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COMMISSION STAFF WORKING DOCUMENT
EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the document

Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulations (EC) No 715/2007 and (EC) No 595/2009 as regards the reduction of pollutant emissions from road vehicles

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1. PROBLEM DEFINITION

1.1. Policy context

Common European emission standards defined in a series of EU Directives set acceptable limits for toxic exhaust emissions of all light duty vehicles (LDV) and heavy-duty vehicles (HDV) sold in the EU. The Euro standards are formulated according to a split-level approach, which means that essential aspects are contained in a main instrument that is agreed via the ordinary legislative procedure, while non-essential technical aspects are regulated by means of delegated or implementing legislation. The corresponding two main instruments are:

- Regulation (EC) 715/2007
- Regulation (EC) 595/2009

1.2. Identified problems

Within the overall context of air pollution, global warming and regulatory simplification, six specific problem areas have been identified where market and regulatory failures hinder addressing the overarching challenges:

- (1) Potential to reduce fuel consumption through efficient driving behaviour insufficiently exploited

The potential to reduce fuel consumption through efficient driving behaviour is insufficiently exploited. The technical support for eco-driving is focused on fuel consumption meters (FCM) and gear shift indicators (GSI). GSI have already been made mandatory in new passenger cars of category M1 which are fitted with a manual gearbox. In contrast to that, no legal requirement exists to fit FCM in any category of motor vehicle at present. However, studies¹ show that the potential of eco-driving can be better exploited when using FCM and GSI at the same time.

- (2) Scope of ammonia (NH₃) emission limits threaten to drive HD natural gas vehicles out of the market

Ammonia (NH₃) limit value has been set in Euro VI emissions legislation² for all HDV regardless of the engine type and became binding as of 31/12/2012. This limit, in principle, was intended to mitigate a risk of ammonia slip (too much ammonia used in emission control systems) in HDV with diesel engines. As the formation of a small amount of NH₃ is also normal in the engine combustion process of petrol or natural gas engines which do not require ammonia based systems, this limit puts vehicles in this very small segment of the HDV market at a severe disadvantage. This would likely drive up the cost of vehicles such as compressed natural gas (CNG) fuelled transit buses considerably, which would encourage their replacement with otherwise more polluting diesel vehicles.

- (3) Upper mass limit of LD Euro 6 regulation necessitates two type approvals for some vehicle platforms

Currently there is a strict reference mass limit defining whether vehicles have to be approved for their emissions according to light or heavy duty legislation, therefore different variants of the same vehicle type can be located on different sides of the borderline. The consequence is that the same vehicle type will need a double

¹ TNO 2010, Effects of a gear-shift indicator and a fuel economy meter on fuel consumption.

² Regulation (EC) 595/2009

emissions certification which requires double testing. This creates considerable costs for the manufacturer, without delivering any obvious environmental benefits.

(4) Euro 6 LD Low temperature emission limits not adjusted to technical progress

The emissions of modern LDV are reduced by after-treatment systems or internal engine measures. Current Euro 5 limits for hydrocarbon (HC) and carbon monoxide (CO) no longer reflect the technical progress made over last years. In addition, no Euro 6 NO_x emission limits at low temperatures are defined yet.

(5) Euro 6 LD emission regulation specifies a limit value for total emissions of nitrogen oxides (NO_x), but no separate limit value for nitrogen dioxide (NO₂)

Nitrogen oxides (NO_x) emitted by motor vehicles consist of nitrogen oxide (NO) and nitrogen dioxide (NO₂). Direct NO₂ emissions are considered particularly problematic as they have the most significant health impacts in inner-city areas. To ensure that the use of modern emission control technologies do not result in an increase in direct NO₂ emissions, specific NO₂ emission limits are already foreseen for HDV in the Euro VI legislation, while the current Euro 6 LDV emissions regulation only specifies a limit value for total emissions of nitrogen oxides NO_x.

