Heavy-duty vehicles CO_2 emissions: EU policy context

Decarbonisation of Heavy Duty Vehicle Transport:
Zero Emission Heavy Goods Vehicles

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Carlos Serra

Road transport – DG CLIMA – European Commission

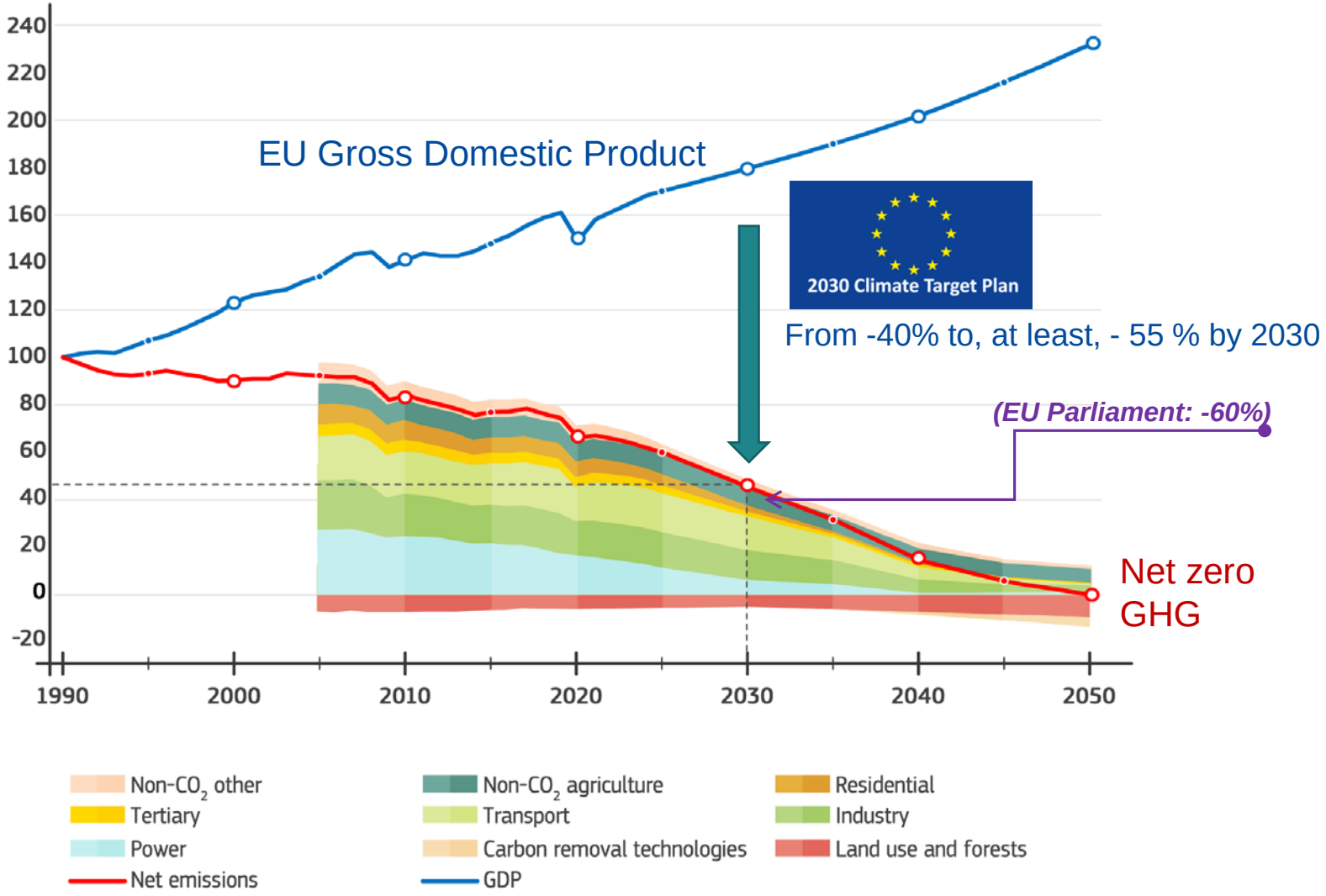
EU HDV CO_2 emissions policy context

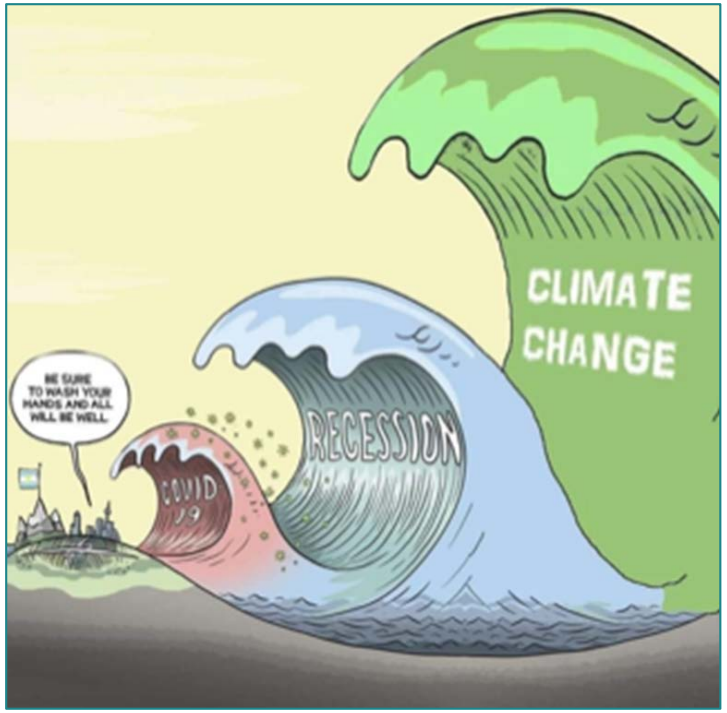
- Climate overview
- Where we stand: current CO_2 emission legislation for HDV
  - ✓ Targets
  - ✓ Zero-emission vehicles incentives
  - ✓ Governance provisions
- Where to go:
  - ✓ Next regulatory steps
  - ✓ To-do's
  - ✓ Main issues at stake

Climate overview

