Position paper: CO_2 standards for heavy-duty vehicles and analysis of the Commission Impact Assessment

May 2023

Eurogas and NGVA Europe are committed to the decarbonisation of the transport sector, notably through the increasing role of gaseous fuels, including biomethane (bioCNG/bioLNG) as sustainable and immediately available fuels with lower GHG footprints. We firmly believe that the upcoming Regulation on CO_2 standards for Heavy-Duty Vehicles (HDVs) will play a key role in addressing the climate performance of the new vehicle fleet and must ensure a level playing field among all viable technologies able to contribute to the urgent decarbonisation of the road transport sector. Accounting for the actual environmental footprint of the fuels is critical and requires an enabling regulatory framework in support of further market development. A rational approach to vehicle CO_2 regulations is key to creating the market conditions for expanding the deployment of bioCNG/bioLNG using established (and still growing) refuelling infrastructure.

It is necessary to break silos when designing fuel and mobility policies. Vehicle manufacturers must be encouraged to invest in solutions that can immediately reduce CO_2 emissions, including vehicles with Internal Combustion Engines (ICE) that can run on fuels with lower GHG footprints, such as fuels from renewable sources. Compressed natural gas (CNG), liquified natural gas (LNG) and their bio- and electricity-based counterparts can deliver greenhouse gas (GHG) savings today, leveraging the existing fleet and infrastructure.

Executive summary and recommendation:

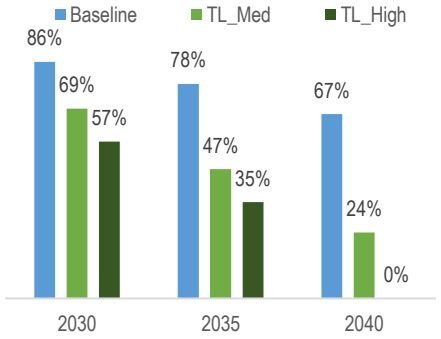
- The EC proposal needs to acknowledge diversified solutions in the heavy-duty transport sector through broader use cases and operating conditions. The proposal is in contradiction to most of the EU policy framework and does not explain why considering fuel alternatives besides zero tailpipe emissions technologies could not help transport operators and society.
- By solely focusing on tailpipe emissions, the proposal does not account for the role of fuels with lower GHG footprints. In particular, the proposed rule does not recognise the role of renewable fuels such as biomethane, which are playing and should continue to play a growing role in the heavy-duty transport sector. Biomethane is well-suited for heavy-duty vehicles required to transport heavier loads over long distances, a segment significantly harder to electrify. Using biomethane and other fuels with lower GHG footprints would allow for a substantial decarbonisation of the heavy-duty transport.
- Not accounting for the fuels dimension also contradicts the reference already in the current CO_2 standards in force for heavy-duty vehicles. The proposed rule would also rely on other policies (e.g. RED, ETS, ETD) to support fuels with lower GHG footprints, without a detailed explanation on how they would actually deliver for heavy-duty transport. Continued support for new vehicles using low carbon fuels is central to creating a fleet composition that enables the objectives of all EU policies to be achieved.
- Furthermore, the proposed framework of the regulation ignores some of the challenges associated with a zero tailpipe emissions-technologies-centric approach (e.g. deployment of the infrastructure, challenge with increased direct/indirect demand for electricity) and disregards the synergies that could exist with lower GHG fuels to tackle these challenges.
- It is possible to correct the proposed CO_2 standards without changing their core design. Adding a definition of a Carbon Correction Factor (CCF) would be a minimal change that would measure the contribution of fuels with a lower GHG footprint and incentivise their deployment. Implemented after vehicle homologation, this would exclude any liability for OEMs.

Need for diversified solutions

Diversity of powertrain technologies in the heavy-duty transport sector

Transport operators need options and different fuels and technologies for different applications and operating conditions. HDVs are hard to electrify and face significant challenges, such as compromising the carrying capacity due to the weight of batteries, the space taken by the powertrain, the reduced range and new recharging pattern. HDVs require powerful, high horsepower engines to cover long distances with heavy loads, while maintaining a favorable total cost of operation (TCO) demanded by fleet operators. This is where bioCNG/bioLNG and other renewable fuels have a major role to play, especially since long haul heavy-duty vehicles represents 90% of the annual CO_2 emissions of the currently regulated vehicle sub-groups[1].

