

Consultation to prepare legislation on the monitoring of HDV CO2 emissions and fuel consumption

Fields marked with * are mandatory.

Explanatory introduction

The July 2016 Strategy for low-emission mobility[1] puts the emphasis on low-emission mobility as an essential component of the broader shift to low-carbon, circular economy needed for Europe to stay competitive and be able to cater to the mobility needs of people and goods. Within road transport, which represents about 19% of total EU Greenhouse Gas (GHG) emissions, Heavy-Duty Vehicle (HDV) CO2 emissions represent 25% of GHG emissions, while representing only 5% of all vehicles in the EU, and some 5% of total EU GHG emissions and their share is expected to grow. While heavy-duty vehicles have been subject to similar air pollution standards as cars and vans, and are now required to meet them under real driving conditions, the EU has neither fuel efficiency standards for them, nor a carbon dioxide monitoring scheme as in the case of cars and vans.

Vehicle efficiency (both in terms of fuel consumption and CO2 emissions) is neither certified under the existing EU type-approval framework legislation for HDVs, nor monitored and reported. This represents an important "knowledge gap" on HDV fuel consumption and CO2 emissions.

For the purposes of the present consultation the term "Heavy-Duty Vehicles" includes:

- all goods (trucks) vehicles of categories N2 (maximum mass from 3.5 tonnes to 12 tonnes) and N3 (maximum mass exceeding 12 tonnes);

and

- all passenger vehicles of categories M2 (having more than 8 seats and a maximum mass below 5 tonnes) and M3 (having more than 8 seats and a maximum mass exceeding 5 tonnes).

The February 2011 European Council agreed to reduce economy-wide greenhouse gas emissions by 80-95% in 2050 compared to 1990. Transport, as a whole, should reduce its CO2 emissions by 2050 by at least 60% of its 1990 level and be firmly on the path towards zero CO2 emissions.

Transport greenhouse gas emissions covered by the 2030 Climate and Energy package agreed by Heads of State in October 2014 fall into two categories: 1) CO₂ emissions covered by the Emission Trading System (aviation and electricity used by rail), 2) the non-ETS sectors (road, diesel rail, inland waterway). The non-ETS sector[2] (which covers most transport emissions, representing about one third of the non-ETS sector) is required to reduce its emissions by 30% compared to 2005.

The October 2014 European Council conclusions also cite the need to promote emissions reductions and energy efficiency in transport, an objective that is fully in line with the call for a resilient Energy Union and forward-looking climate change policy.

The February 2015 Energy Union Communication[3], announced a number of actions in the transport field, including "establishing a monitoring and reporting system for heavy duty vehicles (trucks and buses) with a view to improving purchaser information". The Communication on low-emission mobility, adopted on 20 July 2016 announced speeding up analytical work on design options for standards for heavy duty vehicles.

Differently from cars and vans[4], CO₂ emissions of HDVs have not been certified and officially recorded so far in the EU. This is mainly due to very uneven characteristics of the HDV fleet. The May 2014 Strategy Communication[5] on reducing Heavy Duty Vehicle (HDV) fuel consumption and CO₂ emissions puts the emphasis on closing the knowledge gap regarding HDV CO₂ emissions with a view to improving end-user information and thereby market competition. This should provide incentives to HDV manufacturers to produce vehicles with higher fuel efficiency.

The 2014 Communication announced legislative proposals to:

- (i) certify (at vehicle registration) new HDV CO₂ emissions and fuel efficiency performance[6]; and,
- (ii) monitor and report new[7] HDV fuel consumption and CO₂ emissions data to the European Commission.

The July 2016 Strategy on low-emission mobility furthermore announces that the EU will also need to introduce measures to actively curb carbon dioxide emissions from lorries, buses and coaches.

The Commission will, therefore, launch a public consultation to prepare the ground for a proposal in this mandate. Tackling emissions from HDV interacts with several other overarching policies including: energy security (lower CO₂ emissions meaning less fuel consumption and therefore reduced imports of fossil fuels); air quality (lower fuel consumption meaning fewer emissions of other pollutants); innovation and competitiveness (requirement for improved vehicle efficiency creating research and development into better technologies which enhances the EU's international industrial competitiveness).