Ambitious approach to climate neutrality by 2050

EU pathway to 2050 climate neutrality





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How: Legislative framework

- Commission to include the 2030 Climate Target Plan into the Climate Law
- Updating sectoral legislation under European Green Deal Commitment by June 2021

No HDV CO_2 standards revision expected for 2021

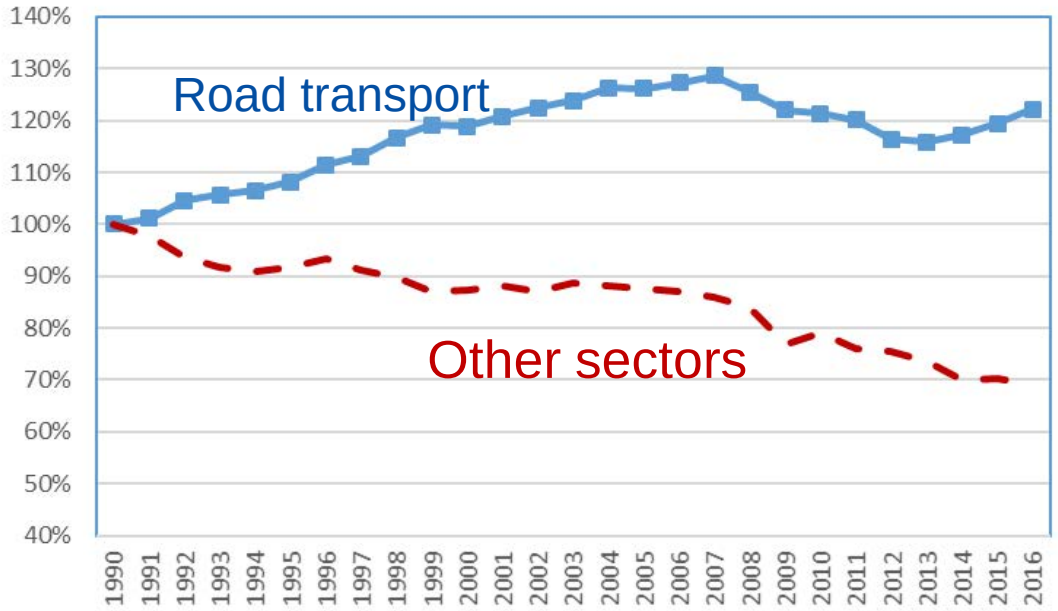
- EU Emissions Trading System / Market Stability Reserve
- Carbon Border Adjustment Mechanism
- Land use, land use change and forestry
- Effort Sharing
- Renewable Energy
- Energy Efficiency/Buildings
- Energy Taxation Directive