ICE technologies make up the largest share of the existing HDVs fleet. In 2023, >97.7% of medium and heavy commercial vehicles, and 96.5% of buses are running on ICE technologies[2]. Considering the time needed to deploy alternatives and related infrastructure, and the long lifetime of these vehicles, ICE will continue to be the prevailing technology for some time. The EC Impact Assessment recognises this[3], be it in the **Baseline scenario**, the **TL_Med scenario** (*i.e. CO_2 reduction targets slightly less stringent than the proposal)* or **TL_High scenario** (*i.e. CO_2 reduction targets slightly more stringent than the proposal)*. A mix of different technologies will coexist in the heavy-duty transport sector, be it in new registrations or the existing fleet:



Share of new internal combustion engines vehicles

- ICE powered with renewable fuels (incl. biomethane & hydrogen)
- Hydrogen fuel cells
- Electric vehicles

The approach of focusing solely on "zero tailpipe emissions technologies" ignores a significant portion of new registrations and represents a shortcoming of the proposed rule. The potential decarbonisation of a majority of new registrations is already addressed in other EU policies. The proposal focuses solely on zero tailpipe emissions technologies. Even for these vehicles, however, the Impact Assessment (IA) lacks clarity on key assumptions related to delivering its ambition. It appears that the total amount of electricity needed for the zero tailpipe emissions trucks envisioned is significantly underestimated. There is no clear indication that the IA accounted for the electricity demand for the assumed – and hopefully renewable – hydrogen production. The EC does not provide any indication how the electricity demand of the sector would be fulfilled without significantly diverting the electricity supply allocated for other sectors such as buildings and industry. It also remains unclear how the electricity infrastructure would be upgraded to accommodate the increased energy demand. As such, the potential of fuels with lower GHG footprints to alleviate such issues should also be acknowledged. In addition, assumptions made regarding the temporal carbon intensity of electricity and hydrogen serving the HDV market remain to be clarified.

Total Cost of Ownership

Another aspect of the IA similarly raises serious concerns about the **total cost of ownership (TCO),** which lacks specificity and does not clearly reference all the assumptions used to conduct the modelling. The EC incorrectly

[1] ACEA report - CO_2 emissions from heavy-duty vehicles - Preliminary CO_2 baseline (Q3-Q4 2019) estimate (March 2020)

[2] ACEA report – Vehicles in use, Europe 2023 (January 2023), incl. Petrol, Diesel, NG, LPG, excl. BEVs, PHEVs, HEVs, Other, Unknown

[3] EC Impact Assessment, pages 25 and 38; incl. Diesel (incl. HEV) + Gas-powered; excl. PHEV, BEV, Hydrogen-powered vehicles (incl. hydrogen ICEVs)

views trucks only as a cost for companies when, in fact, **heavy-duty vehicles are a way to generate company revenue**. The IA also fails to properly detail how a change in the powertrain technology would impact cost and revenues. For example: operational changes due to charging/refuelling time; reduced driving range/payload; maintenance or replacement of the battery or fuel cell stack; and battery recycling requirements that could be the responsibility of the vehicle owner. The TCO analysis should also clarify why zero tailpipe emissions trucks are excluded from truck tolls, charges, and taxes, assuming all Member States will provide such incentives. The TCO analysis also fails to recount how the infrastructure improvement and rollout investment would impact the TCO compared to liquid and gaseous fuels, which are based on existing infrastructures and do not require additional investments.

Why is it important to move beyond a sole focus on tailpipe CO_2 emissions?

Shortcomings of a tailpipe-only approach

The CO_2 standards should ensure the fastest decarbonisation of HDVs by leveraging all viable technologies. We fully recognise the benefits unlocked by zero tailpipe emissions technologies– provided the energy supplied to use them is low in GHG emissions. The European legislative framework must ensure a level playing field, enabling all decarbonisation pathways to contribute to the European climate ambitions.

