CLEPA
European Association of Automotive Suppliers

POSITION PAPER

CO2 Standards for Heavy-Duty Vehicles

For a revised regulation that incentivises zero- and low-emission technology

Contents

Executive Summary

CLEPA, the European Association of Automotive Suppliers, supports the Paris Agreement and the EU Green Deal objective of achieving carbon neutrality by 2050. Automotive suppliers stand ready to contribute to a reliable, technology-open, and ambitious regulatory framework to achieve these objectives.

As an enabler of smart, safe and sustainable mobility, CLEPA is a key stakeholder in the automotive value chain and supports the review of the framework for the reduction of carbon dioxide (CO2) emissions from heavy-duty vehicles (HDVs) in the European Union.

The objective of the CO2 regulation for HDVs is to contribute to the 'Fit for 55' targets in 2030 and carbon neutrality in 2050 in the most cost-effective manner, supporting competitiveness, employment and consumers.

To support this objective, CLEPA recommends the following:

- Standards should account for maturity and feasibility of technologies and provide sufficient lead time for changes to be introduced.

- Zero-emission vehicle (ZEV) technologies, including battery electric vehicles (BEVs), hydrogen fuel cell electric vehicles (FCEVs) and hydrogen engines, will be essential in meeting the CO2 targets.

- Due to market readiness of technologies and lead time requirements, the 2025 target should not be changed.

- Fulfilment of the conditions for the penetration of ZEVs needed to meet the existing 30% reduction target in 2030 is uncertain, as it requires both accelerated reduction of technology costs and substantial policies that support infrastructure and encourage vehicle purchase.

- Introduction of a more ambitious 2030 target and post-2030 targets would necessitate higher ZEV volumes, leading to additional uncertainty in fulfilling the conditions and requiring far stronger policy intervention as well as further reduction in technology costs.

- A life cycle approach is essential to achieve overall atmospheric CO2 goals effectively, with one option being a mechanism to account for the contribution of low-carbon and carbon-neutral fuels.

- Regulatory mechanisms that incentivise zero- and low-emission vehicles (ZLEVs) will support accelerated deployment of those vehicles. The current incentive mechanism is a valid basis for further consideration.

- The upcoming CO2 certification of trailers will enable recognition of certain efficiency features, but integration of additional technology options will be necessary. Measures should be implemented to encourage the most efficient vehicle and trailer combinations.

- The full ecosystem for ZLEVs needs to be in place, notably a sufficiently dense network of electric charging and hydrogen fuelling stations, as a prerequisite for ambitious standards.

- A tightening of existing CO2 targets and the definition of post-2030 targets are contingent upon a further expansion of this infrastructure network.

1 - The revision of the CO2 regulation for heavy-duty vehicles

1.1 Objectives of the regulation

The purpose of the revision of the CO_2 standards for HDVs is to reduce carbon emissions from road transport to contribute to the 'Fit for 55' targets in 2030 and climate neutrality by 2050. For maximum impact, policies should enable the most cost-effective solutions for manufacturers and the transport industry. The regulation should support the EU's competitiveness and employment in the sector whilst also maximising the economic benefit for consumers.

1.2 Policy principles

The above objectives guide the choice of instruments, which should respect proportionality, technology openness and cost effectiveness in an efficient manner, to achieve maximum benefit.

The regulatory design of CO2 regulation should provide a flexible framework for industry and its consumers to choose the best technology options, including ZLEVs, which consist of BEVs, FCEVs, and engines powered by hydrogen or other low-carbon and carbon-neutral fuels. Sufficient lead-time for regulatory changes is essential, both for manufacturers and the transport industry, to ensure feasibility and to maximise utilisation of existing investments.

A major lever for the decarbonisation of the transport sector will be the substitution of fossil fuels by renewable electricity and low- and carbon-neutral fuels. This transition should be facilitated by the CO2 fleet regulation, in synergy with other regulatory initiatives including the Renewable Energy Directive (RED), Emissions Trading System (ETS) for transport and the Alternative Fuels Infrastructure Regulation (AFIR).

