

# Impact Assessment on Heavy Duty Vehicles (HDV) CO<sub>2</sub> emission standards

Fields marked with \* are mandatory.

## Impact Assessment on Heavy Duty Vehicles (HDV) CO<sub>2</sub> emission standards

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The July 2016 Commission's strategy for low-emission mobility recalls that mobility is an essential component of the shift to the low-carbon, circular economy needed for Europe to stay competitive and be able to cater to the mobility needs of people and goods. The strategy set the ambition for the transport sector to reduce greenhouse gas emissions at least by 60% compared to 1990 by mid-century and be firmly on the path towards zero. Action on vehicles' fuel/CO<sub>2</sub> emission performance is one of the key levers to tilt the transport sector in the right direction.

The 2030 climate and energy framework agreed by EU Heads of State and Government in October 2014 requires a 30% reduction in non-ETS sector GHG emissions by 2030 compared to 2005. Road transport represents 1/3 of the non-ETS GHG emissions and heavy-duty vehicles contribute to about 1/4 of road transport emissions and some 5% of total EU GHG emissions.

The May 2014 Strategy Communication on reducing HDV fuel consumption and CO<sub>2</sub> emissions ([COM/2014/0285](#)) emphasises the importance of closing the knowledge gap regarding the CO<sub>2</sub> emissions of lorries and buses with a view to improving market transparency.

The July 2016 Strategy for low-emission mobility furthermore announced that there is a need to curb CO<sub>2</sub> emissions from HDVs.

On 11 May 2017 the Technical Committee for Motor Vehicles has approved under type approval legislation a certification procedure for the determination of the CO<sub>2</sub> emissions and fuel consumption of new HDVs, using the results from [VECTO simulations](#), which has been developed by the European Commission since 2010. HDV manufacturers will have to run VECTO at the end of the production line and declare such information at the time of registration as of 2019.

On 31 May 2017, as part of the Europe on the Move set of initiatives, the Commission adopted a proposal for the monitoring and reporting of such HDV CO<sub>2</sub> emissions and fuel consumption. The data collected will be made publicly available by the European Environment Agency, starting in 2020 to cover data monitored in 2019.

This [inception impact assessment](#) will look into different options for setting the first EU measures to actively curb CO<sub>2</sub> emissions from HDVs, including CO<sub>2</sub> emission standards.

It should be noted that EU manufacturers account for some 40% of global production. Furthermore, other parts of the world, such as the United States, China, Japan and Canada, have already introduced HDV fuel economy standards, and some European manufacturers participate in these schemes.

For the purposes of the present consultation the term HDV should be understood as including (For the definition of vehicle categories see [Directive \(EC\) 2007/46](#), Annex II, part A):

- goods vehicles of categories N2 and N3 and
- passenger vehicles of categories M2 and M3 and
- all trailers of categories O3 and O4.

The Commission is carrying out this consultation in order to be properly informed by public opinion in preparation for possible future legislative action in the area of CO<sub>2</sub> emissions from HDVs, the results of which will be published in consolidated form.

Parts 1 to 5 of this consultation are intended to be completed by every respondent to the extent possible.

Part 6 is mainly intended for experts in the field but of course every respondent may complete it as he wishes.

If data, other information or studies are available which are relevant to the assessment, these can be submitted as part of a stakeholder's general comments or directly to the mail box.

## 1. General information about respondent

\* 1.1. In what capacity are you completing this questionnaire?

Private enterprise

### 1.2. If private enterprise

\* 1.2.1. Business sector

Automotive component supplier

1.2.2. Is your company an SME? ([What is an SME?](#))

- ☐ Yes - medium-sized enterprise (i.e. having less than 250 staff and/or turnover below €50m and/or a balance sheet below €43m)
- ☐ Yes - small enterprise (i.e. having less than 50 staff and/or turnover below €10m and/or a balance sheet below €10m)
- ☐ Yes - micro enterprise (i.e. having less than 10 staff and/or turnover below €2m and/or a balance sheet below €2m)
- ☒ No
- ☐ I don't know

\* 1.5. 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*

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1.6. 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 note that contributions from respondents who choose not to register will be processed as a separate category 'non-registered organisations/business'.

\* 1.7. Please give your country of residence/establishment:

United Kingdom

1.8. If your organisation is involved in the implementation of the HDV legislation, please indicate its role (e.g. manufacturer, system supplier, technical service,...):

*200 character(s) maximum*

Engine manufacturer providing engines to multiple EU truck & bus OEMs

\* 1.9. Please indicate your preference for the publication of your response on the Commission's website: (Please note that regardless of 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](#).)