The proposal does not demonstrate the climate benefits of its tailpipe-only approach. The Impact Assessment fails to fully detail how the proposed tailpipe CO_2 reduction targets actually translate into CO_2 reductions on a more complete Well-To-Wheel (WTW) or lifecycle approach. In addition, the Impact Assessment should detail the CO_2 reductions resulting from a policy option acknowledging the fuels contribution to offer a fair basis of comparison.

The proposal falls short on recognising the decarbonisation potential of fuels and vehicle technologies by not distinguishing between fossil fuels and renewable/lower GHG fuels. **While vehicle efficiency remains crucial, fuels with a lower GHG footprint remain part of the solution, be it for new or existing vehicles. Recognising the contribution of these fuels <u>does not require</u> changing the core design of the CO_2 regulations based on vehicle efficiency.**

Incoherence vs. existing EU framework

Accounting for the actual GHG footprint of fuels is already a core principle of the Renewable Energy Directive, the EU Emissions Trading System and the FuelEU maritime. For consistency and to recognise the full potential of all technologies, this must be addressed in the CO_2 regulations for HDVs. Recent discussions about the CO_2 emissions of new light-duty vehicles highlight the shortcomings of a tailpipe-only approach. Additionally, accounting for the "*full life-cycle CO_2 emissions of new heavy-duty vehicles that are placed on the Union market*" is **already a provision of the existing CO_2 regulations for heavy-duty vehicles** in Art. 15 (5):

> 5. The Commission shall, not later than 2023, evaluate the possibility of developing a common Union methodology for the assessment, and the consistent data reporting, of the full life-cycle CO_2 emissions of new heavy-duty vehicles that are placed on the Union market. The Commission shall transmit that evaluation, including where appropriate proposals for follow-up measures, such as legislative proposals, to the European Parliament and to the Council.

And the EC reporting to be delivered by 31 December 2022 (Art. 15 (3) (g)) should have included:

> (g) an assessment of the possibility of developing a specific methodology to include the potential contribution to CO_2 emissions reductions of the use of synthetic and advanced alternative liquid and gaseous renewable fuels, including e-fuels, produced with renewable energy and meeting the sustainability and greenhouse gas emissions saving criteria referred to in Directive (EU) 2018/2001 of the European Parliament and of the Council [17];

Risk for renewable/low GHG footprint fuels, incl. biomethane and e-methane

Compressed natural gas (CNG) or liquified natural gas (LNG) and their bio- and electricity-based counterparts offer an opportunity for immediate GHG reduction, be it for new or existing vehicles, while using an existing infrastructure as already recognised by the EC, EP and Council in the Alternative Fuels Infrastructure Regulation[4], with a deployment target for LNG infrastructure for heavy-duty vehicles. These fuels are currently being deployed and used; they are encouraged in the rest of the EU policy framework. Their potential is significant: Only 10% of the 2050 biomethane production potential[5] is enough to power nearly 20% of the total 2050 heavy-duty vehicles fleet, notably those long-haul trucks that are harder to electrify, allowing to achieve significant GHG savings of at least 42 million tons per year[6].

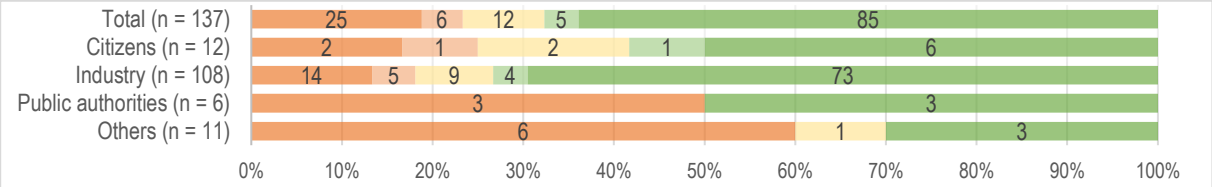
Gas-powered vehicles are likely to represent a significant share of future new registrations according to EC modelling[7]. However, **the current proposal does not distinguish between fossil natural gas, on one hand, and biomethane and synthetic renewable methane on the other**. From a tailpipe point of view, these chemically identical molecules **are all categorised as fossil** and do not offer any GHG saving, even though the Renewable Energy Directive, the Alternative Fuels Infrastructure Regulation, the FuelEU Maritime, the Emission Trading System and the Effort Sharing Regulation do make this distinction.

