



HM Treasury



Department
for Environment
Food & Rural Affairs

Non-road mobile machinery and red diesel

Excluding use for agriculture, fishing
vessels, home heating and static
generators

Call for evidence

May 2018

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Contents

Chapter 1	Introduction	2
Chapter 2	What is red diesel?	4
Chapter 3	Air quality and NRMM	7
Chapter 4	Questions	10
Chapter 5	Next steps	15
Annex A	Main categories of NRMM eligible to use red diesel	18
Annex B	Licences, supply chain and international comparisons	20

Chapter 1

Introduction

- 1.1 At Spring Statement 2018, the government announced a call for evidence on the use of rebated gas oil (often called red diesel) by non-road mobile machinery (NRMM), in order to improve its understanding of what is preventing users from switching to cleaner technologies. Red diesel for agricultural use is outside the scope of this call for evidence, as is use by fishing vessels, home heating use and other stationary applications.
- 1.2 Later in the year, the government will consult on the Clean Air Strategy, setting out how we will work towards our emission reduction targets as well as continuing to deliver air quality improvements in the UK. This will require contributions from a range of emission sources, and today we are issuing this call for evidence to improve the data sources available to government about NRMM red diesel use and to contribute to a better evidence base for future policies.
- 1.3 This publication also builds on the previous call for evidence into the use of red diesel, launched on 20 March 2017.
- 1.4 As well as continued commitment to meeting legal limit values set for concentrations of pollutants, the UK has ambitious targets in place to reduce emissions of five damaging air pollutants (ammonia, nitrogen oxides, non-methane volatile organic compounds, fine particulate matter and sulphur dioxide) by 2020 and 2030.
- 1.5 Between 2010 and 2016, UK emissions of nitrogen oxides fell by almost 27 per cent. Air quality will continue to improve thanks to the action we have already taken. However, we recognise that more needs to be done which is why the government has committed £3.5 billion for tackling poor air quality and cleaner transport.
- 1.6 Red diesel use makes up over 15% of total diesel use, and we believe the majority of red diesel is used by NRMM. This call for evidence is therefore focused on NRMM. The supply chain that

links end users to the original refinery is regulated, hence the government has a good understanding of the suppliers and distributors of red diesel. However, the government has less information about end users and the geographic spread of red diesel use, and would like a better understanding of why red diesel is used, and what are the main barriers to switching to cleaner technologies.

- 1.7 We also want to know what cleaner alternatives currently exist. This information is relevant because of the impact diesel usage has on air quality, especially in urban areas where multiple uses of red diesel may be concentrated in single locations.
- 1.8 The government invites evidence on red diesel to explore the quantities used across different sectors, the value of the fuel duty rebate to those industries which benefit, the reasons for red diesel use and the cleaner alternatives that currently or will soon exist. We welcome data on equipment numbers, use, lifespan and cleaner alternatives, either technologies or practices.
- 1.9 This call for evidence will inform considerations for Budget 2018 about how best to encourage those who use mobile machinery, particularly in urban areas, to purchase cleaner alternatives.
- 1.10 Anyone with an interest in red diesel is encouraged to share their views. However, we would be particularly interested in the views of users, manufacturers and suppliers of NRMM, red diesel suppliers and industries that benefit from the use of red diesel and hold data we require. The government also invites environmental groups and representative bodies to submit their views. Genuine use in agriculture and fishing vessels is to be excluded, as is home heating use and other static generators.
- 1.11 Chapter 2 covers the technical nature of red diesel. Chapter 3 sets out the environmental impacts of air pollution, and the action the government has already taken to improve air quality. In particular, it concentrates on how far emissions of air quality pollutants from NRMM contribute to the UK's overall air pollution situation, which is most acute in some of our urban areas. Chapter 4 poses questions for respondents. Information about how to submit your responses can be found in Chapter 5. If respondents feel that there are issues that are not covered by the questions set out, but which are relevant to the government's call for evidence, they are welcome to submit additional evidence in their response.

Chapter 2

What is red diesel?