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

## Questions

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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. Fuel consumption and CO<sub>2</sub> emissions of Heavy-Duty Vehicles' (HDVs) are treated together as they are strongly correlated and proportional: both would be certified and monitored together.

## 2. Main problem to address

The following 3 key problems have been identified in the context of the Inception Impact Assessment where more detailed information can be found. In your view, how important are the problems to be addressed?

	Very important	Important	Somewhat important	Not important	I don't know/ no views
Growing GHG emissions from the heavy-duty vehicle sector	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing competitiveness challenges for vehicle manufacturers	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transport operators and their clients miss out on possible fuel savings and reduced fuel bills	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Are there other key problems to be addressed?

200 character(s) maximum

### 3. The need for EU action

There is a single market for HDVs across the EU. If no EU action was taken to address the problem, Member States might adopt individual approaches to reduce HDV CO<sub>2</sub> emissions, in order to achieve the needed reductions for the non-ETS sector. In your view, what would be likely to happen without EU action?

	Likely	Neutral	Unlikely
Member States would individually implement legislation to reduce HDV CO <sub>2</sub> emissions	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Legislation introduced by individual Member States would lead to market fragmentation and higher costs	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Member States would have difficulty to achieve the necessary reductions to meet EU climate goals	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Are there other potential effects?

200 character(s) maximum

Lack of EU leadership on HDV CO<sub>2</sub> may result in regions that normally use EU regulations as a base developing individual approaches potentially leading to product diversification and hence higher cost

### 4. Main policy objectives

The following 3 key policy objectives have been identified in the context of the Inception Impact Assessment where more detailed information can be found.

1. Reduce the climate impact of HDVs in line with the requirements of EU climate policy and the 2030 climate and energy framework.
2. Contribute to the improvement of the competitiveness of HDV and component manufacturers (suppliers to HDV manufacturers)
3. Facilitate a reduction in the total cost of ownership for transport operators, most of which are SMEs.

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

	Very important	Important	Somewhat important	Not important	I don't know
Reduce the climate impact of HDVs	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contribute to the improvement of the competitiveness of the European HDV and component manufacturers	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitate a reduction in the total cost of ownership for transport operators	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Are there other key objectives to be reached?

200 character(s) maximum

## 5. Form that action should take to reduce HDV CO<sub>2</sub> emissions

Please indicate, by order of importance, your preferred options to reduce new HDVs CO<sub>2</sub> emissions, and contribute to the 2030 Energy and Climate Targets (with 1<sup>st</sup> being your most preferred option and 7<sup>th</sup> the least preferred)?

	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
Legislation setting HDV CO <sub>2</sub> emissions targets at EU level	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Legislation defining a CO <sub>2</sub> labelling scheme at EU level	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use of vehicle or fuel taxes or other incentives by Member States to affect vehicle choice and use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

A voluntary agreement with industry to reduce new vehicle CO <sub>2</sub> emissions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Member State actions to influence vehicle choice and use in other ways such as labelling schemes based on VECTO, best practice dissemination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Development of international standards for HDV fuel economy	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No action	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Other option	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify:

200 character(s) maximum

A first phase that combines engine standards with a labelling scheme for the whole vehicle that could be implemented ahead of complete vehicle standards

## 6. Options to consider for regulating CO<sub>2</sub> emissions of HDV

If CO<sub>2</sub> emissions of HDVs will be regulated by defining binding targets, the following options are considered.

### 6.1. Options for the basic regulatory approach

- Option A: CO<sub>2</sub> emission standards would be defined for the engines only.
- Option B: CO<sub>2</sub> emission standards for the whole vehicles, to be based on VECTO simulations
- Option C: Separate CO<sub>2</sub> emission standards for engines and complete vehicles

Please indicate the order of your preference (numbers 1, 2, 3) for the different options:

	1 st	2 nd	3 rd	4 th
A	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
C	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Other option	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify:

200 character(s) maximum

A first phase that combines engine standards with a labelling scheme for the whole vehicle that could be implemented ahead of complete vehicle standards

Comments on your choices on options for the basic regulatory approach:

300 character(s) maximum

Basing engine standards on the existing Euro VI emissions regulatory structure would be efficient & timely, combining this with a vehicle labelling approach using VECTO would facilitate the introduction of both engine and vehicle technologies and could be an option for an early first phase standard

## 6.2. Options for the types of targets

- Option A: targets at the level of each individual vehicle; CO<sub>2</sub> emissions would be limited at the level of individual vehicles/engines (i.e. specification of limit values)
- Option B: average targets per vehicle group on the basis of the vehicles placed on the market by each manufacturer (similar approach as for cars and light commercial vehicles)

Please indicate the order of your preference (numbers 1, 2, 3) for the different options:

	1 st	2 nd	3 rd
A	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
B	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Other option	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments on your choices on the options for the types of targets:

300 character(s) maximum

Assessing the compliance of an engine model that is used in vehicles from multiple OEMs would be very complicated. Cummins preference is for a structure that allows an engine family to be assessed independent of customer and volume.