(6) Euro 6 LD THC emission limits cause problems for CNG vehicle manufacturers

The current Euro 6 LDV emission limits for total hydrocarbons (THC) include the methane and non-methane hydrocarbon (NMHC) emissions. The main reason for the inclusion of methane is the fact that it is a strong greenhouse gas. However, it would be more appropriate to add methane to the CO₂ equivalent emissions of a vehicle and to "deregulate" methane emissions at type approval. This would also help the entry into the market of natural gas vehicles (NGV). The inclusion of methane therefore makes it difficult for NGVs to meet THC limit values while such vehicles produce lower overall GHG emissions per distance travelled.

1.3. Who is affected, in what ways and to what extent?

A range of different groups are affected by the problems discussed above:

- The population of the European Union is affected by poor air quality through the acute and chronic effects on health³.
- Consumers of motor vehicles are affected by changes in the price of new vehicles. However, they may also profit from increased fuel economy;
- Manufacturers of motor vehicles are affected as stricter emission limits necessitate development of new technologies. However, manufacturers could benefit from simplification and a possible revision of NH₃ and THC emission limits. The impact on third-country manufacturers is not expected to differ from the impact on domestic ones;
- Component suppliers may be affected by increasing demand for certain components. SMEs are almost exclusively located at the beginning of the automotive supply chain and the effect on them is expected to be minimal.

³ WHO 2004, Health aspects of air pollution.

2. ANALYSIS OF SUBSIDIARITY

In line with other legislation concerning the type-approval of motor vehicles, the action under consideration is based on Article 114 of the TFEU ensuring the functioning of the internal market. As the initiative under consideration concerns amendments to existing EU legislation, only the EU can act effectively. European Union action is also necessary because of the need to avoid the emergence of barriers to the single market, and because of the transnational nature of air pollution and climate change.

3. OBJECTIVES

The general policy objectives are:

- To ensure the proper functioning of the internal market; and
- To provide for a high level of environmental and health protection in the European Union.
- To contribute to the European Union's ambitious Greenhouse Gas reduction targets.

The specific objectives are:

- to have emissions legislation and type approval requirements that reflect technical progress and address regulatory failures that have been identified; and
- to make use of simplification potential in the legal framework; and
- to improve the efficiency of driving patterns in order to reduce air pollutant and GHG emissions.

The operational objectives are:

- to ensure that new motor vehicles are equipped with systems assisting the driver in eco-efficient driving style where potential fuel savings are not fully exploited;
- to avoid that the agreed NH₃ limits for all heavy duty vehicles obstruct market-uptake of certain positive ignition vehicles;
- to resolve the need for costly double emissions certification and thereby eliminate unnecessary compliance cost;
- to enable the Commission to propose updated low temperature emission limits by way of delegated act if this is deemed necessary and justified by the evidence base;
- to enable the Commission to propose a separate NO₂ limit for LDV by way of delegated act if this is deemed necessary and justified by the evidence base;
- to enable the Commission to propose the deregulation of methane emissions by way of delegated act if this is deemed necessary and justified by the evidence base, and provided that methane emissions are included as CO₂ equivalent emissions under the automotive CO₂ Regulation.

4. POLICY OPTIONS

In line with the identified problems described in section 1.2, concrete policy options for addressing the first three problem areas are presented below:

(1) *Potential to reduce fuel consumption through efficient driving behaviour insufficiently exploited*

Option 1: No changes to the existing situation

Option 2: Mandatory fuel consumption meters for all LD vehicles and extension of the mandatory installation of gear shift indicators from only passenger cars to all LD vehicles

Option 3: Introduce mandatory FCM for LD and HD vehicles and extend the mandatory installation of GSI from only passenger cars to all LD and HD vehicles

(2) *Scope of ammonia (NH₃) emission limits threaten to drive HD natural gas vehicles out of the market*

Option 1: No changes to the existing situation

Option 2: Change the scope of the Euro VI NH₃ limits so that they only apply to HDV with compression ignition engines

(3) *Upper mass limit of LD Euro 6 regulation necessitates two type approvals for some vehicle platforms*

Option 1: No changes to the existing situation

Option 2: Remove the upper mass limit of the LD Euro 6 regulation for emission purposes

For the specific problems 4-6 mentioned above, the options are to either leave the current situation unchanged or to introduce mandates for delegated acts to the relevant type approval regulations. .

