An European view on zero-emission heavy goods transport

ITF Workshop on Low-and zero-emission HDVs
February 17-18, 2020
Paris (France)
Overview

Where we stand: current EU legislation

Where to go:

- Implementing measures
- Next regulatory steps
- Main issues at stake
Road charges: proposal for the Eurovignette Directive

- Extension of scope to all vehicles with 4+ wheels
- Phasing out of time-based user charges (vignettes) for HDVs (HGVs and buses/coaches) by end 2023
- Variation of the infrastructure charge for HDVs based on certified CO2 emissions (instead of variation based on Euro class)
- Very low road charges for low-emission (LEV) & zero-emission (ZEV) heavy-duty vehicles

Final negotiations in Council and European Parliament are ongoing.
Amendment of Directive 2009/33 on the promotion of clean, energy-efficient road transport vehicles

Objectives:

• Improve effectiveness of public procurement
• Create additional demand/market for clean vehicles and drive innovation, complementing emission standards

Amendments:

• Extend scope to cover all relevant public procurement practices
• Minimum procurement targets at MS level for 2025 and 2030
  • clean LDV: CO₂/air pollutant emission threshold
  • clean HDV: alternative fuels based (CO₂ emission based once standards in place) and ZEVs (mainly relevant for public transport buses)
Alternative Fuels Infrastructure Directive

Alternative Fuels: Electricity, hydrogen, CNG, LNG

- Requires Member States to develop national policy frameworks for the market development of alternative fuels and their infrastructure;

- Foresees the use of common technical specifications for recharging and refuelling stations;

- Paves the way for setting up appropriate consumer information on alternative fuels, including a clear and sound price comparison methodology

=> Currently being revised: e.g. ‘binding’ national infrastructure requirements (?), better consideration of HDVs,...
Batteries Initiative

- Batteries are a key enabler for the clean energy transition
- Industry led initiative, bringing stakeholders together in order to establish a complete value-chain for the development and manufacturing of advanced batteries in the EU, esp. as regards cell manufacturing
- Crucial to move quickly from research to testing and demonstration,
- Additional EUR 200 mn will is allocated to batteries research and innovation under research programme Horizon 2020 (2018-2020)
- Action Plan adopted as part of Mobility Package III
CO$_2$ Emission Standards for Heavy Duty Vehicles
Regulating CO₂ emissions from heavy-duty vehicles

Step-wise approach

- **VECTO simulation tool** to determine fuel consumption and CO₂ emissions from new HDVs placed on the EU market
- **Commission Regulation (EU) 2017/2400**
  - **Certification regulation**: Procedure to calculate CO₂ emissions and fuel consumption with VECTO for new HDVs placed on the EU market
- **Regulation (EU) 2018/956**
  - **Monitoring & reporting legislation**: VECTO CO₂ emissions & fuel consumption from every new HDV registered in the EU to be monitored & reported to EC
- **Regulation HDV CO₂ standards**
  - **CO₂ emission standards** on the basis of certification values

**ongoing**

**2019**
- Buses at a later stage

**2019**
- Data available in 2021
HDV: CO2 Targets Regulation (EU) 2019/1242

Binding reduction targets for fleets of new lorries with TPMLM > 16 t of each manufacturer:

- **15%** in **2025**
- **30%** in **2030**

as compared to the 2019 baseline (= average of all manufacturers).

- Sufficient lead time combined with the possibility of early uptake of existing fuel-efficient technologies

- **Unit:** g CO₂/t km
- Tailpipe based approach
HDV: Incentive mechanism for ZEV/LEV

• **Type of incentives:**
  - **Super-credits until 2024**, subject to a cap (for early adoption credits facilitating compliance in 2025)
  - One-way/bonus-only crediting system based on a **2% benchmark from 2025 onwards**
  - 2030 EZV/LEV benchmark to be set by the 2022 review
  - Scope covering both ZEV and LEV: technology-neutral
  - Also smaller ZE trucks with TPMLM < 16t not regulated yet for their CO2 emissions contribute to incentives

• **Definition LEV:**
  - Emissions below 50% of the reference CO$_2$ emission of the sub-group to which the vehicle belongs
Penalties for exceedances of targets

**HDV:**
- **EUR 4250** per gCO$_2$/tkm in 2025
- **EUR 6800** per gCO$_2$/tkm in 2030

(LDV: EUR 95 per gCO$_2$/km in 2025)