The purpose of this questionnaire is twofold.

Part A addresses the preparation of the legislation on monitoring and reporting of HDV fuel consumption and CO₂ emissions data. This part covers all key areas of the upcoming Impact Assessment. HDV CO₂ and fuel efficiency certification legislation is being prepared in parallel.

Part B offers the first possibility for stakeholders to provide their views and input on the preparation of future standards as announced in the Communication on low-emission mobility.

A further consultation will be launched in due time to discuss the details of options for standards.

Replies are expected to contribute to the analysis, and to the understanding of stakeholders' views, on the main issues raised.

[1] 'A European strategy for low-emission mobility', COM(2016) 501 final

[2] Greenhouse gas emissions in the non-ETS sector can be divided in three categories of origin: almost one third of them come from the transport sector (around 900 Mt CO₂-eq); a slightly lower share of greenhouse gas emissions, under 800 Mt CO₂-eq, come from the buildings sector (this includes heating of farmhouses and greenhouses); finally, the rest are non-CO₂ emissions, about half of which comes from agriculture.

[3] COM(2015)80

[4] Regulation 443/2009 as amended by Regulation 333/2014 for passenger cars and Regulation 510/2011 as amended by Regulation 253/2014 for light commercial vehicles

[5] Strategy for reducing Heavy-Duty Vehicles' fuel consumption and CO₂ emissions, Communication from the Commission to the Council and the European Parliament, COM(2014)285

[6] The Commission has developed a simulation methodology "VECTO" to calculate whole vehicle CO₂ emissions and fuel consumption data. This will be deployed under the type approval legislation

[7] In the present impact assessment "new vehicles" will either mean newly registered vehicles (see options 1 and 3) or newly sold vehicles (see option 2) in the EU, on an annual basis.

General information about respondents

* In what capacity are you completing this questionnaire?

- ☐ As an individual / private person
- ☒ Public authority
- ☐ Academic / Research institution
- ☐ International organisation
- ☐ Civil society organisation
- ☐ Professional organisation
- ☐ Private enterprise
- ☐ Other

Please indicate your main area of focus:

Text of 3 to 200 characters will be accepted

*Please give your name if replying as an individual/private person, otherwise give the name of your organisation:

Text of 3 to 200 characters will be accepted

Ministerium für Verkehr Baden-Württemberg / Landesanstalt für Umwelt,
Messungen und Naturschutz Baden-Württemberg

If your organisation is registered in the Transparency Register, please give your Register ID number:

20 character(s) maximum

If your organisation is not registered, you can [register now](#).

Please give your country of residence/establishment:

Germany

*Please indicate your preference for the publication of your response on the Commission's website:

- ☒ Under the name given: I consent to publication of all information in my contribution and I declare that none of it is subject to copyright restrictions that prevent publication
- ☐ Anonymously: I consent to publication of all information in my contribution and I declare that none of it is subject to copyright restrictions that prevent publication
- ☐ Not at all — please keep my contribution confidential (it will not be published, but will be used internally within the Commission)

(Please note that regardless the option chosen, your contribution may be subject to a request for access to documents under [Regulation 1049/2001](#) on public access to European Parliament, Council and Commission documents. In this case the request will be assessed against the conditions set out in the Regulation and in accordance with applicable [data protection rules](#).)

Questions

The questions below are based on the initial analysis carried out by the Commission and presented in its Inception Impact Assessment to which you may refer for further background on each specific question. Heavy-Duty Vehicles' fuel consumption and CO2 emissions are treated together as they are strictly correlated and proportional: both would be certified and monitored together.

Part A - Monitoring & reporting

Main problem to address

The May 2014 Strategy Communication on reducing Heavy Duty Vehicle (HDV) fuel consumption and CO₂ emissions puts the emphasis on closing the knowledge gap regarding HDV CO₂ emissions also with a view to contribute to reversing the emissions trend by encouraging the uptake of more energy efficient vehicles.

In your view, how important is the following action?