- 2.1 “Red diesel” is the term used for gas oil, commonly known as diesel, that is intended for use other than as fuel to propel road vehicles. Gas oil intended for use in diesel engine road vehicles (DERV) has a fuel duty rate of 57.95 pence per litre (ppl). Gas oil intended for other uses is entitled to a rebate of 46.81 ppl (an 81% discount) giving an effective duty rate of 11.14ppl.
- 2.2 Red diesel is so called because it has been a requirement since 1961 for it to be marked with a red dye as well as chemical markers (other than in circumstances where a technical marking waiver is granted). This is to enable its misuse in road vehicles to be identified.
- 2.3 Red diesel use accounts for 15% of total diesel used in the UK. Having a rebated rate for red diesel costs the Exchequer around £2.4 billion a year in lost revenue compared with if duty was charged at the main diesel rate.

Uses of red diesel

- 2.4 Red diesel is used in a large number of circumstances. Almost all forms of NRMM are eligible to use red diesel, insofar as they operate in an off-road context. We know that there are substantial amounts of red diesel that are used in NRMM, including many pieces of machinery that operate in urban areas, such as construction machinery, mobile back-up generators and airport users. A sample list of NRMM that is eligible to use red diesel is set out at Annex A.
- 2.5 In addition, red diesel usage is common in the following categories:
- heating – red diesel used for heating is known as ‘35 second oil’. Its use as red diesel for heating has declined with the availability of natural gas but it is still used ‘off-grid’ for the heating of commercial and public sector premises, and in agriculture for

heating animal sheds and processes such as drying grain, as well as some household heating. Use of red diesel for industrial heat in kilns and furnaces has similarly declined

- stationary engines – this includes static generating sets, for instance back-up capacity at power stations and stand-by generators
- mobile machinery – red diesel can be used to operate machinery mounted on road vehicles so long as the machinery is supplied from a separate tank, for example transport refrigeration units. It is also used in mobile generating sets
- ships – including inland waterways. Private pleasure crafts can use red diesel but suppliers must retain and repay to Her Majesty's Revenue and Customs (HMRC) the proportion of the rebate that relates to motive power rather than to generate electricity for use on board.
- rail – this use has reduced with electrification of the railways but not all passenger lines have been electrified. Freight trains mostly run on red diesel

2.6 Red diesel cannot be used for the propulsion of road vehicles but can be used in 'excepted vehicles'. This includes unlicensed vehicles used exclusively on private property, such as some construction and airport vehicles. It also includes other categories of vehicles that can be used on the public road if certain design and/or use criteria are met. This concession reduces compliance burdens on businesses that employ off-road machinery which is not intended for use on the road but which may unavoidably make incidental use of the road network. Examples of this are an agricultural tractor, or a works truck such as a fork lift which can travel short distances on the road in defined circumstances. A list of NRMM that use red diesel is contained in Annex A.

Reliefs

2.7 Reliefs from fuel duty are offered on red diesel in certain circumstances, for instance:

- greenhouses growing eligible produce qualify for full relief under the horticultural producers scheme. This relief allows the grower to reclaim all of the duty paid on any heavy oil used to heat the building or structure used for the growth of horticultural produce

- under the ship's stores relief or marine voyages relief duty can be reclaimed on red diesel used at sea other than in a private pleasure craft
- where red diesel is used to generate electricity for supply through a licensed supplier the duty can be reclaimed less any carbon price support payment due

