

Summary

This paper is a response from Transport & Environment to the ‘Consultation on the revision of Directive 97/68 on emissions from non-road mobile machinery engines’ by the European Commission¹.

Our key points are

- Given serious persistent air quality problems in Europe, Euro VI levels for heavy duty on-road engines should serve as a benchmark for new standards for NRMM. We are concerned with the much lower ambition levels hinted at in the consultation document.
- In particular there is a need to solve the problem of diesel particles, and related black carbon, once and for all by introducing Euro VI equivalent standards for particle number count for all engines covered;
- The scope of the legislation should be extended to also cover engines below 37kW and above 560 kW, and by also including stationary applications (e.g. diesel generators, air conditioning engines);
- Following developments in standards for the on-road sector, we would prefer moving towards a regulation instead of a directive;
- Standards should be fuel-neutral.
- Greenhouse gas emissions (CO₂ and CH₄) should be measured and reported;
- Exemptions, flexibilities etc. should be cut drastically so that it is impossible to sell machinery equipped engines complying with an old standard a limited time after entry into force of the standard;
- In-service emissions need to be a top priority. As a minimum, relevant provisions of Euro VI legislation should be copied to also cover non-road engines;
- Emissions from existing engines need to be addressed;
- Transparency should be ensured by mandatory publication of engine emissions performance in an EU-wide publicly accessible database.

Ancillary climate benefits - black carbon

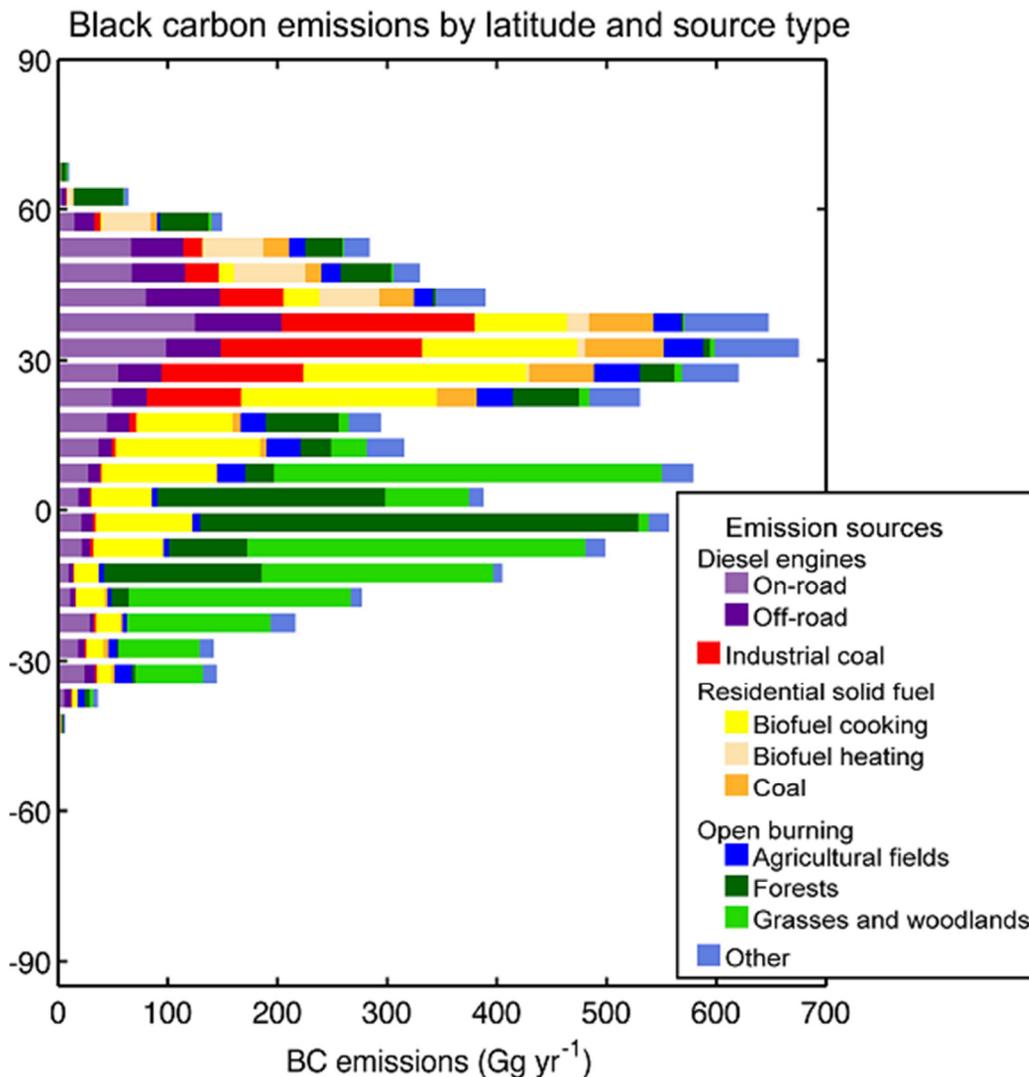
Emission standards for on and off road vehicles and machines have traditionally been justified on the basis of their advantages for air quality and human health, and on occasion (for example in the context of the national emission ceilings) also on their environmental advantages such as acidification and eutrophication. For machines operated at building sites and the like, occupational health is significant additional concern.