	Very important	Important	Somewhat important	Not important	I don't know
Monitoring vehicle efficiency (both in terms of fuel consumption and CO ₂ emissions) in the EU in order to gather the necessary data to close the identified knowledge gap	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The need for EU action

In the absence of EU-wide monitoring/reporting legislation, national authorities may adopt varied monitoring and reporting approaches or further measures to curb CO₂ emissions. While the production of HDVs, as well as freight transport, are EU-wide markets, the lack of an EU-wide picture risks leading to market fragmentation.

In your view, what would be likely to happen if no action is taken at EU level?

	Likely	Neutral	Unlikely
Monitoring of HDV CO ₂ emissions would not take place	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Member States would separately take the necessary measures to monitor and report HDV CO ₂ emissions	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Main policy objectives

On the basis of the certified data, information to end-users is expected to be available regarding new HDVs, facilitating the uptake of the most energy efficient HDVs. The increased push for fuel-efficient technology should also contribute to the competitiveness of the European HDV industry.

In your view, how important are the following policy objectives?

	Very important	Important	Somewhat important	Not important	I don't know
OBJECTIVE 1: reducing fuel consumption and HDV CO2 emissions	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OBJECTIVE 2: Improving market transparency in the HDV sector	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OBJECTIVE 3: Improving road transport competitiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
OBJECTIVE 4: Ensuring competitiveness of the European HDV manufacturing sector	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Options to consider for the EU monitoring/reporting of HDV fuel consumption and CO2 emissions

Currently the following options are being considered for the introduction of EU monitoring of HDV certified fuel consumption and CO2 values:

- *option 1, that mirrors the monitoring already carried out for light-duty vehicles' CO2 emissions, with manufacturers reporting to national authorities and national authorities reporting to the Commission (or an EU designated agency such as the EEA), with the Commission publishing annual average values per vehicle type/manufacture; and*
- *option 2, entrusting HDV manufacturers in charge of the monitoring, with reporting to the Commission (or an EU designated agency such as the EEA) and with the Commission publishing annual average values; and*
- *option 3, which is an intermediate option between options 1 and 2, whereby designated national authorities would report to the Commission (or an EU designated agency such as the EEA) individual HDV vehicle identification numbers ("VINs") of new registered vehicles. Based on the latter, the Commission or EEA would extract relevant monitoring information from vehicle manufacturers' data files.*

Please rank these options in order of how appropriate they are in view of the above policy objectives from 1 to 4, where 1 is the most appropriate to you and 4 is the least appropriate:

	1: the most appropriate	2: the second most appropriate	3: the third most appropriate	4: the least appropriate
Option 1	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Option 2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Option 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you see other possible options please explain which one you suggest :

1000 character(s) maximum

There should be implemented mechanisms which ensure the real-world compliance in order to avoid differences between VECTO and the real driving emissions. In addition, VECTO should be transparent and accessible for all stakeholders.

Likely economic and competitiveness impacts of the EU monitoring and reporting

According to the Inception Impact Assessment, Economic impacts related to the EU monitoring and reporting of HDV CO₂ emissions are not expected to be sizeable. However, as indicated in the impact assessment that underpinned the HDV Strategy "A more transparent HDV market would contribute to an improved level playing field among HDV manufacturers and transport operators." This should foster competition to produce more energy efficient vehicles and innovation in the EU market and reduce transport costs for the benefit of the whole economy. Economic impacts of the various options are not expected to differ.

Do you agree with the following statements?

	Fully agree	Tend to agree	No strong view	Tend to disagree	Fully disagree
The economic impacts are expected to be positive even though limited	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Economic impacts of the various options are expected to be broadly similar	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No sizeable competitiveness impacts are expected in the Internal market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
A more transparent HDV market would contribute to an improved level playing field among HDV manufacturers and transport operators	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marginal impacts on competitiveness are expected: comparability between manufacturers' vehicles energy efficiency may foster innovation	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fuel savings on more energy efficient vehicles would further foster lower transport costs in the EU, leading to (marginal) increased competitiveness of the transport sector	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Increased competitiveness of the transport sector would and, by way of lower prices of intermediate goods, translate into increased (marginal) competitiveness of many other segments of the EU economy					
There is no expected material direct impact on third countries					
If as assumed above improvements in innovation uptakes and the industry's competitiveness are possible, this will (marginally) benefit the EU HDV industry's international competitiveness					
Pass-through of lower transport costs to many sectors of the EU economy would (marginally) benefit EU exports and international competitiveness					

Likely impacts on SMEs

There is no expected impact on SMEs from the manufacturing sector as HDV manufacturers on which the monitoring burden is expected to fall, particularly in the second and third option, are all very large international companies. However, transport companies, most of which are small SMEs operating only a few trucks or buses, would benefit from the monitoring of emissions as this would provide more transparency on the most energy efficient HDVs. Transport SMEs could take this into consideration in their purchase decisions, thereby realising fuel savings and reducing their operating costs. Impacts on SMEs of the various options are not expected to differ.

