Decarbonizing EU transport: the role of CO$_2$ standards for passenger cars and vans

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Background

GHG emissions in the EU

*pending agreement with the European Parliament

*historical and targeted

Emissions sector or subsector
- Non-transport sectors
- Motorcycles, rail, and other transportation
- International aviation
- Domestic aviation
- International marine navigation
- Domestic marine navigation
- Trucks and buses
- Passenger cars and vans

Potential 2030 emission reduction target of 55% compared to 1990 levels

Transport 2050 emission reduction target of 90% compared to 1990 levels

EU Green Deal 2050 net-zero emission target

Potential negative emissions required to offset transport

*pending agreement with the European Parliament
Background

GHG emissions in the EU
historical and targeted

Transport sector emissions remain a key challenge in achieving the EU’s proposed climate targets.

*pending agreement with the European Parliament*
Policy scenarios

We consider:

• Type approval targets
• ZLEV benchmarks
• PHEV uptake for passenger cars
• Real-world CO₂ gap

Data labels: % reduction from 2020/21 target levels
Methods

Adopted policies scenario

- OEMs meet fleet-wide type approval targets
- OEMs exceed ZLEV benchmarks by 5% for cars
- Maintain current ZEV:PHEV ratio for cars
- 1% annual growth in real-world CO₂ gap to 2030
### Adopted policies scenario

- OEMs meet fleet-wide type approval targets
- OEMs exceed ZLEV benchmarks by 5% for cars
- Maintain current ZEV:PHEV ratio for cars
- 1% annual growth in real-world CO$_2$ gap to 2030

### New policy scenarios

#### Passenger cars and vans

<table>
<thead>
<tr>
<th>100% ZEV target</th>
<th>Annual ICE efficiency improvement*</th>
<th>100% ZEV target</th>
<th>Annual ICE efficiency improvement (post-2025)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lower ambition</strong></td>
<td></td>
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</tr>
</tbody>
</table>
| 2040            | **Cars**: 0.9% to 2025, then 2.3% to 2035  
                 | **Vans**: 0.4% to 2025, then 2.0% to 2035 | 2050 |  
                 | MDTs and buses: 2.9% to 2040  
                 | HDTs: 1.9% to 2040 |
| **Moderate ambition** |                                   |                 |                                             |
| 2035            | **Cars**: 4.3% to 2025, then 1.0% to 2030  
                 | **Vans**: 2.9% to 2025, then 0.6% to 2030 | 2045 |  
                 | MDTs and buses: 4.3% to 2035  
                 | HDTs: 3.7% to 2035 |
| **Higher ambition** |                                   |                 |                                             |
| 2030            | **Cars**: 5.7% to 2025  
                 | **Vans**: 1.2% to 2025 | 2040 |  
                 | MDTs and buses: 8.4% to 2030  
                 | HDTs: 7.2% to 2030 |

#### Trucks and buses

*For LDVs, ICE efficiency improvements are shown in reference to the WLTP test cycle. The gap between WLTP and real-world tailpipe CO$_2$ emissions is accounted for separately.

MDT = medium-duty truck; HDT = heavy-duty truck
**CO₂ emission trajectories**

**LDVs**
- Relatively strong decarbonization by 2050 in all new policy scenarios, owing to 100% ZEV targets

**HDVs**
- Slower ZEV uptake drives wider spread in 2050 emissions

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**Data labels:** % reduction from 2020

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**Results**
Road transport in 2030

- Up to 11% reduction by 2030 relative to 1990

Data labels: % reduction from 1990 (absolute reduction from 1990)
Road transport in 2030

- Up to 11% reduction by 2030 relative to 1990

- Complementary policies and/or other sectors would need to reduce emissions by an additional 260–330 Mt CO₂e
Results

LDVs only in 2030

- Emission savings are 4.8 times greater in higher vs. lower ambition scenario in 2030

![Graph showing CO2 emission savings compared to adopted policies](image)

Data labels:
- % reduction from 2020
- Incremental emission savings
Results

LDVs only in 2030

- Emission savings are 4.8 times greater in higher vs. lower ambition scenario in 2030

- LDVs would achieve a 20% reduction from 1990 levels by 2030 in higher ambition scenario

(right panel plus 27 Mt CO₂ savings from adopted policies)
Transport sector in 2050

*based on an ambitious yet feasible emissions trajectory*

<table>
<thead>
<tr>
<th>Subsector</th>
<th>2018 emissions Mt CO₂</th>
<th>2050 projections Mt CO₂</th>
<th>2050 ambition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine navigation</td>
<td>153</td>
<td>47</td>
<td>75% reduction from 2008 levels by 2050</td>
</tr>
<tr>
<td>Aviation</td>
<td>143</td>
<td>56</td>
<td>50% reduction from 2005 levels by 2050</td>
</tr>
<tr>
<td>Motorcycles</td>
<td>9</td>
<td>0</td>
<td>Net zero by 2050</td>
</tr>
<tr>
<td>Rail</td>
<td>4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Other road transportation</td>
<td>&lt;1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
Transport sector in 2050

- No scenario achieves the EU Green Deal’s 90% reduction target
- This assumes ambitious mitigation in other transport subsectors (e.g., ships, planes, rail)
- Even if target is achieved, negative emissions will be needed in non-transport sectors to reach net-zero
Cumulative CO\textsubscript{2} emissions savings by 2030 and 2050

- Cumulative 2021–2030 emission savings are 5.1 (LDVs) and 7.5 (HDVs) times greater in higher vs. lower ambition scenario
- By 2050, moderate ambition scenario saves ~1 Gt CO\textsubscript{2} more than lower ambition, and higher ambition saves additional ~0.5 Gt CO\textsubscript{2} compared to moderate ambition (LDVs)

<table>
<thead>
<tr>
<th></th>
<th>Passenger cars and vans</th>
<th></th>
<th>Trucks and buses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2030</td>
<td>2050</td>
<td>2030</td>
</tr>
<tr>
<td>Lower ambition</td>
<td>40</td>
<td>2,040</td>
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<tr>
<td>Moderate ambition</td>
<td>130</td>
<td>2,970</td>
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<tr>
<td>Higher ambition</td>
<td>200</td>
<td>3,520</td>
<td>30</td>
</tr>
</tbody>
</table>

Cumulative tailpipe CO\textsubscript{2} emissions savings from 2021 to 2030 and 2021 to 2050 under new policy scenarios relative to the adopted policies scenario in million tonnes
Recommendations

LDV type approval targets
• Strengthen 2025 targets to drive near-term ICE efficiency improvements and ZEV uptake
• Set 2030 targets as close to 0 gCO₂/km as feasible

ICE efficiency
• Add a CO₂ emissions cap for ICE vehicles to prevent backsliding

Real-world CO₂ gap
• Expedite the Commission’s timeline for real-world enforcement of CO₂ emissions (i.e. adjust manufacturers’ average CO₂ emissions based on real-world data)

PHEVs
• Use real-world data to adjust the utility factor assumed in the regulation
• At the member state level, only incentivize PHEV models designed for electric driving (i.e. capable of rapid charging with limited combustion engine power)
Questions?
Contact josh@theicct.org or s.diaz@theicct.org
Appendix
Activity growth assumptions
based on EU Reference Scenario 2016