CER

The Voice of European Railways

POSITION PAPER

CER POSITION ON THE NRMM DIRECTIVE

Consultation on the revision of Directive 97/68/EC on emissions from non-road mobile machinery engines

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COMMUNITY OF EUROPEAN RAILWAY AND INFRASTRUCTURE COMPANIES - COMMUNAUTÉ EUROPÉENNE DU RAIL ET DES COMPAGNIES D'INFRASTRUCTURE - GEMEINSCHAFT DER EUROPÄISCHEN BAHNEN UND INFRASTRUKTURGESELLSCHAFTEN

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1. POLITICAL AND LEGISLATIVE BACKGROUND

The purpose of this paper is to share with the European Commission CER's view in response to the public consultation "Stakeholder Consultation on the revision of Directive 97/68/EC on emissions from non-road mobile machinery engines".

Despite the limits set by Directive 97/68/EC and its subsequent amendments, the NRMM sector has become an increasingly important source of air pollution, in particular of NO_x and particulate matter. In order to reverse this trend, the European Commission is exploring different options for revising the Directive. CER understands that the overall objective of the revision is to further contribute to the improvement of the air quality in Europe while at the same time ensuring the correct functioning of the internal market.

A strong political focus was put on rail exhaust emissions since the NRMM Directive was updated in 2004 to include diesel railcars and locomotives and drastic improvements have been made for rail with regards to NO_x and PM emissions**. The total emissions from rail diesel traction have continuously decreased since 1990 and are extremely low today compared to the transport sector as a whole**. Further improvements are expected from the legal introduction of the emissions limits of stage IIIB, which entered into force on 1st January 2012. Diesel traction only accounts for 20% of European rail traffic and the rail sector is looking at new technologies such as optimisation of fossil energy consumption, hybrid solutions or even carbon-free propulsion concepts in the long term in order to provide rail traction on non-electrified lines. Moreover, new engines and exhaust after-treatment systems are reducing the already low local emissions caused by rail diesel traction. However, rail diesel propulsion will still play an indispensable role for the European transport system in the coming years.

The Commission's 2011 Transport White Paper sets a vision for the future European transport system where railways play a significant role in passenger and freight traffic. The upcoming revision of the NRMM Directive must reflect the White Paper's vision and allow the rail sector to be competitive.

2. EMISSIONS TRENDS AND RAILWAYS INITIATIVES

Despite the low impact of rail transport on air quality[1], the sector has committed to further improve its emission performance. CER has adopted a strategy which sets specific targets to reduce the already low impact of rail on the environment even further. These targets include:

a. An exhaust emission reduction target: **by 2030 European railways will reduce their total exhaust emissions of NO_x and PM10 by 40%** in absolute terms compared to 2008 despite the projected traffic growth.

b. A CO_2 reduction target: by 2030 the European railways will reduce their specific average **CO_2 emissions from train operation by 50%** compared to 1990.

At the same time the rail sector is working on the CleanER-D project which will help the sector achieve these exhaust emission reduction targets. The project aims to develop, improve and integrate emissions reduction technologies for diesel locomotives and rail vehicles. Furthermore it uses innovative methods and hybrid solutions for the best possible contribution to reductions in CO_2 emissions.

[1] Rail contributes far less than road, shipping and aviation to the total amount of transport NO_x and PM emissions.

When it comes to future scenarios, diesel traction is expected to become cleaner and more efficient in terms of consumption of fossil energy in the coming decades. If we look at the fleet composition expected in the coming years, by 2020 the number of diesel locomotives operated in the EU is expected to be reduced from approximately 13,700[2] in 2010 to approximately 9,000, while the number of Diesel Multiple Units (DMUs) in the EU27 & EFTA will increase from approx. 9,000[3] trainsets to approximately 11,250. Intermediate scenarios from the CleanER-D project show that total NO_x emissions should be reduced by around 30% between 2008 and 2020. The expected drop in emissions is due to the substantial decrease in diesel locomotives numbers linked with electrification and to efforts of the sector when it comes to fleet development and fleet renewal (i.e. an increase in IIIA- and IIIB-compliant vehicles) and to higher load factors. To achieve further emission reduction targets, railways are investing in emission reduction programmes and activities such as eco-driving, energy savings programmes, introduction of start and stop systems.

3. RECOMMENDATIONS FOR THE FUTURE NRMM DIRECTIVE

Against the background of the modal shift targets proposed by the Commission in the 2011 Transport White Paper, the upcoming revision of the NRMM Directive is an opportunity to ensure that rail diesel emissions continue to be reduced in a cost-efficient way. The sector is continuously reducing its exhaust emissions. At the same time, it should be stressed that the relative cost for accommodating new and cleaner engines are higher than in the road market, due in particular to the small size of the rail diesel market.