## 6.3. Options for the timing of the targets

- Option A: fixed dates of application
- Option B: annual reduction targets

	1 st	2 nd	3 rd

A	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
B	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Other option	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments (please indicate also your suggestions for the first application date of targets as well as the quantitative annual reductions (for option B)):

*300 character(s) maximum*

Timing of standards should allow sufficient leadtime to allow for technology development and with a suitable period of stability between steps so costs can be recouped. If not feasible to set absolute levels for all steps out the outset then indicative levels should be communicated for latter stages

#### 6.4. Options for the setting of the quantitative targets

- Option A: Targets (initial values and annual reductions, if applicable) are defined ex-ante by the legislation by relative technology improvements over some baseline (as for cars and vans)
- Option B: Targets for the year  $y + n$  ( $n \geq 1$ ) are defined by the performance of a certain percentile of best performing vehicles in the year  $y$  ("top runner" approach) with a minimum yearly target

	1 st	2 nd	3 rd
A	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
B	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Other option	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments your choices on options for the setting of the quantitative targets:

*300 character(s) maximum*

Targets should be set only after the baseline and potential improvement trajectory is fully understood using the selected regulatory approach. When setting targets the impact of elements that may disrupt that trajectory (e.g. changes to criteria emissions regulations) should be considered

#### 6.5. Options for the scope of the legislation

VECTO and the underlying type approval legislation will provide certified CO<sub>2</sub> emission values for the four main groups of HDVs (Vehicle groups 4, 5, 9 and 10 as defined in Table 1 of Annex I of the [draft Commission Regulation](#) implementing Regulation (EU) No 595/2009 as regards the determination of the CO<sub>2</sub> emissions and fuel consumption of heavy-duty vehicles, which are responsible for about 65% of all HDV CO<sub>2</sub> emissions), which would also be addressed by the first step of regulatory binding targets.



Currently VECTO provides the CO<sub>2</sub> emission values for these trucks only for the long haul and regional delivery mission profiles.

However, there are also a limited (between 2 – 10% (indicative figures to be confirmed in the IA)) number of vocational vehicles in these groups, which serve for special purposes, for instance construction sites or waste collection.

- Option A: the targets are applied to all vehicles within the 4 main vehicle groups, regardless of their use and on the basis of the long haul and regional delivery mission profiles
- Option B: Separate targets are applied to vocational vehicles within the 4 main vehicle groups, on the basis of VECTO urban, municipal and construction mission profiles
- Option C: certain vocational vehicles to be specified are excluded for this first regulatory step

Please indicate the order of your preference (numbers 1, 2, 3) for the different options:

	1 st	2 nd	3 rd	4 th
A	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
B	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other option	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments on your choices on options for the scope of the legislation:

*300 character(s) maximum*

The regulation structure should recognise the impact on CO<sub>2</sub> of different types of mission profile. For engine standards an option would be to use the different engine test cycles already defined in the Euro VI emissions regulation, the WHTC could be used for vocational and the WHSC for long haul.

Can you suggest technical criteria for the definition of 'vocational' trucks?

*200 character(s) maximum*

## 6.6. Options for the metric for expressing the targets

The CO<sub>2</sub> emission targets will have to be formulated in terms of a certain "metric", meaning that the regulatory target corresponds to CO<sub>2</sub> mass emissions divided by some "transport utility parameter", e.g. mileage travelled (km), mileage travelled times weight (km x t) or volume (km x m<sup>3</sup>) transported.

- Option A: targets expressed in g CO<sub>2</sub>/km,
- Option B: targets expressed in g CO<sub>2</sub>/(km x t)
- Option C: targets expressed in g CO<sub>2</sub>/(km x m<sup>3</sup>)
- Option D: targets expressed in a combination of several metrics listed in options A to C

	1 st	2 nd	3 rd	4 th	5 th
A	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
B	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
D	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other option	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If other, please specify:

*200 character(s) maximum*

Engine standards expressed in g/kWhr combined with vehicle level emissions expressed in the metric suitable for intended mission of vehicle

Comments on your choices on options for the metric for expressing the targets:

*300 character(s) maximum*

A distance focused standard would not be suitable for application to the engine so suggest using the metric typically used for engine emissions limits (g/kWhr). For vehicle emissions we see the need to recognise the mission HDV are designed to perform so a combination of option B & C may be suitable

Would you suggest any other metric for expressing the targets?