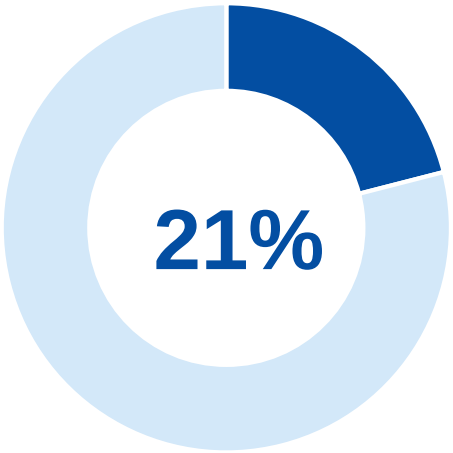
- **LDV** CO_2 efficiency standards
- Sustainable fuels (shipping, aviation)
- Fuel Quality Directive
- Trans-European Networks (TEN-T, TEN-E)
- Alternative Infrastructure Directive (AFID)
- Fluorinated gases
- State Aid guidelines

Where we stand: current CO_2 EU legislation

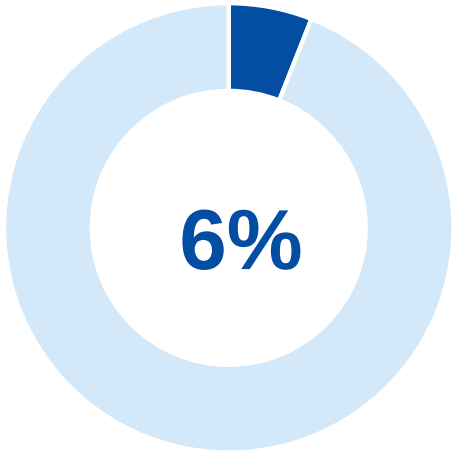
CO_2 emission standards for HDV: Regulation (EU) 2019/1242

EU transport CO_2 emissions figures





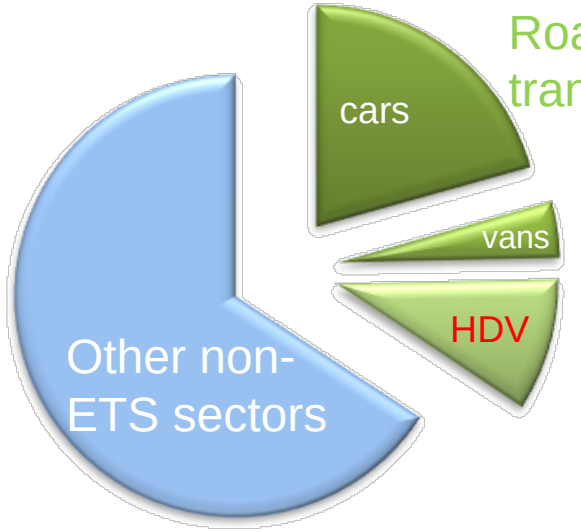
Road transport



HDV

Of total EU CO_2 emissions

2015 Emissions in non-ETS sectors



Road transport: 34% of non-ETS emissions in 2015

Despite some improvements in fuel consumption efficiency in recent years, **HDV CO_2 emissions are still rising**, mainly due to increasing road freight traffic.