Replacement engines

The replacement of original engines by new ones complying with the thresholds fixed by the updated legislation is very difficult to be performed in a technically and economically viable way, taking into account the technical limitations when fitting non-original engine types in existing vehicles.

Historically, railcar engines used to be developed for this specific application. The new ones consist mainly of engines of road origin in the lowest power classes and the low proportion represented by rail in the use of Diesel engines of this category. In spite of their good performances and their clean efficiency, they are designed for a service life which is much shorter than the one of the railcars themselves. This leads to the integration in the maintenance plan the possibility of repairing or replacing the engines throughout the entire life of the vehicles.

Existing rolling stock encounters significant technical constraints, for example maximum weight per axle and dimension (loading gauge) constraints or the ones coming from the incompatibility between the new engine and the internal control command of the trainset, when replacing the originally installed engines with a new engine complying with the emission standards in force at the time of replacement. In some cases, such a replacement is technically possible, but the modifications required for such an operation would be extremely costly, inefficient business-wise and generally uneconomic. In other cases, due to the limitations of available size on the vehicle (i.e. below floor and respecting clearances of track/platforms), installation of, for example, IIIB engines is impossible due to the additional equipment required for after-

[2] EU27 & EFTA, UIC member companies: approx. 10,200 active diesel locomotives (out of 13,300 active and non-active diesel locomotives), non-UIC members approx. 3500 diesel locomotives
[3] UIC member companies: approx. 7,000 DMUs (trainsets), non-UIC members approx. 2,000 DMUs (trainsets)

treatment. In these cases, the only solution is to attempt to retain life-expired, and more polluting engines or withdraw the vehicle before its normal economic life ends.

The costs inherent in either the modifications or premature withdrawal of vehicles would lead to increases in the price of rail transport services or even to a stop of the operation, in particular in rural and mountain areas where the economics of operation are finely balanced. Forcing railways to replace the original engine type with a new one could therefore produce a reverse modal shift from rail to road on several lines, which contradicts the objectives of the NRMM Directive and the vision of the 2011 Transport White Paper.

Railway operators encounter this problem, because the general exemption on the emission limits for replacement engines provided in Directive 97/68/EC does not apply to railcars and locomotives. This issue has been only partially solved with the limited revision of the NRMM Directive, where the technical constraints of fitting IIIB-compliant engines in existing rail vehicles have been recognised[4]. As a consequence, Member States may authorise the replacement of engines in existing (pre-2012) vehicles with Stage IIIA-compliant engines, by means of a derogation where there is the existence of "significant technical difficulties" in fitting IIIB engines.

While this was a step in the right direction, it failed to recognise the technical constraints existing in a limited number of cases with the installation of IIIA compliant engines in earlier vehicles because of the gauge, axle load and design limits of such vehicles. Similar problems exist when new motored vehicles need to be inserted in existing train sets due to compatibility issues with the control-command of the engines within the existing set. **CER therefore welcomes the recommendation[5] from the European Parliament and Council Directive 2011/88/EU, which is to investigate the possibility of authorising, under strict conditions, replacement engines that do not comply with Stage IIIA requirements for existing railcars and locomotives.**

CER believes that such recommendations would ensure that the rail sector's progress in reducing emissions on existing vehicles will be continued. At the same time, it would oblige the fitting of the cleanest engine that can reasonably be expected to be accommodated in existing vehicles, whilst avoiding the retention of more-polluting engines and/or most of the waste that would be involved in scrapping still good railway vehicles well before their normal economic life expectancy.

Role of the European Railway Agency (ERA)

The revision of the NRMM Directive provides an opportunity to increase the involvement of the European Railway Agency (ERA) in the process of ensuring an effective coherence between this environmental directive and the technical and implementation requirements of the interoperability directive[6], of which the legal definition for railways include environmental protection, which is one of its essential requirements.

The placing in service of diesel vehicles equipped with compliant engines would then be regulated by the European Interoperability Directive implementation documents (TSIs) after an assessment of the European Railway Agency, which has developed great experience in carrying out rail-related impact assessments.

[4] Please see Article 1, §2(b) of Directive 2011/88/EU amending Directive 97/68/EC
[5] Whereas (2) 5th bullet of Directive 2011/88/EU amending Directive 97/68/EC
[6] Directive 2008/57/EC

Such a model would also allow for phasing together the development and placing in service of new vehicles compliant with both NRMM and e.g. revised noise TSI, thus significantly reducing the costs for adaptation without jeopardising the environmental benefits of the legislation.