Chapter 3

Air quality and NRMM

Air Pollution from NRMM

- 3.1 NRMM that run on diesel produce harmful emissions as a result of the combustion process. The main air quality pollutants are set out below:
- 3.2 Nitrogen monoxide (NO) and nitrogen dioxide (NO₂) convert into each other quickly in the atmosphere and are therefore referred to as Nitrogen Oxides (NO_x). NO_x is emitted from a wide variety of human activities, generally those which involve high-temperature combustion processes, such as the internal combustion engine or burning natural gas.
- 3.3 NO₂ has a detrimental effect on human health and is subject to maximum legal concentrations which must not be exceeded.
- 3.4 Particulate matter is made up of airborne solid and/or liquid particles, which have an impact on health and the environment. Most of the particulate matter in our air is formed by human activity, like biomass burning, industrial processes or transport.
- 3.5 Particulate matter (in particular, PM_{2.5}) is the air pollutant that causes the greatest harm to human health in Europe. In 2015, NRMM accounted for 5% of emissions of PM_{2.5}.
- 3.6 Non-methane volatile organic compounds (VOCs) are a wide range of chemicals which are released from a variety of human activities, from industrial processes and farming to use of everyday household items. Many VOCs are toxic to humans, and some are broken down by sunlight, forming ozone and secondary particulate matter in the atmosphere. In 2015, NRMM accounted for around 2% of VOCs emitted in the UK.
- 3.7 Ozone caused by the breakdown of VOCs is also harmful in its own right, acting as a respiratory irritant, damaging ecosystems and lowering crop yields. Ozone can also react with particulate matter which is already in the air and potentially increase its toxicity to

humans. The UK is committed to aiming to reduce levels of VOCs and ozone.

- 3.8 The last time that NRMM use in the UK was studied and quantified was in 2004, in a [report](#) by Netcen, part of AEA Technologies for the Department for Transport. The study included estimation of the size and range in the population of NRMM, their typical usage rates, their typical useful lifespan and approximate engine power, with the intention of informing the UK's atmospheric emissions inventory.
- 3.9 Since 2004, there may have been changes in technologies and practices in use of NRMM so it is timely to review the evidence base which informs the UK emissions inventory. Furthermore, we are interested in best practice and lower emission technologies available.

Current regulatory standards for NRMM

- 3.10 NRMM is subject to emission standards. At the moment, new engines for use in NRMM must be approved for sale before they can be placed on the market. There have been European emission requirements for engines used in this sector since 1999. The scope has been expanded and standards enhanced on a number of occasions, and the latest requirements ensure that all power categories of engine will be subject to emission limits, in particular small compression ignition (diesel) engines and large spark ignition (petrol) engines. The evolution of the scope and stringency has been driven by the need to address the most prominent NRMM emitters and technological advancements. It is now at the point where almost all new NRMM engines will be subject to emission limits. The latest NRMM Regulation encompasses a more stringent emissions standards known as Stage V, which is of roughly similar stringency to Euro 6 for lorries and buses.
- 3.11 Because NRMM emission standards apply to new engines when first placed on the market; we know that there are considerable numbers of older, "legacy" equipment which has high emissions because it was either subject to less stringent or no emission standards at all. Furthermore, emissions will also depend on how equipment is used. We are interested in understanding ways to promote greater uptake of the lowest emission options (practices and equipment), particularly through sharing data on emissions and best practice.

3.12 Our estimate is only 25% of red diesel is used for agriculture, which is not in densely populated areas. In urban areas, where emissions are of greater concern for human health, the main NRMM source is construction machinery – in London, 7% of NO_x and 8% of PM₁₀ emissions are estimated to come from machinery used in the construction and infrastructure building sectors. As emissions from road transport continue to fall this proportion is expected to increase in the coming years without further action.

Location data for NRMM is imprecise, partially due to the mobile nature of the equipment and the lack of data about where it is deployed. However, construction statistics produced by the Office for National Statistics provide some insight; with 24% of new construction work (by value) in Great Britain in 2015 taking place in London, and a strong positive correlation between the value of construction work (per hectare) in other regions and the proportion of land area that is urban in those regions.

Chapter 4

Questions

- 4.1 Alongside the wider actions which the government expects to be taken in the context of the Clean Air Strategy, we are interested in how far environmental improvements could be facilitated by cleaner NRMM, which have a superior performance in terms of air quality pollutants.
- 4.2 NRMM includes a very large range in the types of specialised machinery, ranging from small mobile generators up to enormous pieces of equipment for specialised purposes, such as cranes in port facilities. We are interested in understanding more about the investment decisions that owners and operators of such equipment make, when deciding on replacing and upgrading existing machinery; and in particular in whether we can improve the incentives for owners and operators of NRMM to consider the environmental and fuel economy performance of modern equipment, including those powered by alternative power or fuel sources.
- 4.3 In particular, we have heard reports from a number of stakeholders that environmental performance is currently only a very minor consideration in investment decisions for new NRMM equipment. In particular manufacturers of some types of machinery which are powered by alternative fuel sources report that demand is low, though there is little strong evidence as to whether financial or behavioural factors are most important in causing this low demand.
- 4.4 A number of possibilities may be at play, and the government would like better information in order to test these hypotheses:
- The cost of new NRMM is so significant that owners/operators will seek to extend the operating life of existing equipment for as long as possible. We know that in several segments of the NRMM category, machinery is used for a long time. This may