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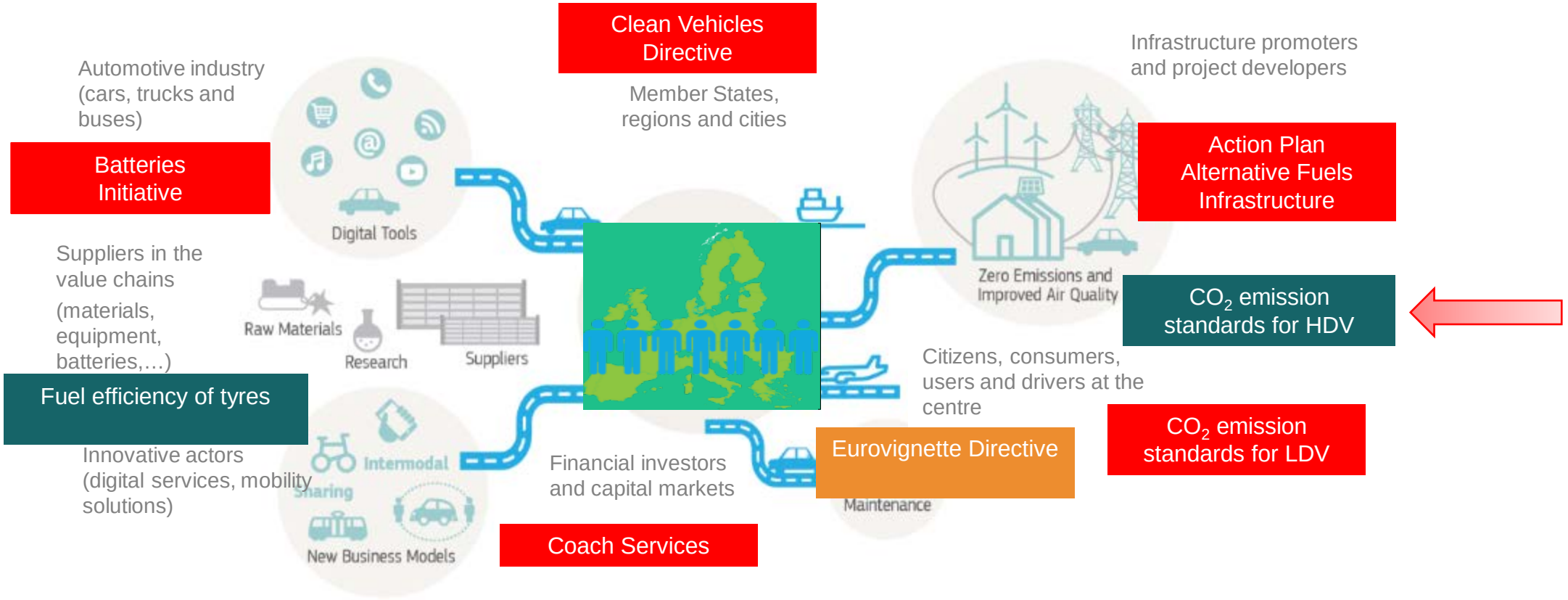
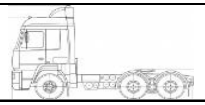
Mobility Packages I-III: an integrated approach



Regulation (EU) 2019/1242: What HDV are regulated?