Do you agree with the following statements?

	Fully agree	Tend to agree	No strong view	Tend to disagree	Fully disagree
There is no expected impact on SMEs from the manufacturing sector since HDV manufacturers on which the monitoring burden shall fall, are all very large international companies	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transport companies, most of which are small SMEs, are expected to benefit from the monitoring of fuel consumption and CO2 emissions as this would provide more transparency on the most energy efficient HDVs. SMEs could take this into consideration in their purchase decisions, thereby realising fuel savings	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Likely social impacts

According to the Inception Impact Assessment, there is not really any expected material social impact from either option. The only possible impact on employment could be the few jobs related to the monitoring and reporting function in national authorities (option 1), vehicle manufacturers (option 2), for both under option 3, and under all options in the agency in charge of the EU monitoring (presumably the EEA) and the Commission. Social impacts of options would hence only slightly differ in this respect.

Do you agree with the following statements?

	Fully agree	Tend to agree	No strong view	Tend to disagree	Fully disagree
No material social impact is expected from either option	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social impacts of options would only slightly differ	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Administrative burden of monitoring HDV CO2 emissions

No simplification of administration and related costs can be expected as HDV CO2 emissions are not currently monitored or reported.

An administrative burden is expected (on the top of the administrative burden attached to the certification of HDV CO2 emissions under type approval legislation) for:

- *vehicle manufacturers under all three options, as they would have to format their IT systems along monitoring requirements and devote human resources to the monitoring and reporting function;*
- *for public authorities, namely national authorities (in most Member States, registration authorities) as well as the European Commission and possibly the European Environment Agency.*

Do you agree with the following statements ?

	Fully agree	Tend to agree	No strong view	Tend to disagree	Fully disagree
Manufacturers of heavy-duty vehicles should bear the essential administrative burden of monitoring HDV fuel consumption and CO2 emissions.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public authorities should bear the essential administrative burden of monitoring HDV fuel consumption and CO2 emissions.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manufacturers of heavy-duty vehicles and public authorities should share the administrative burden of monitoring HDV fuel consumption and CO2 emissions.	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Likely environmental impact on CO2 emissions

As indicated in the [impact assessment](#) that underpinned the 2014 HDV strategy, the effectiveness of certification, monitoring and reporting of HDV CO2 emissions in curbing HDV fuel consumption and CO2 emissions "is expected to be real even though limited: this action would establish a reliable track record of whole HDV emissions, independent from each manufacturer's measurement, providing reliability and transparency to the market as to real vehicle performances. This would be expected to increase awareness among fleet operators on the most cost effective vehicles to operate, and influence decision making in purchasing new HDVs. While a precise quantification of this action's effect over time (this would apply only to new vehicles and only progressively affect the whole HDV fleet) on HDV fuel consumption and emissions in the EU is not possible (there is no reliable methodology for such an assessment), its impact is however not expected to be considerable in curbing HDV CO2 emissions in view of the Transport White Paper's objectives. Emissions may only be reduced by a maximum of a few percentage points." Environmental impacts on CO2 emissions of the various options are not expected to differ.

Do you agree with the following statements?