On 26th June 2012, the ERA Administrative Board adopted a position paper about proposals on the governance and the functioning of the Agency, the §7 of which states "the Agency has skills, knowledge and competencies that can help facilitate other EU policies that have an impact on the development of railways. The Agency should be able to effectively interact in a structured way with other services of the Commission (such as DG Enterprises in relation with the NRMM directive)…"

Next emission stage and timeframe

Cost-effectiveness, technical feasibility and emission improvements gained through other initiatives than the thresholds put on the engine itself are key elements to consider when addressing the issue of emissions from the rail sector.

CER questions any move towards more stringent emission reductions for the rail sector in the current revision of the NRMM Directive. The fact that the ambitious IIIB emissions stage just kicked-in, as well as railways' own emission reduction initiatives, ensure a continuous reduction of emissions from the rail sector in the long term.

In any case, as already stated by CER and UNIFE in their common position paper of 22 May 2012, the next emission stage for rail should not be introduced sooner than seven years after the publication of the final requirement in the OJEU, taking into account the long periods of design, construction and authorisation for placing in service of a new rail vehicle type.

Flexibility Scheme or implementation through TSIs

The transition between two emission stages is complex, especially if the transition makes a drastic change in technology necessary. Because flexibility for locomotives during the transition from stage IIIA to stage IIIB was extremely limited, today some locomotive types cannot be supplied because no appropriate III B engines are available. As a result, operators cannot purchase certain power classes and instead have to keep older engines running for longer. In future, well-dimensioned flexibility schemes which reflect the market realities will be needed for the transition between two stages.

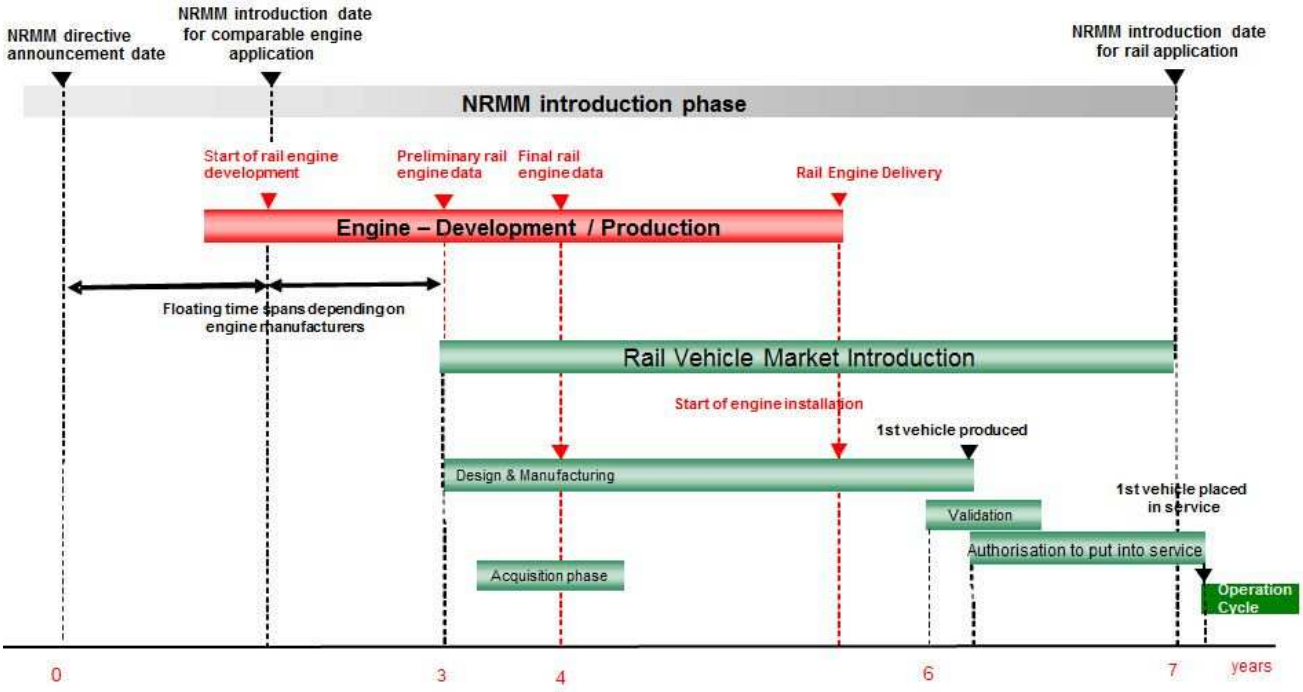
In line with the principle established in Directive 97/68/EC, CER calls on the Commission to ensure that a flexibility scheme is retained during the transition period between any two successive stages of emissions controls. The experience gained from the transition between IIIA and IIIB shows that the low production volumes of rail engines and the long development time of rail vehicles types (including the long time needed for the new vehicle authorisation due to the Railway specific European regulation) require a certain amount of flexibility. Particular consideration should be given to the degree of difficulty and length of time required to bring on to the market rail vehicles incorporating the new engines.