- Trucks are divided within Regulation 2019/1242 into 18 different vehicle groups
- Scope: As a first step, the CO_2 emission standards cover only some large truck categories: vehicle groups 4,5,9 and 10 with a technically permissible maximum laden mass (TPMLM) > 16t
- Vocational vehicles (garbage trucks, etc.), smaller trucks, buses, coaches… are excluded for the moment of the regulatory scope

Vehicle group	Axle and chassis configuration	Without trailer
4	4x2 Rigid	
5	4x2 Tractor	
9	6x2 Rigid	
10	6x2 Tractor	

4 categories summing up to 2/3 of the total CO_2 emissions from HDVs

Vans up to 3.5 ton are not HDV

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Vehicle groups for vehicles of category N (trucks)

Description of elements relevant to the classification in vehicle groups			Vehicle group	Allocation of mission profile and vehicle configuration						
Axle configuration	Chassis configuration	Technically permissible maximum laden mass (tons)		Long haul	Long haul (EMS)	Regional delivery	Regional delivery (EMS)	Urban delivery	Municipal utility	Construction
4x2	Rigid lorry	> 3,5 –7,5	(0)							
	Rigid lorry (or tractor)**	> 7,5 – 10	1			R		R		
	Rigid lorry (or tractor)**	> 10 – 12	2	R+T1		R		R		
	Rigid lorry (or tractor)**	> 12 – 16	3			R		R		
	Rigid lorry	> 16	4	R+T2		R		R	R	
	Tractor	> 16	5	T+ST	T+ST+T2	T+ST	T+ST+T2	T+ST		
	Rigid lorry	> 16	4v***						R	R
	Tractor	> 16	5v***							T+ST
4x4	Rigid lorry	> 7,5 – 16	(6)							
	Rigid lorry	> 16	(7)							
	Tractor	> 16	(8)							
6x2	Rigid lorry	all weights	9	R+T2	R+D+ST	R	R+D+ST		R	
	Tractor	all weights	10	T+ST	T+ST+T2	T+ST	T+ST+T2			
	Rigid lorry	all weights	9v***						R	R
	Tractor	all weights	10v***							T+ST
6x4	Rigid lorry	all weights	11	R+T2	R+D+ST	R	R+D+ST		R	R
	Tractor	all weights	12	T+ST	T+ST+T2	T+ST	T+ST+T2			T+ST
6x6	Rigid lorry	all weights	(13)							
	Tractor	all weights	(14)							
8x2	Rigid lorry	all weights	(15)							
8x4	Rigid lorry	all weights	16							R
8x6 8x8	Rigid lorry	all weights	(17)							

* EMS - European Modular System
** in these vehicle classes tractors are treated as rigid lorries but with specific curb weight of tractor
*** sub-group "v" of vehicle groups 4, 5, 9 and 10: these mission profiles are exclusively applicable to vocational vehicles

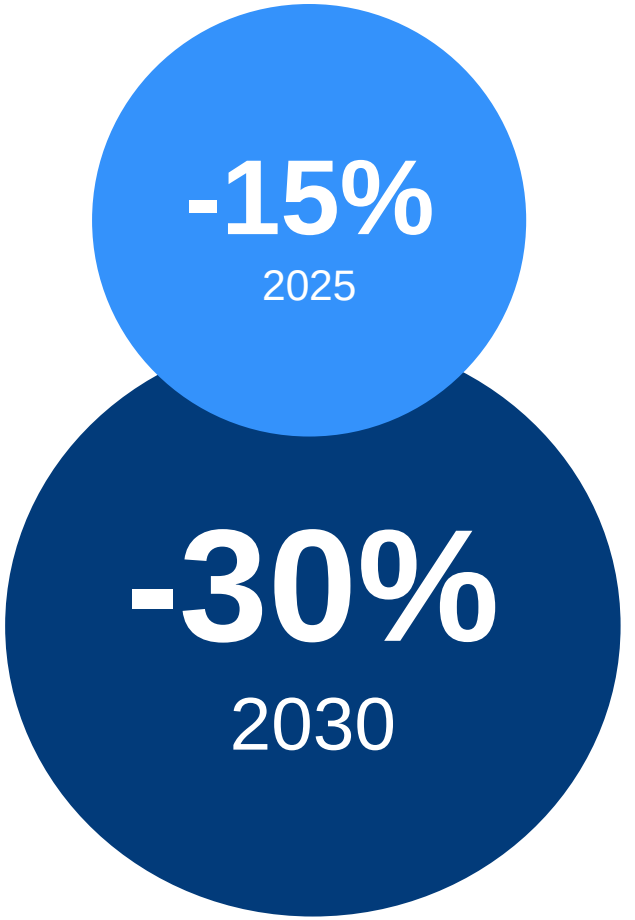
T	=	Tractor	
R	=	Rigid lorry & standard body	
T1, T2	=	Standard trailers	
ST	=	Standard semitrailer	
D	=	Standard dolly".	