In addition, in recent years it has become clear that in particular diesel particulates have impacts far beyond those on human health. In fact, so-called ‘black carbon’ emissions (dark tiny carbon particles which absorb sunlight) contribute significantly to climate change.

¹ http://ec.europa.eu/enterprise/sectors/automotive/documents/consultations/2012-emissions-nrmm/index_en.htm

By far the most comprehensive assessment on black carbon and the global climate was published in January 2013². It concludes that '*black carbon, with a total climate forcing of +1.1 W m⁻², is the second most important human emission in terms of its climate-forcing in the present-day atmosphere; only carbon dioxide is estimated to have a greater forcing.*'

Part of the warming impact is caused by deposition of black carbon on snow and ice, which accelerates melting. Emissions over 40 degrees of latitude are particularly important in this respect since a large part of these emissions ends up being deposited in the arctic. See the graph below.



The graph shows that above 40 degrees latitude i.e. latitudes above which significant parts of black carbon emissions end up in the arctic region, BC emissions from off-road diesel engines (the dark purple parts) constitute a significant part of total BC emissions.

This adds to the urgency to address PM emissions from non-road diesel engines.

Simplification of standards

² Bounding the role of black carbon in the climate system: A scientific assessment, Bond, T.C. et al, January 2013

Current standards for non-road engines are a difficult-to-understand patchwork. Standards per category differ without any apparent reason. Sometimes even standards for similar engines differ depending on application. For some engines Stage 4 standards do not even exist. The transition rules add dramatically to the confusion.

We would propose a drastic simplification according to the following principle:

- Use Euro VI levels as baseline standard for Stage V;
- Skip stage IV for engines for which Stage IV does not yet exist, and move straight towards Stage V;
- Scrap the upper (560kW) limit in terms of kW so that all non-road engines are covered, and extend lower (19kW) limit in line with US EPA categories;
- Make standards equal for constant and variable speed engines, as well as stationary engines;
- Make standards equal for all fuels, and make them fuel-neutral i.e. the same standards regardless of fuel used;
- Drastically cut and simplify flexibility and other transitional provisions.