hint that availability of investment capital is a limiting factor for some NRMM owners/operators.

- Manufacturers and suppliers of NRMM offer limited ranges of new products, with better environmental performance. Therefore owners/operators of NRMM who would like to replace existing machinery with environmentally better machines are faced with limited choices and/or high prices for alternative products. Lack of acceptable choices may force some users to order like-for-like replacements for existing machinery, which may provide a marginal environmental benefit, but not as great as an electric engine, for example. This may hint that the main problem is on the supply side.
- More efficient forms of NRMM or those powered by alternative fuel sources do not deliver sufficient operating cost savings over a whole-life basis, in order to be economically attractive. In this case, even if owners/operators of NRMM would like to switch to cleaner technologies, they cannot make the business case for this type of investment. In particular, we have heard suggestions that ready availability of red diesel – which benefits from a sizeable cost relief compared with diesel in road vehicles – may distort incentives for purchasing cleaner versions of some types of NRMM purchase.
- There is lack of awareness about emissions from NRMM and their impact on air quality and operator health, resulting in lack of demand for lower emission options.

4.5 The government would like to seek evidence about how far respondents recognise these suggestions, and how relevant they are across the NRMM sector. We would welcome evidence, where available, about how far whole life costs factor into investment decisions for new machinery. In particular we would welcome evidence of situations in which purchasers have attempted to replace existing NRMM with environmentally cleaner alternatives, but have not been able to make the business case work. Likewise, we would welcome evidence from manufacturers of cleaner NRMM products that they offer or have considered offering, but for which they think the market is not operating correctly.

Hire companies and users of NRMM, especially those that use red diesel

The government wants to gather views and insights into how NRMM is used, and in particular why NRMM users choose diesel powered machinery.

1 What NRMM do you use/hire currently?

For each type of machinery identified in question 1 please can you provide the answers to the following questions:

2 What is the power source of the machinery (specify fuel type or if electric or hybrid)?

3 Where do you use it? For what purpose is it typically used, and is it used primarily in urban or rural areas?

4 In a typical year, how many litres of red diesel do you use?

5 How many hours do you use red diesel on average over the course of a typical year? Does this change as the machinery gets older?

6 How old is your NRMM?

7 At what age do you replace your NRMM?

8 Do you buy NRMM new, second-hand or lease? Do you have a policy for deciding to replace/upgrade machinery?

9 What are the criteria you use to decide when to replace your machinery? For example, fuel costs, reliability, safety, maintenance costs.

10 Have you considered alternatives and if so, why do you still use red diesel?

11 Have you implemented any operating procedures to minimise the emissions and/or energy usage of your machinery?

12 What other types of equipment will be available to you next time you come to replace your machinery? What technologies are available? Are there any clean technologies e.g. electricity/alternative fuels?

13 What barriers are there for you picking these cleaner technologies?

14 What does the business case look like, on operating costs, between the alternatively fuelled equipment and the red diesel-powered ones

15 If you know your Standard Industrial Classification¹ code, please also provide this. If you don't know your SIC code, please describe the sector in which your business primarily operates.

Manufacturers of machinery and engines

4.6 The government would be interested in views from manufacturers of machines and engines which use red diesel on the following questions:

16 What non-diesel machinery do you sell that could operate in these markets?

17 What cleaner technologies do you have currently?

18 What cleaner technologies are in the pipeline and when will they become available?

19 Do you consider you are faced with commercial pressure to accelerate development of cleaner technologies for these types of machinery? If not, why not?