This shortcoming puts at risk the decarbonisation of (heavy-duty) transport and the achievement of the EU climate ambitions, including the necessary ramp-up of biogas and biomethane. This is contrary to the EC's REPowerEU ambitions to reach a 35 bcm biomethane production in 2030 and the Net Zero Industry Act (NZIA), which both consider sustainable biogas/biomethane technologies as "*strategic net-zero technologies*" that require manufacturing capacities to be scaled up to support the EU 2030 and 2050 climate ambitions. **While the EC considers that it is not the role of the CO_2 regulations to incentivise renewable/low GHG fuelled vehicles, the Regulation should not hinder their deployment by considering these renewable fuels as performing at the same GHG performance level as their unabated fossil-based counterparts.**

How to improve the EC proposal?

Support for a mechanism that considers the contribution of fuels

As detailed above, a tailpipe-only approach does not reflect the actual GHG performance of powertrain technologies running on fuels with a lower GHG footprint than their unabated fossil-based counterparts. A dedicated mechanism acknowledging the contribution of lower carbon fuels was discussed by the EC in the public consultation associated with the review of the Regulation[8], and was met with a high level of support (*from red = no agreement to dark green = highest agreement*):



Topic: "A mechanism should be introduced in the HDV regulation so that compliance assessment takes into account the contribution of renewable and low carbon fuels".

[4] Alternative fuel infrastructure: Provisional agreement for more recharging and refuelling stations across Europe (28 March 2023)

[5] Gas For Climate report - Biomethane production potentials in the EU (July 2022)

[6] NGVA Europe: Roadmap to carbon neutrality - An industry declaration to deliver the Green Deal and achieve net zero CO_2 emissions in commercial road transport with biomethane (December 2022)

[7] EC Impact Assessment, pages 25 and 38

[8] EC Have your say - Reducing carbon emissions – review of emission standards for heavy-duty vehicles (March 2022)

Additionally, in the context of the discussion on the CO_2 standards for light duty vehicles in May 2021, **such a system was also supported by 223 associations, companies and scientists**[9]. **More recently, in February 2023, more than 110 stakeholders and 90 scientists voiced their support to consider sustainable and renewable fuels for compliance in the CO_2 Regulation for HDVs**[10].

The proposed regulation can be improved by recognising the role of renewable and low carbon fuels: a Carbon Correction Factor (CCF) should be introduced and applied after the homologation of the vehicle. **This would address the shortcomings of a tailpipe-only approach <u>without changing its core design</u>.** Implemented after vehicle homologation, it would also allow to exclude any liability for OEMs.

Designing a Carbon Correction Factor (CCF)

We are advocating for an approach that acknowledges the actual GHG credentials of a specific and proven transport solutions and not limited to the sole engine technology as is currently proposed. Accounting for the environmental contribution of fuels accelerates the transition by supporting the deployment of renewable and low-carbon fuels and by leveraging existing infrastructures. This would mean that combustion engines, still representing the bulk of the sector, could be progressively decarbonised.