	Fully agree	Tend to agree	No strong view	Tend to disagree	Fully disagree
Real but limited effect on reducing HDV fuel consumption and CO2 emissions	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Establishment of a reliable and transparent track record of whole HDV CO2 emissions, independent from each manufacturer's measurement	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased awareness among fleet operators on the most effective vehicles to operate	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Influence decision making in purchasing more effective HDVs	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No differentiated environmental impacts of the various options on CO2 emissions	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
HDV CO2 monitoring should be focussed only on the main petrol and diesel fuels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
The scope of the HDV CO2 monitoring should be broadened to incorporate alternative fuels such as biofuels, CNG or LPG	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
HDV CO2 monitoring should focus on tailpipe (tank-to-wheel) emissions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
HDV CO2 monitoring should incorporate a comprehensive approach on well-to-wheel emissions, to better reflect the lower carbon content of some alternative fuels	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Likely environmental impact on non-CO2 emissions (exhaust gases and particulate matter – PM)

As regards other emissions (exhaust gases, particulate matter), the Inception Impact Assessment considered that if increased vehicle efficiency and hence reduced fuel consumption (even though limited) leads to reduced emissions from other exhaust gases, this impact may be favourable. One should however not anticipate any straightforward impact on pollutant emissions: as indicated in the above mentioned impact assessment attached to the 2014 HDV strategy: "only negligible environmental impacts (related to other exhaust gases and PM already regulated under Euro VI) can be expected. While the relationship between total non-CO2 pollutant emissions and energy consumption may not be linear since pollutant emissions per kWh may vary, it seems reasonable to assume that pollutant emissions will slightly decrease. Quantitative estimates cannot be provided at this stage." Options were not expected to have any differentiated environmental impacts.

Do you agree with the following statements?

	Fully agree	Tend to agree	No strong view	Tend to disagree	Fully disagree
Increased fuel efficiency of vehicles would lead to limited reduction of other non-CO2 emissions	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No differentiated environmental impacts on non-CO2 emissions	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Would you have any other comments to make in the context of the present impact assessment?

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The impacts on the emissions as a whole (CO2 as well as non-CO2) have to be considered when regulations and limits will be defined.

Part B - CO₂ emissions / fuel efficiency standards

Internationally, Japan introduced in 2007 a fuel consumption rule setting objectives for HDVs in 2015, based on a best performer approach. Japan is currently reassessing this rule. The US established a CO2 limit for trucks in 2011, setting standards to apply to vehicles and engines as of 2014. A second phase proposed in 2015 is currently being finalised. Canada adopted in 2012 a similar legislation. China, which has become the most important HDV market, introduced a first phase of standard in 2012 applying as of 2013, followed by a second phase in 2014. It recently proposed a third phase due to apply to new vehicles as of 2019.

As recognised in the 2016 Strategy for low-emission mobility, Europe cannot lag behind. The mere certification and monitoring/reporting may not be enough to sufficiently curb fuel consumption and CO2 emissions in line with long term decarbonisation objectives. The Commission communication on low-emission mobility underlined that for some categories – such as city buses – early adoption of zero emission technologies seems in reach and a separate zero-emission target should be explored.

Do you agree with the following statements?

	Fully agree	Tend to agree	No strong view	Tend to disagree	Fully disagree
In view of the importance of fuel costs for transport freight activities, market competition between manufacturers will provide sufficient incentives to curb emissions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Certification and monitoring /reporting will not be enough to sufficiently curb fuel consumption and CO2 emissions of this sector in light of the EU 2030/2050 objectives	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The EU should set up standards setting limits on fuel consumption and/or CO2 emissions	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The EU should adopt other measures than standards to reduce HDV fuel consumption and CO2 emissions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Should HDV CO2 emission limits be introduced, what are your views on how to define such limits and the methodology to determine the baseline of the fuel consumption and CO2 emissions for the categories of trucks considered in the absence of certified emissions data?

2000 character(s) maximum

The approach should be based on total car energy consumption (incl. auxiliaries). Considering the potential of cost-effective reductions of at least 30% in CO2 emissions, the limits have to be ambitious. HDV Standards should be introduced as soon as possible, preferably in 2020, to contribute to the necessary reduction from non-ETS sector. Incentives for low- and zero-emission vehicles should be implemented.

Should other measures to curb HDV CO2 emissions be considered, what are your views on which measure(s) to consider?

2000 character(s) maximum

Complementary to emission limits, there should be introduced road pricing for coaches. Additionally, CO2 emissions should to be integrated in road pricing.

Would you have any other comments to make as regards the possible setting of fuel and CO2 emission standards for HDVs?

2000 character(s) maximum

Contact

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