5. ASSESSMENT OF IMPACTS

5.1. Approach

Policy options are being analysed in a proportionate way and with focus on the economic (effects on industry and consumers) and environmental aspects (emissions of greenhouse gases and pollutants). Due to the low order of magnitude of the possible employment effects, the scope for meaningful quantification of social impact is very limited.

Given that the regulatory options identified in problem areas 4, 5 and 6 are aimed at giving the Commission a mandate to amend or supplement emission legislation, no assessment of impacts is provided for these options. Therefore, the present report is focused on providing a proportionate assessment of the impacts of the policy options devised to address problem areas 1, 2 and 3.

5.2. Assessment

(1) Potential to reduce fuel consumption through efficient driving behaviour insufficiently exploited

OPTIONS	ECONOMIC	SOCIAL	ENVIRONMENTAL
Option 1:	No additional economic impacts expected.	No impact on employment expected.	The continued absence of technical systems assisting the driver in adopting an eco-efficient driving style from parts of the vehicle fleet would result in a foregone

			reduction of pollutant and GHG emissions
Option 2:	Moderate additional costs, for producers, estimated to be 0-10 EUR per vehicle for FCM and 0-15 EUR for GSI ⁴ .	No effects on employment are expected.	CO ₂ emission savings are expected. Those are directly linked to reduced fuel consumption conservatively estimated at 1% for an average driver.
Option 3:	No precise cost estimates exist for FCM and GSI to be installed in HD vehicles. Costs for FCM are probably of the same order as costs for LD vehicles. Costs for GSI are estimated to be significantly higher.	Due to the relatively low order of magnitude of the cost increase, no effects on employment are expected.	Due to a number of HD specific issues the additional positive environmental impact of option 3 over option 2 is considered to be very limited.

It should be noted that in light of the rather low cost of FCM and GSI in LD vehicles, even a relatively low fuel saving potential will make the investment pay off very quickly.

While, in principle, positive effects on eco-driving and therefore reductions of CO₂ emissions can be expected when installing FCM and GSI in HD and LD vehicles, the additional benefits of including HD vehicles would very likely be marginal.

(2) *Scope of ammonia (NH₃) emission limits threaten to drive HD natural gas vehicles out of the market*

OPTIONS	ECONOMIC	SOCIAL	ENVIRONMENTAL
Option 1:	The estimated additional material costs amount to EUR 48 million per year and the additional project costs would be in the range of EUR 60-80 million per year.	The order of magnitude of the cost increase suggests that the market potential of these vehicles would be seriously diminished. This would disproportionately affect specialised small and medium sized component suppliers.	The NH ₃ emission reduction would be largely insignificant. The reduced market potential of natural gas buses would likely result in an increase of PM, NO _x and CO ₂ emissions.
Option 2:	A positive economic impact for manufacturers and operators of natural gas HD vehicles is expected, as additional material and project costs estimated to be EUR 108-128 million per year would be avoided.	The effect on employment is expected to be neutral or slightly positive. There may be some limited creation of jobs in manufacturing of natural gas HD vehicles. The potential negative effects on employment under the baseline would be avoided.	The additional NH ₃ emissions would be largely insignificant. Positive environmental effect with respect to the emissions of NO _x and CO ₂ expected

(3) *Upper mass limit of LD Euro 6 regulation necessitates two type approvals for some vehicle platforms*

OPTIONS	ECONOMIC	SOCIAL	ENVIRONMENTAL
Option 1:	The additional development costs are	No impacts on employment are	No environmental impacts are expected.