The transition to electromobility and hydrogen will create new dependencies, therefore diversification is essential as well as energy and fuel efficiency and increasing circularity.

1.3 Targets

To achieve the stated objectives and to comply with the above principles, targets must be technically, economically and socially feasible.

- A single fleet-wide target for each manufacturer, as in the existing targets, facilitates optimised compliance strategies and maximum overall CO2 reduction. Segmented targets are suboptimal and encourage shifts between vehicle types that could increase overall CO2 emissions.

- The existing tonne-km metric is the most effective one for securing actual CO2 emissions reduction.

- The 2025 target should not be changed since ZEV technologies are not expected to be in the market in sufficient volumes and due to the very short lead time for introducing changes.

- For 2030, the scope of the regulation should be expanded to those additional vehicle segments whose overall CO2 emissions reduction potential will optimise the impact of the regulation.

- The existing 30% CO2 emissions reduction target in 2030 requires a substantial fraction of the market to be ZEVs (see annex 1). To achieve that level of penetration, mature ZEV technologies plus favourable total cost of ownership (TCO) and utility compared to conventional vehicles are necessary.

- Recent studies[1] demonstrate that several critical conditions need to be fulfilled to meet these TCO and utility requirements for BEVs (see annex 2). Further analysis indicates that the fulfilment of those conditions, including cost and infrastructure, is uncertain.

- FCEVs and hydrogen engines are alternative technologies that can significantly contribute to meeting the CO2 emissions reduction targets. Similarly, these technologies require critical conditions such as cost reduction and refuelling infrastructure to be in place.

1 - ICCT & Fraunhofer references

- To enable compliance with the 2030 target, measures to fulfil those uncertain conditions and accelerated reduction in technology costs are essential. Potential measures include policies to support infrastructure roll-out, ensure availability of green hydrogen, and incentivise vehicle purchase.

- Any tightening of the 2030 target and introduction of more stringent post-2030 targets would require a higher share of ZEVs, implying greater uncertainty that would need additional intervention to ensure enabling conditions are in place.

- Close monitoring and re-assessment of the targets and the fulfilment of the conditions for meeting them will be necessary around 2027-2028.

1.4 Life cycle approach

Due to the uncertainties inherent in setting a tail-pipe CO_2 emissions target as described above, a life cycle approach (LCA) must be applied to facilitate optimum CO_2 reductions from the raw material mining, processing and shipping, vehicle manufacturing, vehicle use, energy supply and end-of-life phases.

Currently, delineated responsibilities are assigned to fuel suppliers for emissions from transport fuels from well-to-tank and to vehicle manufacturers for tank-to-wheel emissions from the vehicle. In addition, flexibility mechanisms should be applied to account for low-carbon and carbon-neutral fuels in line with requirements of the RED. These would enable the optimum combination of CO_2 emissions reduction from fuels and vehicles, unlocking investments into additional low-carbon and carbon-neutral fuel volumes and providing a path to improve the in-use vehicle parc.

Low-carbon and carbon-neutral fuels, including biofuels and RFNBOs[2], are especially important for the de-fossilisation of the existing HDV fleet. For example, a study by DENA[3], the German energy agency, concludes that efuels are necessary to meet the EU climate targets within the transport sector.

CLEPA therefore calls for the introduction of, initially, an integrated well-to-wheel approach that can be further developed towards an LCA meth-

2 - Renewable Fuels of Non-Biological Origins
3 - DENA 2017 The potential of electricity-based fuels for low emission transport in the EU

odology. This would allow assessment of mobility options according to their overall climate impact, enabling optimum reductions and facilitating the achievement of climate neutrality.