Penalties for LDV & HDV established on the basis of equivalence regarding the effect on lifetime CO$_2$ resulting from exceedances. Significantly above the marginal cost of meeting the targets, and therefore deterrent for manufacturers.
## ZEV incentives: overview

Benchmarks (ZEVs count as 2 above these thresholds)

<table>
<thead>
<tr>
<th></th>
<th>Cars</th>
<th>Vans</th>
<th>Lorries</th>
</tr>
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<tbody>
<tr>
<td><strong>Up to 2025</strong></td>
<td>None (super-credits)</td>
<td>None (super-credits)</td>
<td>None (super-credits)</td>
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<tr>
<td><strong>2025 – 2029</strong></td>
<td>15%</td>
<td>15%</td>
<td>2%</td>
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<tr>
<td><strong>As from 2030</strong></td>
<td>35%</td>
<td>30%</td>
<td>tbd</td>
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</table>
To Dos: LEV & ZEV type-approval & certification

Definitions:

- ZEV: no combustion engine or less than 1 gCO2/kWh* at type-approval of engine (=> no VECTO certification of vehicle necessary for regulatory compliance, only for user information!)
- LEV: CO2 Emissions below 50% of the reference CO2 emission of the sub-group to which the vehicle belongs (=> VECTO certification of vehicle necessary for regulatory compliance!)

To Dos pollutant emission & component type-approval

- Pollutant emission type-approval of hydrogen internal combustion engines to be introduced into UNECE R 49 (in particular PEMS test)
- Nice-to-have: specific PEMS testing for hybrids, battery durability & other parameters,...

* To accommodate e.g. hydrogen ICE
To Dos: VECTO certification of electrified vehicles

- VECTO certification of vehicles with electrified powertrain (pure and hybrid electric) currently not possible
- To be made available in type-approval legislation until end of 2021
- Including certification of electric consumption and electric driving range
- Technical challenge: handling of different hybrid technologies (parallel, serial, ...); flexible accommodation of innovative concepts
- "Component based" ⇔ "Power-pack based"

**VECTO Simulation**

- Hybrid electric vehicles:
  - charge depleting/sustaining CO2 emissions + electric driving range + utility factor
    ⇒ regulatory specific CO2 emissions
- Utility factor: charging scenarios, in particular for long-haul transport?
Review of Regulation (EU) 2019/1242

- Article 15: Commission proposal tentatively scheduled for 2022
- Review of fleet CO2 emission reduction targets considering the deployment of ZEV & LEV
- Assessment of incentive scheme for ZEV & LEV, possible consideration of electric driving range,…
- Assessment of the roll-out of the necessary recharging/refuelling infrastructure
- Assessment of including for compliance the contribution of sustainable bio- and e-fuels to the reduction of CO2 emissions from HDVs
- Possibility of developing a method for determining and reporting the full life cycle CO2 emissions of HDVs (=> battery production etc.)
A lot of assessments... One has to think from the end

Clear political objective: Decarbonisation of road transport by 2050!

- Can sustainable bio- and e-fuels contribute significantly to CO2 reductions in road transport considering possible supply and the demand of other sectors in a ‘decarbonised’ global economy?

- How will we use lorries vs. rail? To what extent will long-haul operation be relevant for lorries? Future performance requirements for ZEV determine criteria for incentives (e.g. consideration of electric driving range) today!

- How can ZEV design, infrastructure development and hydrogen/electricity production be aligned? What about technological neutrality?
**ZEV: Regulatory tech. neutrality ↔ Infrastructure ??**

**Likely Technologies**

<table>
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<tr>
<th>LDV</th>
<th>HDV</th>
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<tr>
<td>Electrification (battery)</td>
<td>Electrification (battery)</td>
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<tr>
<td>(road-to-rail)</td>
<td>Electrification (catenary)</td>
</tr>
<tr>
<td>(hydrogen)</td>
<td>Hydrogen (fuel cell + ICE)</td>
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<tr>
<td></td>
<td>Road-to-rail</td>
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<td>(Synthetic fuels if cost + sustainability issues are solved)</td>
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- How can we reconcile regulatory flexibility for the technologically unknown with the need to develop fast concrete infrastructure?
- Are our solutions globally scalable?
Two ‘high level’ conclusions

1. Decarbonisation of road transport requires a toolbox of different instruments and mainstreaming into a wide range of regulatory and non-regulatory measures

2. Many answers as ‘thought from the end’ will not be known by 2022

=>

The review of HDV CO2 Standards Regulation (EU) 2019/1242 is possibly the end of a beginning, but regulatory elements will need continuous adjustments for following developments from outside the road transport sector.