⁴ TNO 2010, Effects of a gear shift indicator and a fuel economy meter on fuel consumption

	difficult to estimate, but are expected to correspond to several million Euros per calibration. Administrative costs for two type approval procedures are limited (in the order of 100 000 EUR per type approval)	expected.	
Option 2:	Additional choice at type approval, which would reduce the regulatory burden in particular for vehicle platforms with some vehicles above and others below today's LD-HD reference mass borderline.	No major employment impacts are expected. It should lead to cost reductions that could potentially translate into lower prices for buyers.	No negative environmental effects are expected.

Given the different nature of the issue areas covered by this impact assessment, there are no synergies or trade-offs between the options assessed in different areas. Their cumulative effect across options is therefore equal to the sum of the parts.

6. COMPARISON OF OPTIONS

When comparing the policy options in the three problem areas that were subject to a detailed assessment of impacts, the following picture emerges:

COMPARISON OF THE OPTIONS FOR PROBLEM 1			
Potential to reduce fuel consumption through efficient driving behaviour insufficiently exploited			
OPTIONS	EFFECTIVENESS	EFFICIENCY	COHERENCE
Option 1: <i>No changes to the existing situation</i>	N.A	N.A	N.A.
Option 2: <i>Introduce mandatory fuel consumption meters (FCM) for LDV vehicles and extend the mandatory installation of gear shift indicators (GSI) from only passenger cars to all LD vehicles</i>	HIGH	MEDIUM	HIGH
Option 3: <i>Introduce mandatory FCM for LD and HD vehicles and extend the mandatory installation of GSI from only passenger cars to all LD and HD vehicles</i>	HIGH.	LOW	MEDIUM.

Option 2 emerges as the preferred one from this comparison, as it is the more efficient way to address the problem. The positive environmental impacts of option 3 are unlikely to be significantly higher than the ones for option 2. Although there will be some limited, additional environmental benefits of option 3 over option 2, these are unlikely to be proportionate to the costs. Therefore, at the current stage, the mandatory installation of GSI or FCM in HD vehicles appears difficult to justify.

COMPARISON OF THE OPTIONS FOR PROBLEM 2			
Scope of ammonia (NH3) emission limits threaten to drive HD natural gas vehicles out of the market			
OPTIONS	EFFECTIVENESS	EFFICIENCY	COHERENCE
Option 1: <i>No changes to the existing situation</i>	0	0	0
Option 2: <i>Change the scope of the Euro VI NH3 limits so that they only apply to HDV with compression ignition (diesel) engines</i>	HIGH	HIGH	HIGH

Option 2 is clearly preferable to the baseline, as it solves the problem without creating any costs. The coherence with EU policy objectives is high as the environmental and social impacts are expected to be positive on balance

COMPARISON OF THE OPTIONS FOR PROBLEM 3			
Upper mass limit of LD Euro 6 regulation necessitates two type approvals for some vehicle platforms			
OPTIONS	EFFECTIVENESS	EFFICIENCY	COHERENCE
Option 1: <i>No changes to the existing situation</i>	0	0	0
Option 2: <i>Remove the upper mass limit of the LD Euro 6 regulation for emission purposes</i>	HIGH	HIGH	HIGH

Option 2 is clearly preferable to the baseline, as it solves the problem without creating any costs. No negative environmental or social impacts expected.

7. MONITORING AND EVALUATION

A joint evaluation of the measures contained in this impact assessment and the follow-up impact assessment could be usefully carried out five years after entry into force. Reporting mechanisms are already in place to monitor ambient air quality and Member States' adherence to Community air quality objectives. These reporting mechanisms also generate data that allow the monitoring of pollutant emissions.

The compliance of motor vehicles sold in the European market with EU requirements is checked by the national type approval authorities during the approval process for new vehicle types. These existing reporting mechanisms, therefore, would allow the Commission to monitor the effects of the proposed legislation to a certain extent.