We fully support the introduction of a robust and transparent Carbon Correction Factor (CCF) for renewable and low-carbon fuels. Such a factor would help to deliver additional volumes of renewable fuels and lower GHG footprint fuels to the market, which in turn would decrease the CO_2 emissions of existing and new vehicles and contribute to ambitions on climate, REPowerEU and NZIA. **The core principle of such a Carbon Correction Factor should be to consider that a portion of the CO_2 emissions of a heavy-duty vehicle can be offset to reflect the current level of renewable and low-carbon fuels in the fuel mix.**
Implementation and calculation of a Carbon Correction Factor (CCF):

- <u>Step 1:</u> Create a definition for fuels benefiting from this mechanism which should reference existing EU policy (e.g. RED):
  'CO_2 Neutral Fuel' means a renewable and/or synthetic fuel as defined by Directive 2018/2001 including biofuel, biogas, biomass fuel, Renewable liquid and gaseous transport Fuel of Non Biological Origin – RFNBO or a Recycled Carbon Fuel – RCF, where the emissions of the fuel in use (e_u) can be taken to be net zero, meaning that the CO_2 equivalent of the carbon incorporated in the chemical composition of the fuel in use e_u is of biogenic origin and/or has been avoided being emitted as CO_2 into the atmosphere or has been captured from ambient air or has avoided its existing fate. Other renewable and/or synthetic fuels not listed in Directive 2018/2001 can fulfil this definition provided that they meet the above criteria and the sustainability criteria of said Directive and associated delegated acts. A mixture of two or more CO_2 Neutral Fuels is considered a CO_2 Neutral Fuel.
- <u>Step 2:</u> Retrieve the EU contribution of these fuels based on existing official data from the EC SHARES database[11].
- <u>Step 3:</u> For each type of fuels, define a factor (their CCF) reflecting the share of these fuels in the mix for that year: e.g. for gaseous fuels, if the share of biomethane and other qualifying gaseous fuels is 20% in the mix, the CCF would be 20% (= 0.2).
- <u>Step 4:</u> For each vehicle registered in the EU powered by these types of fuels, correct the CO_2 emissions determined by the type approval methodology with the CCF e.g. if a gas powered heavy-duty vehicle's emissions determined with the VECTO tool are 100 g CO_2/km and the CCF is 20% = 0.2, the final CO_2 emissions to be reported would be $CO_{2,\ corrected} = CO_{2,\ VECTO}$ x (1-CCF) = 100 x 0.8 = 80 gCO_2/km

[9] Call to include a voluntary crediting system for sustainable renewable fuels into the vehicle CO_2 regulations (26 May 2021)
[10] Open letter: Joint statement of the EU industry: CO_2 Regulation for Heavy-Duty Vehicles should recognise decarbonisation potential of sustainable and renewable fuels (6 February 2023)
[11] Eurostat SHARES Database

A CCF would be easy to introduce in the Regulation, with minimal disruption, based on reliable official data and would ensure no double counting/false claims. Such a system is already in place in Switzerland[12], where a biogenic share of 20% in the gaseous fuels mix is recognised. Consequently, 20% of the CO_2 emissions of vehicles able to be fuelled with a blend of natural gas and biomethane are considered as being climate neutral.

What about double counting concerns?

To address this concern, it is crucial to underline that double counting one unit of energy toward one objective is different from doing so toward multiple targets. For example: one unit of bioenergy could count toward the RED objective of renewable energy share as well as toward the GHG inventory of the ETS or Effort Sharing. This is not double counting of the unit of bioenergy per se, as those are different targets with different methodologies.

In the context of the Renewable Energy Directive and the CO_2 standards, assuming one unit of bioenergy is added to the transport energy mix, this will be accounted for under the Renewable Energy Directive objectives. This unit currently exists and is consumed by transport, therefore, there is no reason to disregard it.

CCF considerations in the Impact Assessment

The Impact Assessment explored the potential of a CCF but the analysis was ultimately biased considering that:

- The CCF was to be associated with less ambitious CO_2 targets.
- The CCF and the recognition of CO_2 reduction coming from renewable fuels were assumed not to bring any economic benefits to transport operators or society as a whole.
- Only advanced biofuels were considered, excluding RFNBO and other fuels in the scope of the Renewable Energy Directive.
- It was assumed that vehicles that are included within the scope of the CCF would compete with Zero Emissions Vehicles, which is a blanket assumption that fails to consider the different role of powertrain technology in the heavy-duty sector.

[12] Article 12a of the Ordonnance sur les exigences relatives à l'efficacité énergétique d'installations, de véhicules et d'appareils fabriqués en série