1.5 Incentive mechanisms for ZEVs and ZLEVs

Additional regulatory mechanisms to encourage take-up of ZLEVs can provide additional incentives to deploy these vehicles and allow flexibility to OEMs to adapt their portfolios to achieve compliance. These mechanisms need to be clearly defined regarding phase-in and phase-out. They should not distort the market and should consider the technology readiness of ZLEV.

The effectiveness of the mechanism in the current regulation is not yet known. For the proposed regulation, the current scheme should be retained and reviewed as experience is gained along this decade.

1.6 Trailers

Trailer designs can contribute substantially to higher energy efficiency and CO_2 emissions reduction of the vehicle combination, including improved aerodynamics, low-rolling-resistance tyres and weight reduction. The upcoming CO_2 certification of trailers will offer the possibility to certify some of these features but there remain significant open issues. For example, speed-dependent adaptable aero-features, e-axles for propulsion and recuperation, and electrified cooling devices for reefers are currently out of scope. Such solutions should be integrated into the certification to incentivise trailer manufacturers to bring these technologies into the market.

The CO_2 certification of trailers needs a monitoring phase of at least one year before discussion of CO_2 targets for trailers. If targets are considered, they should apply to the trailer independently from the towing vehicle for correct assignment of responsibilities and be set at levels that are technically, economically and socially feasible.

The calculated efficiency ratio in the upcoming CO_2 certification for trailers is a good indicator for consumers to compare all trailers based on their use-cases. The efficiency ratio may also be used for the determination of the CO_2 value for specific tractor-trailer combinations. It could be used for CO_2-based tolling with an appropriate revision of the directive 1999/62/EG.

2 - Ecosystem and framework conditions

2.1 Infrastructure

Supporting conditions must ensure that CO_2 fleet targets are achieved by actual sales to consumers. In particular, this requires that a sufficient infrastructure of both high-power electric recharging and high-capacity hydrogen refuelling is in place in time to support the level of ambition of the CO_2 fleet regulation.

The estimates below identified by CLEPA, ACEA and VDA[4] show the minimum density of refuelling and recharging stations required to meet the existing CO_2 targets in 2025 and 2030. Higher CO_2 fleet targets would correspondingly require a network with increased density, recharging and refuelling capacity. The AFIR must result in an infrastructure which is at least as dense as these estimates for both recharging and hydrogen. Failure to meet these conditions would jeopardise the necessary penetration of ZLEVs needed to meet existing or amended targets.

2.2 Additional policy instruments

Additional policy instruments can incentivise transport users to switch to ZLEVs and low-carbon and carbon-neutral fuels. Such instruments include a CO2 pricing system, purchase subsidies, renewable fuel quotas, CO2-based road charging, amendments to weights and dimensions regulation, public procurement and energy taxation.

Minimum (both ways)	TEN – T Core Every 50 km	TEN – T Comp. Every 100 km	Parking on highways	H_2 TEN-T Core Every 100 km
2025	5000 kW incl. 4 x 350 kW + 4 x 800 kW			
2027		1400 kW incl. 2 x 350 kW		2 t/day
2030	6500 kW incl. 4 x 1200 kW	3000 kW incl. 2 x 800 kW	1600 kW, 100-150 kW/point	3.5 t/day
2035		5000 kW incl. 2 x 1200 kW		

4 - ACEA Position Paper - Proposal for the Alternative Fuels Infrastructure Regulation (AFIR) November 2021

Annexes

Annex 1 - Required ZEV penetration to meet current CO2 targets for 2030

ACEA (July 2022)[5] estimated that 330,000 zero-emission HDVs would need to be in operation by 2030 to meet the existing CO2 targets (15% in 2025 and 30% in 2030). This volume corresponds to a ZEV share of at least 20% of the new vehicle market in 2030.