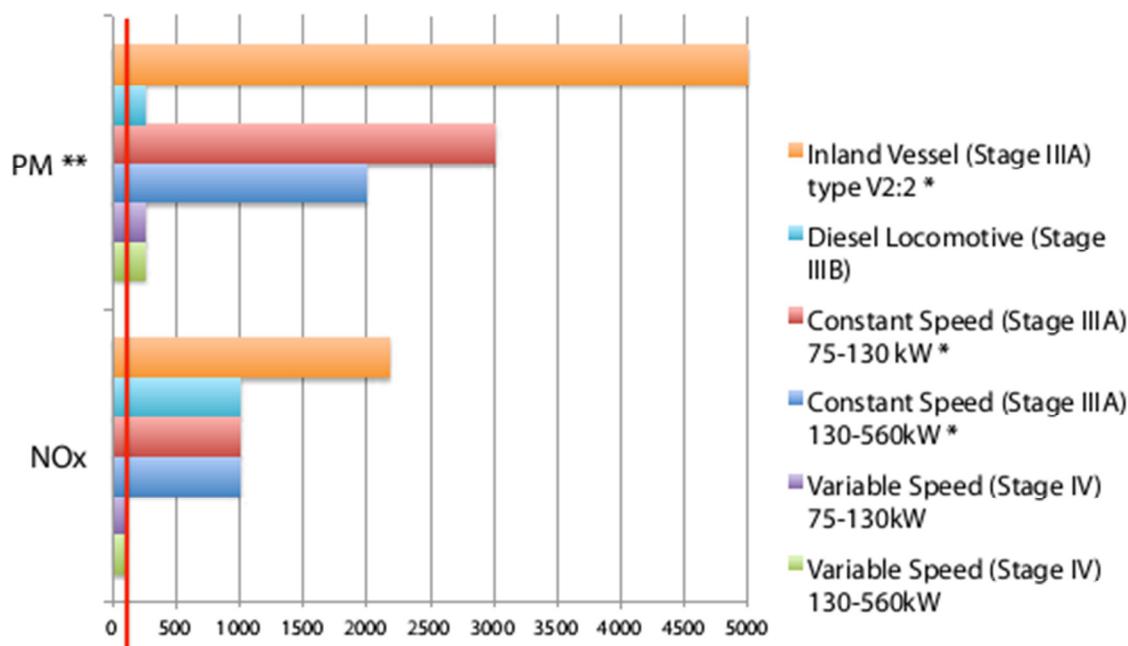
There is, however, one area where current legislation is too simple because virtually non-existent: compliance. Off cycle emissions, conformity of production, durability, and market surveillance all need drastic strengthening.

Euro VI standard as benchmark, rather than US EPA

One of the key questions to be answered for this review is what the departing principles should be for setting new, Stage V, standards. For four reasons we believe that Euro VI levels offer a better point of departure than US EPA Tier 4 standards:

- First and foremost, Euro VI has a tighter particle emissions standard and, crucially, includes a particle number standards, whereas US EPA does not;
- Second, US EPA standards for locomotives, railcars and inland waterway engines are too weak. There is no environmental or cost effectiveness argumentation for weaker standards; the engines are not technologically different and not smaller;
- Third, US EPA standards for engines over 560 kW are disappointingly weak. There is no reason to give bigger engines a more relaxed standard, On the contrary, in general, the bigger the engine, the better the cost effectiveness of environmental standards;
- Finally, applying Euro VI levels would mean that manufacturers that comply with EU standards can sell anywhere in the world, giving industry operating in Europe an advantage.

The graph below illustrates the wide variation of current emission standards in place for non-road engines, and the distance to the Euro VI standard in place for lorry engines.



Euro VI emission limits

* These standards are expected to be reviewed in the next revision of the Directive

** Euro VI limits on particulate matter include a PN limit value!

Specific: the need for a PN standard

It has become clear that the current Stage IV PM standards are inadequate. Engine manufacturers even advertise the fact that they don't need particle filters to meet the standard³.

While from a marketing point of view this might be understandable, from an environmental point of view this means that the number of particles emitted is one or two orders of magnitude higher than they could be if a closed filter were used.

There is hence an urgent need to set particle emission standards that implicitly force the use of state-of-the-art i.e. closed filters. Again, the Euro VI standard, in particular the particle number limit contained in Euro VI, does just that.

We see no reason not to include PN standards right now in the proposal for co-decision. Euro VI PN standards have proven to be feasible for lorry diesel engines. A straightforward and cost effective technical solution exists, the closed diesel particulate filter (DPF). Delaying PN standards to implementing regulations will only delay the whole process further.

