel mix in 2030 and between 86% and 88% by 2050” COM(2021) 562 final

“(…) sustainable aviation fuels should account for at least 5% of aviation fuels by 2030 and 63% by 2050” COM(2021) 561 final
## Scenario analysis

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Adopted Policies** | -15% and 30% reduction in CO$_2$ of regulated HDVs  
- Low level of ZE-HDV uptake until 2030  
- Gradual acceleration thereafter |
| **Sustainable and Smart Mobility Strategy** | -80,000 zero emission trucks in 2030  
- Nearly all zero emission buses in operation by 2050  
- Nearly all new trucks sold in 2050 are zero emission |
| **Manufacturer-Aligned Zero Emission Targets** | - Models the ambitions for ZE-HDV deployment laid out by major HDV manufacturers |
Manufacturer zero-emission vehicles pledges

<table>
<thead>
<tr>
<th>Fleet Zero Emission Vehicle Targets</th>
<th>OEM</th>
<th>2025</th>
<th>2030</th>
<th>2039</th>
<th>2040</th>
<th>2020 Sales Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAF</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%†</td>
<td>18%</td>
</tr>
<tr>
<td>Iveco</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%†</td>
<td>6%</td>
</tr>
<tr>
<td>MAN</td>
<td>-</td>
<td>50%</td>
<td>-</td>
<td>-</td>
<td>100%†</td>
<td>15%</td>
</tr>
<tr>
<td>Daimler Trucks</td>
<td>-</td>
<td>60%*</td>
<td>100%</td>
<td>-</td>
<td>100%†</td>
<td>18%</td>
</tr>
<tr>
<td>Renault Trucks</td>
<td>10%</td>
<td>35%</td>
<td>-</td>
<td>-</td>
<td>100%†</td>
<td>9%</td>
</tr>
<tr>
<td>Scania</td>
<td>10%</td>
<td>50%</td>
<td>-</td>
<td>-</td>
<td>100%†</td>
<td>18%</td>
</tr>
<tr>
<td>Volvo Trucks</td>
<td>7%</td>
<td>50%</td>
<td>-</td>
<td>-</td>
<td>100%†</td>
<td>16%</td>
</tr>
</tbody>
</table>

*Daimler’s target for 2030 is ‘up to 60%’
†The target set for 2040 commits to ‘fossil-free’ vehicles, not zero-emission vehicles
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| **European Climate Law** | -Increases ZE-HDV deployment in line with 98% reduction in emissions |
Compliance levers

Efficiency Improvements

Adopted Policies

Sustainable and Smart Mobility Strategy
Manufacturer-Aligned Zero Emission Targets
European Climate Law

Efficiency improvement in line with the CO₂ standards
3% annual efficiency improvements

ZEV adoption

Zero-emission vehicle sales share

- European Climate Law
- Manufacturer Aligned Zero Emission Targets
- Sustainable and Smart Mobility Strategy
- Adopted Policies
Results – Emissions trajectory

Historic Tailpipe CO₂ emissions (MtCO₂e)

- European Climate Law
- Manufacturer Aligned Zero Emission Targets
- Sustainable and Smart Mobility Strategy
- Adopted Policies

+8% rel. 2019
-78%
-96%
-98%
Corresponding 5-year targets
Conclusions and policy recommendations

• Truck and bus emissions are on track to **increase by 8% 2050**, despite the CO₂ standards

• Revise the CO₂ reduction target for 2030 from 30% **to at least 60%**

• Introduce CO₂ reduction targets of at least **90% for 2035 and 100% for 2040**

• Extend the scope of the regulation to include **all sales of HDVs**, to the extent feasible
Questions?
Contact e.mulholland@theicct.org
ZEV Adoption

Fast Transition

- Light and Medium trucks; Buses

Medium Transition

- Urban delivery; Regional delivery

Slow Transition

- Long-haul delivery; Construction

Legend:
- European Climate Law
- Manufacturer Aligned Zero Emission Targets
- Sustainable and Smart Mobility Strategy
- Adopted Policies
Stock Modelling

Sales
- IHS Markit (2005 – 2020)

Stock
- ACEA Vehicles in Use
- Eurostat (by age profile)
- Comext (imports and exports)

Mileage
- TRACCS
- 2019/1242 reference values

Energy Consumption
- EEA (Limited to vehicles covered by 2017/2400)
- Own Analysis
Historic Freight Activity

Source: EU Transport in Figure: Statistical Pocketbook (2021)

Source: Eurostat (2021): [demo_pjan], [road_go_ta_tott], [SDG_10_10]

Elasticity of 0.5
Survival Profiles

Buses

Trucks

Increasing GDP/capita
Stock Modelling - Results

Trucks

- Age Profile
  - 0-5
  - 5-10
  - >10

ACEA Reported Stock

Own Analysis

Buses

- Stock of Vehicles
  - 0
  - 100,000
  - 200,000
  - 300,000
  - 400,000
## Cumulative Emissions

<table>
<thead>
<tr>
<th>Scenario</th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
<th>2030</th>
<th>2050</th>
<th>Cumulative emission reduction by 2050 compared to Adopted Policies (MtCO$_2$e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopted Policies</td>
<td>-30%</td>
<td>-30%</td>
<td>-30%</td>
<td>+4%</td>
<td>+8%</td>
<td>-</td>
</tr>
<tr>
<td>Sustainable and Smart Mobility Strategy</td>
<td>-38%</td>
<td>-52%</td>
<td>-77%</td>
<td>-3%</td>
<td>-78%</td>
<td>1,897</td>
</tr>
<tr>
<td>Manufacturer Aligned Zero Emission Targets</td>
<td>-57%</td>
<td>-92%</td>
<td>-100%</td>
<td>-10%</td>
<td>-96%</td>
<td>3,080</td>
</tr>
<tr>
<td>European Climate Law</td>
<td>-81%</td>
<td>-95%</td>
<td>-100%</td>
<td>-19%</td>
<td>-98%</td>
<td>3,498</td>
</tr>
</tbody>
</table>

New HDV CO$_2$ target (vs. 2019/2020)

HDV CO$_2$e emissions savings (vs. 2019)