Annex 2 - Review of conditions necessary to achieve 2030 HDV CO2 targets through deployment of BEVs

Meeting the existing 2030 fleet average HDV CO2 reduction target of 30%, requires an estimated 20% or more of the new vehicle fleet in that year to be zero tailpipe-CO2 emission vehicles (ZEVs – see section above). Transitioning to ZEVs in the cost-sensitive commercial vehicle sector requires vehicles to be competitive both on a TCO basis and availability basis. Focusing on BEVs as a primary ZEV option, CLEPA reviewed the recent study by ICCT in 2021 on the TCO of BEV), which is the most comprehensive recent analysis. ICCT's analysis concluded that in six European countries, TCO equivalence of BEVs compared to diesel is achieved before 2030, which may be a condition that supports the required market penetration. The table on the next page reviews the impacts of the main elements of the ICCT study, states the conditions that need to be fulfilled to confirm the study's conclusions and identifies some relevant data for further assessment.

Would like to know more?

You can contact

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5 - Position paper – Review of CO2 emission standards regulation for heavy-duty vehicles

TCO elementΩ	Condition for viability of ICCT 2030 TCO projection and current and potential 2030 targets	Relevant data for further analysis
Electric drive DMC	Cost achieved as projected - reduction from €82/kW to €18/kW	Future cost development to be monitored
Indirect cost multiplier (ICM)	Correctness of ICCT complexity level "High 1" (0.27) applied to electric components instead of "High 2" (0.368).	Actual multiplier to be monitored
Battery cost per kW	Viability of pack cost estimate €80/kWh (implying cell cost ~€40 kWh according to ICCT assumption of 2:1 pack/cell cost ratio).	BNEF 2020 cell cost projection[6] ~ €49/kWh (~20% higher). Most recent (2022) BNEF presentations give no 2030 projection, slower cost reductions projected in coming years[7]. Actual cost development to be monitored. Continued correctness of 2:1 pack/cell cost ratio to be assessed.
	Correctness of ICCT complexity level "High 1" (0.27) applied to battery instead of "High 2" (0.368).	Actual multiplier to be monitored
Battery capacity	Viability of truck-trailer efficiency improvement of 28%, which enables lower battery capacity for the same range.	Source of ICCT 28% figure unclear. Viability of improvement to be monitored.
	Availability of adequate fast charging network	In case of lower density network, calculation of increased range and therefore battery capacity ➔ increased BEV cost.
	No provision for security buffer in vehicle range.	If x% security buffer provided for ➔ x% additional battery capacity and cost.
Truck residual value	Correctness of 30% non-battery residual value after 5 years instead of JRC figure of 56%.	Using JRC estimate for residual value ➔ lower net cost of diesel truck compared to BEV. Further review required.
Charging station operating expenses	Correctness of OPEX assumed to be 1.2% of CAPEX independent of charging point power.	Developments to be monitored and estimates further assessed.
Charging station utilisation rate	Viability of estimates for utilisation rate for overnight charging (33%) and fast charging (16%).	
Grid upgrade	Viability of absence of provision for grid upgrade to 3.5MW for overnight charging stations	

6 - Battery Pack Prices Cited Below $100/kWh for the First Time in 2020, While Market Average Sits at $137/kWh | BloombergNEF (bnef.com)

7 - BNEF 23rd March at SMMT Electrified (London) "Prices will be flat in the coming years".

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CLEPA, the European Association of Automotive Suppliers, represents over 3,000 companies supplying state-of-the-art components and innovative technologies for safe, smart, and sustainable mobility.

CLEPA brings together over 120 global suppliers of car parts, systems, and modules and more than 20 national trade associations and European sector associations. CLEPA is the voice of the EU automotive supplier industry linking the sector to policy makers.

- The automotive sector accounts for **30% of R&D** in the EU, making it the number one investor.
- European automotive suppliers invest over **30 billion euros** yearly in research and development.
- Automotive suppliers register over **9,000 new patents** each year.
- Automotive suppliers in Europe generate **1.7 million** direct jobs.

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