In addition, from a democratic point of view, it is questionable to leave the setting of such a crucial standard to a technical committee.

³ Two examples: <http://www.perkins.com/cda/layout?m=96600&x=7&id=3470264>
http://www.scania.com/images/P12401EN%20Stage%204%20ready%20engines_tcm40-302905.pdf

Scope: include larger and smaller engines

We agree that larger and smaller engines, below 19 and above 560 kW respectively, should be included.

For engines over 560 kW Euro VI–equivalent standards should apply, there is no reason to set looser standards for bigger engines.

Also, identical PN standards should apply to all engines covered, from small to large.

From NRMM to NRM legislation – include stationary engines

There is no economic or environmental reason not to include stationary engines, for example diesel generators or air conditioning systems, in the legislation. We agree with the intention to include them.

Exemptions, derogations, transitions

It is ironic that the plethora of flexibility provisions in the legislation - originally introduced for supposed economic reasons, sometimes even in the context of the crisis – is now resulting in *'unmanageable production cycles for engine manufacturers with severe economic consequences'* as the consultation document puts it.

Clearly the combined impact of sell-off and flexibility provisions makes it extremely difficult to predict demand for specific engines with specific emission classifications – are customers going to use the provisions or not ? And if yes, to what extent ?

Clearly there is a need to clean-up. We support the proposals mentioned in the consultation document, in particular to introduce a hard cut-off date where all machinery sold needs to be equipped with compliant engines. We think two years is generous in that respect.

Greenhouse gas emissions

We insist that, just like is happening with Euro VI standards, greenhouse gases need to be measured under any new emission standard proposed.

This will at least have to include CO₂ and CH₄ (methane), given the expected wider take-up of natural gas engines. Methane is a powerful greenhouse gas and so stable that it is not converted by oxidation or three-way catalysts and should hence be addressed separately.

Measurement and publication of these emissions allows industry and public authorities to make the best-informed decision possible and gives an additional incentive to minimise these emissions too.

Fuel-neutral standards

There can be no privileged treatment for any type of fuel. Standards need to be fuel-neutral, even between petrol and diesel. We believe that in the road sector, setting more lenient standards for diesel engines has been a mistake. Exemptions for specific technologies tend to grow into unintended loopholes.

From directive to regulation

In recent years, all legislation governing on-road emission standards has been transformed from directives to regulations. This has increased clarity, avoided uneven implementation, and facilitated early adoption because national transposition is not needed.

Therefore we support designing new rules in the form of a regulation rather than a directive.

Compliance

There are several reasons why in-service emissions are typically higher than the emission standards. Engines for type approval are typically specifically prepared. Engines are optimised for the test cycle. Engines, catalysts and filters can all deteriorate.

Regulation 582/2011 (implementing rules for Euro VI lorry engine standards), in particular in its articles 12-16 and the corresponding annexes, specifies a number of procedures for controlling in-service emissions of heavy duty engines for lorries and buses. As a minimum, these requirements should where applicable be used for non-road engines too.

Market surveillance should be stepped up in order to identify and ban non-compliant new engines from the market.

Existing engines

Given the slow turnover rate of the fleet of non-road engines, existing engines will pollute the air for a long time to come if nothing is done.

The UN-ECE REC working group is harmonising standards for retrofit devices. As soon as such standards have been agreed, the EU should do everything in its power to promote their application; for example by allocating funds, and by including application of such devices into air quality action plans that non-compliant member states need to draw up.

Additionally, a regime should be set up to identify and address 'super-emitters'; machines that clearly and often even visibly emit much more than any sensible standard would allow.

Transparency

Emission data of engines need to be publicly available in a single comprehensive EU database that should be publicly available and easily accessible, on the internet. The same has happened, for example, with the CO₂ regulations for cars and vans, as well as environmental and safety standards for tyres.

An easily accessible central EU database will greatly help purchase managers and public authorities select the cleanest possible options, as well as facilitate monitoring of compliance and market penetration.