*200 character(s) maximum*

See description of 'other'

## 6.7. Options regarding mission profiles

For mainstream HDVs used for the transport of goods, VECTO simulations provide four different CO<sub>2</sub> emission values: for a regional delivery and long haul driving pattern, each driven "empty" and a "typically full" payload. Targets may apply to each of these four emission profiles separately or as a weighted average.

	YES	NO	Neutral
Should all four mission profiles be applied to all HDVs?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Should the targets be defined for each mission profile separately?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Should the targets be compared with a weighted average of the mission profiles?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

If no, according to what criteria should certain mission profiles not be applied and to what sorts of HDVs?

200 character(s) maximum

It is logical to recognise that long haul and regional missions on the same vehicle are likely to result in different CO<sub>2</sub> emissions, for simplicity payload could be set to a median for the vehicle

## 6.8. Options regarding utility parameters

Any future legislation defining targets aims at achieving a certain level of CO<sub>2</sub> savings for the least overall costs while ensuring that the requested transport utility is still available. If the design of a vehicle (e.g. stronger engine or higher transport volume) has an impact on CO<sub>2</sub> emissions and the vehicle's utility, it may have to be factored into the applicable target (e.g. by choosing appropriate utility factors and formulas setting the targets as a function of thereof). In the case of cars and vans, mass is used as an utility parameter in the current legislation on CO<sub>2</sub> emission standards.

Should utility parameters be used for regulating CO<sub>2</sub> emissions from HDVs?

☒ YES ☐ NO ☐ Neutral

If yes, what utility parameter should be used and factored in for setting the targets?

200 character(s) maximum

Cycle work over the engine test cycle (e.g. WHTC) should be considered as a potential utility factor in the setting of engine standards as brake specific CO<sub>2</sub> is typically proportional to it

## 6.9. Options for elements supporting cost-effective implementation of the targets

Several options can be considered to support the cost-effective implementation of the targets, which may however also create additional administrative burden:

- Pooling: Several manufacturers may decide to combine their vehicle fleets for assessing the compliance with the regulatory targets (as in the case in the cars and vans CO<sub>2</sub> legislation.)
- Banking and borrowing: A manufacturer may compensate non-compliance with targets in a given calendar year by over-achievements in previous ("banking") or future ("borrowing") years according to well defined regulatory rules.
- Trading: a manufacturer over-achieving its targets may sell corresponding credits in order to facilitate compliance of other manufacturers.
- Transfer of credits between vehicle groups of a manufacturer. In the case of targets set at the level of each vehicle group, a manufacturer may transfer credits between the different groups of its vehicles.

What are your views on these options?

	YES	NO	Neutral
Pooling of manufacturers	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Banking and borrowing	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Trading between manufacturers	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Transfer of credits between vehicle groups of a manufacturer	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please provide your comments on these or possible other elements for supporting cost-effective implementation:

*500 character(s) maximum*

Cummins supports an efficient system of CO2 credit banking/trading or transference but feels that, to avoid any unintended dilution of the regulation, credits should not be fungible between the different aspects regulated i.e. credits for the engine should not be transferable to the vehicle.

## 7. Governance - HDV CO<sub>2</sub> certification and real driving emissions

Under the current process, CO<sub>2</sub> emissions of HDVs are certified on certain pre-defined mission profiles, the design of which is inspired by real driving data.

What are your views:

	YES	NO	Neutral
Will it be important to develop processes assessing the certified CO <sub>2</sub> emissions against real driving emissions of HDVs?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
If such processes are being developed, should there be some ex-post feedback mechanism requiring compliance of the certified CO <sub>2</sub> emissions with real driving emissions (within certain tolerances)?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Can you suggest such a process?

*500 character(s) maximum*

The term RDE suggests demonstration of conformity across an undefined range of duty cycles, using this open ended structure would put an unnecessary burden on manufacturers. If an in-use CO2 conformity assessment is felt necessary it should utilise a standardised test process that encapsulates a sufficiently wide range of operating modes that the majority of the likely real world operation is effectively captured. The process employed in Euro VI has proven effective for criteria emissions.

## 8. Additional comments and Upload of Documents

If you wish to add further information, comments or suggestions – within the scope of this questionnaire – please feel free to do so here:

*1000 character(s) maximum*

Due to apparent website issues it was not possible to include intended comments here - please see attached document

In addition, you could also upload a document providing further information, comments or suggestions.

The maximum file size is 1 MB

**bcc54bce-fb23-44d3-b2c3-e8c3ee1aebeb/Cummins\_comments\_ref.\_\_HDV\_CO2\_standard\_-  
\_Supporting\_Jan\_2018\_consultation\_input.pdf**

## Contact

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