Furthermore, it should be stressed that the flexibility scheme as introduced by Directive 2011/88/EU does not solve the problem faced by railway operators concerning the manufacturing or modification of long series of the same type of vehicles. This can take more than seven years, after more than four to five years

of design, tests and type authorisation of this type of vehicle. In short, this means that the engine may be already designed before later emission threshold and sometimes even type-approved.

Specific measures, as the ones introduced in the Loc&Pas TSI[7] (with phase A for the type development and phase B for the series construction) shall allow long periods of production of a series of vehicles of the same type, in order not to impose a redesign of the type in the middle of the series in case of a new change in emissions thresholds having as a consequence a change of the engine type and its auxiliaries.

In summary, CER advocates a system whereby the emission limits, type approval and testing procedures for railway engines are fixed by the NRMM Directive, but the placing on the market of rail engines is covered by the rolling stock TSIs. CER would like to draw the Commission's attention to the timeframe required by the rail industry for the development, manufacturing, validation and certification of a new type of rail vehicle, which is shown in the following figure.



Because of the above mentioned reasons, and in order to ensure the availability of affordable engines that comply with new limits, CER proposes that the next emission stage after III B should not be introduced sooner than seven years after the publication of the final requirement in the official journal.

Finally, the current flexibility scheme does not solve the problem of replacement engines as described in the paragraph above.

Exhaust emission limits and derating

Another important issue that affects railway operators in the NRMM Directive in force today is the current distinction of exhaust emissions limits by application, i.e. railcars and locomotive engines. CER proposes to

[7] Decision 2011/291/EU of 26th April 2011

change the current distinction of exhaust emissions limits by application (railcars/locomotives) to a distinction by power categories (+/- 560 Kw).

While it is generally assumed that railcars engines are derived from truck engines, the picture of the railway engine market is actually more complicated. Railcars in the higher power range have engines derived from generator sets, mining or marine applications. The same engines are used in shunting locomotives. On the contrary, some small shunting locomotives are equipped with engines derived from the truck sector. There are indeed several examples of identical engines used in different railway applications. The 2007 JRC report already confirmed that the engine distinction between railcar and locomotive is not justified from a technical point of view.

Therefore, CER would like to propose to replace the current application distinction by a power distinction using the widely recognised limit of 560 kW.

This paper also intends to highlight that derating is unsuitable as an inducement measure for rail vehicles. Derating is unsuitable for rail because, unlike other modes of NRMM, rail vehicles depend on the infrastructure to steer them and as a result have no ability to move out of the way of following traffic. Vehicles travelling up steep gradients with engines derated may fail to produce enough tractive effort to overcome the gradient.

Test-cycles

CER proposes mandatory application of the F-cycle for all railway applications. Railway engines are niche markets. Despite a few exceptions, there are no dedicated railway diesel engines due to the very small number of engines sold in the rail sector as explained above.

When engine manufacturers have to adapt an engine for any applications, they are required to adapt the engine in order to comply with the applicable test cycle. The result of this adaptation process influences the pollutant emission behaviour of the engine, but also its fuel consumption and therefore its emissions of CO_2. It is therefore of utmost importance for the end-user, i.e. the rail operator, that the relevant test cycle represents as close as possible true operational conditions.

This is the only guarantee for the rail operator that the test cycle used for homologation is representative of real cycles encountered during service, but also that the engine is optimised with regard to fuel consumption and therefore CO_2 emissions. In this context, it should be noted that the engine fuel costs count for more than 80% of the total life-cycle cost of an engine.

The revision of the NRMM Directive provides an opportunity to include the F-cycle as the mandatory test cycle for all railway applications.

While performing the F-cycle adds two hours of testing to the certification procedure, it allows optimal emission behaviour and fuel consumption throughout the engine's operational service. The environmental and economic impact of the introduction of the F-cycles would therefore be very important.

CER's position is in line with the recommendations of the report of the Joint Research Centre of the European Commission "2007 Technical Review of the NRMM Directive 1997/68/EC as amended by Directives 2002/88/EC and 2004/26/EC", Draft Final Report, status: December 2007.

Stationary engines

Railway infrastructure managers and station managers have a lot of diesel stationary engines used only for rescue when the normal electric power source fails, in order to maintain a safe operating level of signal boxes, traffic control centres, stations, etc. The period in which are used every year is very limited and it would be counterproductive to impose these stringent emissions limits.

In service conformity

To install Portable Emissions Measurement System (PEMS) devices on railcars or even on locomotives may be very difficult and specific studies should be performed before trying and extending the results of the PEMS pilot program made on a farm tractor or a forklift truck.

Automatic stop of the engine in case of over passing the required emissions levels in rail applications could have severe safety consequences.

Therefore CER suggests not regulating such topics in the next revision of the NRMM directive.

Disclaimer

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