An European view on zero-emission heavy goods transport

ITF Workshop on
Low-and zero-emission HDVs
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Overview

Where we stand: current EU legislation

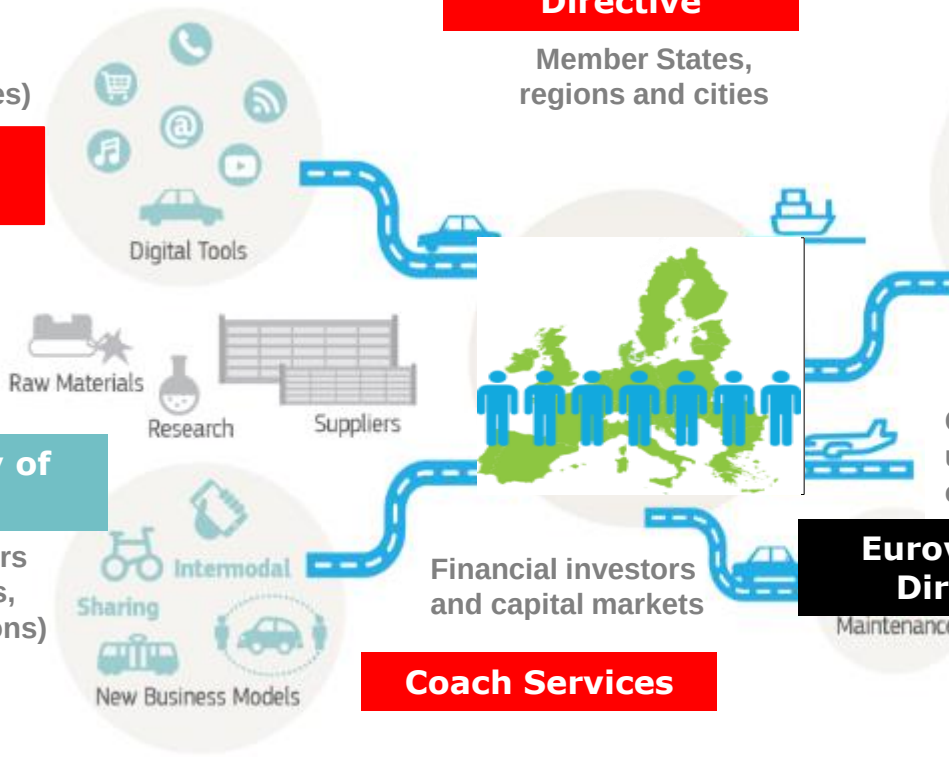
Where to go:

- Implementing measures

- Next regulatory steps

- Main issues at stake

Mobility Packages I-III: an integrated approach



Automotive industry (cars, trucks and buses)

Batteries Initiative

Suppliers in the value chains (materials, equipment, batteries, ...)

Fuel efficiency of tyres

Innovative actors (digital services, mobility solutions)

Clean Vehicles Directive

Member States, regions and cities

Financial investors and capital markets

Coach Services

Infrastructure promoters and project developers

Action Plan Alternative Fuels Infrastructure

CO_2 emission standards for HDV

Citizens, consumers, users and drivers at the centre

Eurovignette Directive

New CO_2 standards for cars and vans

2016 Clean Energy Package incl. RED-2 (low-carbon fuels)

2016 European Low-Emission Mobility Strategy

European Commission

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: CO_2/air pollutant emission threshold
  - clean HDV: alternative fuels based (CO_2 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 develop EU-wide approach 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 CO_2 emissions from heavy-duty vehicles
step-wise approach

Commission Regulation (EU) 2017/2400

Regulation (EU) 2018/956

Regulation HDV CO2 standards

- **VECTO simulation tool** to determine fuel consumption and CO_2 emissions from new HDVs placed on the EU market
- **Certification** regulation: Procedure to calculate CO_2 emissions and fuel consumption with VECTO for new HDVs placed on the EU market
- **Monitoring & reporting** legislation: VECTO CO_2 emissions & fuel consumption from every new HDV registered in the EU to be monitored & reported to EC
- **CO_2 emission standards** on the basis of certification values

ongoing — **2019** — **2019**

Buses at a later stage — **data available in 2021**

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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 CO_2/t km
- Tailpipe based approach

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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)

	Cars	Vans	Lorries
Up to 2025	None (super-credits)	None (super-credits)	None (super-credits) *
2025 – 2029	15%	15%	2%
As from 2030	35%	30%	tbd

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 CO_2 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 accomodate 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

LDV	HDV
Electrification (battery)	Electrification (battery)
(road-to-rail)	Electrification (catenary)
(hydrogen)	Hydrogen (fuel cell + ICE)
	Road-to-rail
	(Synthetic fuels if cost + sustainability issues are solved)

- How can we reconcile regulatory flexibilty 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.