4 categories summing up to 2/3 of the total CO_2 emissions from HDVs

Regulation (EU) 2019/1242: CO_2 targets

Binding CO_2 reduction targets for fleets of new trucks for the regulated HDV categories

- Reduction as compared to the 2019 baseline (= average of all manufacturers).
- For each manufacturer ('specific CO_2 emissions target')
- Sufficient lead time combined with the possibility of early uptake of existing fuel-efficient technologies
- **Unit:** g CO_2/t km
- Tailpipe based approach. Based on type-approval values
- Full flexibility for manufacturers to balance emissions between the different groups of vehicles within their portfolio, including ZEV contributions, even from non-regulated vehicle categories



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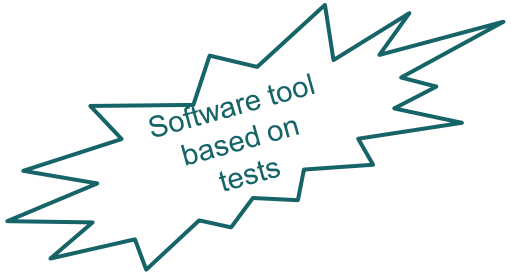
Regulation (EU) 2019/1242: What emissions are regulated?



- Step-wise approach
- Compliance with targets verified on basis of emissions determined at type approval
- HDV type approval based on **VECTO** simulation tool as a 'virtual laboratory' to determine fuel consumption and CO2 emissions
- Only for newly registered HDVs placed on the EU market
- **Certification** regulation: Procedure to calculate CO_2 emissions and fuel consumption with VECTO

VECTO
Vehicle Energy Consumption Calculation Tool

Certification regulation

Monitoring and reporting

- CO_2 emission standards
- Setting of baseline

2017 2018 2019

First official data to be published in 2021

(Buses and coaches at a later stage)

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Incentive mechanism for ZEV/LEV

- No ZEV / LEV quotas currently
- Scope covering both ZEV and LEV: technology-neutral
- Also smaller ZE trucks with TPMLM < 16t not regulated yet for their CO_2 emissions can contribute to incentives! (ZE buses and coaches excluded)
- **Until 2024:**
  - Super-credits subject to a 3% CO_2 reduction cap (for early adoption credits facilitating compliance in 2025).
  - ZEV counted as two vehicles. LEV *up* to two vehicles according to: its specific CO_2 emissions and the low-emission threshold of the vehicle sub-group to which the vehicle belongs
- **From 2025:**
  - One-way/bonus-only crediting system based on a 2% benchmark from 2025 onwards
- 2030 ZEV/LEV benchmark to be set by the next Regulatory review in 2022

Low-emission heavy-duty vehicle

LEV

Emissions below 50% of the reference CO_2 emission of the sub-group to which the vehicle belongs (other than ZEV)

Zero-emission heavy-duty vehicle

ZEV

No combustion engine or emissions less than 1 gCO2/kWh at type-approval of engine*

Governance provisions

CO_2 emissions reference baseline

- 2019; review in 2022
- Avoid inflated reference CO_2 emissions baseline
- Setting criteria for determining undue increases and how they should be corrected

Real-world CO2 emissions

- Ensure type-approval certification procedures (VECTO) result in CO_2 emission values representative of real-world emissions
- Prevent an increase of the **gap** between real and certified emission values
- 2027: Mechanism to adjust concerning 2030 specific manufacturer's emissions, if needed

Penalties (€/gCO_2/tkm)

- 2025: €4,250
- 2030: €6,800
- Above the marginal cost of meeting the targets → deterrent for manufacturers

In-service verification

- Type-approval certification validation of CO_2 emission values in vehicles in use
- Commission to lay down principles and procedures. Verification by Member States (type-approval)

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Where to go

Next regulatory steps: review of CO_2 emission standards for HDV, Regulation 2019/1242

To-do’s

Main issues at stake

Review of Regulation (EU) 2019/1242

Art 15 - Reg 2019/1242

Review proposal for 2022

- Assessment based on cost-efficient CO_2 reduction technical potential

CO_2 emission targets review

- Overall ambition assessment for 2025, 2030
- Possible targets for 2035 and 2040

Review of existing targets

2025 & 2030

New binding targets

- 2025 and beyond (depending on HDV categories)

ZEV / LEV

- Key role for 2030
- Deployment assessment and potential

Incentives

- Evaluation of current incentive mechanism
- Assessment to stimulate ZEV/LEV market uptake

Bio- and e-fuels

- Including hydrogen
- Assessment of ccontributions to decarb.
- CO_2 credits for manufacturers?
- Life-cycle assessment of CO_2 emissions?

VECTO
Vehicle Energy Consumption Calculation Tool

- Assessment to ensure tool updating
- More certificated HDV categories

CO_2 Standards scope extension

- Smaller trucks' categories
- City buses and coaches
- Trailers and semi-trailers
- Vocational vehicles
- EMS concept
- Pooling

Refueling infrastructure

- Assessment within revised AFID (Alternative Fuels Infrastructure Directive)

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To-Do's: VECTO certification of vehicles

- Buses, coaches, smaller trucks and vehicles with electrified powertrain (pure and hybrid electric) to be included into VECTO certification
- Hybrid electric vehicles:
  - charge depleting/sustaining CO_2 emissions + electric driving range + utility factor
  - regulatory specific CO_2 emissions
- To be made available in type-approval legislation including certification of electric consumption and electric driving range
- Hydrogen internal combustion engines to be introduced into UNECE-R 49 pollutant emission type-approval (in particular PEMS test)
- Technical challenge: handling of different hybrid technologies (parallel, serial, …); flexible accommodation of innovative concepts
- Utility factor: charging scenarios, in particular for long-haul transport?

Main issues at stake

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?
- Synthetic / renewable / e- fuels / ? Yes if cost + sustainability issues are to be solved
- How will we use truck vs. rail? To what extent will long-haul operation be relevant for trucks?
- How can ZEV design, infrastructure development and hydrogen/electricity production be aligned?
- ZEV quotas? On which categories?
- Technological neutrality vs need of investment certainty
- Are our solutions globally scalable?
- Role of lighthouse projects (e.g. ‘hydrogen valleys’ within main EU corridors)

Conclusions

- Decarbonisation of HDV requires a toolbox of different instruments and mainstreaming into a wide range of regulatory and non-regulatory measures
- Future: No single silver bullet for all transport modes; but clean hydrogen seems crucial for decarbonising heavy-duty transport
- To prepare for a transition towards climate neutrality post 2030, zero- and low-carbon technologies will need to be kick-started by right now
- The review of HDV CO2 Standards Regulation by 2022 is possibly only the end of a beginning, but regulatory elements will need continuous adjustments for following technological developments

Timeline

2019
Regulation 2019/1242 force entry

2022
HDV CO_2 standards review

2025
-15% CO_2 compared to 2019

2027
Manufacturer's targets adjustment? (real-world assessment)

2030
-30% CO_2 compared to 2019

2035
-XX% CO_2

2050


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Thank you

carlos.serra@ec.europa.eu

https://ec.europa.eu/clima/policies/transport/vehicles/heavy_en

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