20 What could accelerate the uptake of cleaner engines?

21 What information do you have on the lifespan of the machinery, red diesel and other engines you currently provide?

22 What information do you have on the cost of lower emission machinery compared with diesel engines?

General information

4.7 The government invites further views from any interested groups. Please submit any evidence that you feel would be valuable. The government is interested in gathering views on the following:

23 The current list of "excepted vehicles" listed in Annex A and whether the definitions are clear enough

24 Opinions and data on the environmental impact of red diesel use, particularly in urban areas where use is more concentrated

¹ <http://resources.companieshouse.gov.uk/sic/>

25 Available options for reducing emissions from NRMM and their cost-effectiveness

26 London has launched a low emission NRMM scheme which sets minimum emission standards for NRMM used in construction, according to location, and HS2 has set minimum emission standards for NRMM used in the project – do you have views on the need for further intervention to reduce emissions from the sector, and what interventions might be effective?

Chapter 5

Next steps

Submitting your responses

- 5.1 Responses are requested by 24 July 2018. The government cannot guarantee that responses received after this date will be considered.
- 5.2 The government invites feedback on the annexes to this document, in addition to the specific questions raised in the consultation document.
- 5.3 Responses can be sent online at:
<https://consult.defra.gov.uk/airquality/non-road-mobile-machinery-and-red-diesel>
- 5.4 They can also be sent by email to
cleanair.consultations@defra.gsi.gov.uk
- 5.5 Alternatively, they can be posted to:

Air Quality and Industrial Emissions Team
Department for Environment, Food and Rural Affairs
Area 2C, Nobel House
17 Smith Square
London
SW1P 3JR

When responding, please state whether you are doing so as an individual or representing the views of an organisation. If you are responding on behalf of an organisation, please make clear who the organisation represents and, where applicable, how the views of members were assembled. In the case of representative bodies, please provide information on the number and nature of people or organisations that the body represents.

Confidentiality

- 5.6 A summary of responses to this consultation will be published on the Government website at: www.gov.uk/defra. The summary will include a list of organisations that responded but not personal names, addresses or other contact details.
- 5.7 Information provided in response to this consultation, including personal information, may be made available to the public on request, in accordance with the requirements of the Freedom of Information Act 2000 (FOIA) and the Environmental Information Regulations 2004 (EIRs). Defra may also publish the responses to the FOIA/EIR requests on www.gov.uk/defra.
- 5.8 If you want your response, including personal information such as your name, that you provide to be treated as confidential, please explain clearly in writing when you provide your response to the consultation why you need to keep these details confidential. If we receive a request for the information under the FOIA or the EIRs we will take full account of your explanation, but we cannot guarantee that confidentiality can be maintained in all circumstances. However, Defra will not permit any unwarranted breach of confidentiality nor will we act in contravention of our obligations under the Data Protection Act 1998 (DPA). An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as a confidentiality request.
- 5.9 Defra will share the information you provide in response to the consultation, including any personal data, with a third party of contracted external analysts for the purposes of response analysis and provision of a report.
- 5.10 Defra is the data controller in respect of any personal data that you provide, and Defra's Personal Information Charter, which gives details of your rights in respect of the handling of your personal data, can be found at:
<https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs/about/personal-information-charter>.

- 5.11 This consultation is being conducted in line with the “Consultation Principles” as set out in the Better Regulation Executive guidance which can be found at:
<https://www.gov.uk/government/publications/consultation-principles-guidance>.
- 5.12 If you have any comments or complaints about the consultation process, please address them to:

Consultation Co-ordinator
8A
8th Floor, Nobel House
17 Smith Square,
London, SW1P 3JR.

Or email: consultation.coordinator@defra.gsi.gov.uk

Annex A

Main categories of NRMM eligible to use red diesel

Table 5.A: Table

NRMM using red diesel
Airport operations includes aircraft tugs, stairs, luggage conveyor belts, etc
Agricultural and horticultural includes tractors, combines, shredders, etc
Construction, incl. plant-and equipment hire – includes rough terrain forklifts, access platforms, welding equipment, air/gas compressors, wheeled loaders, industrial tractors (not for agricultural purposes), cranes, concrete pavers, surfacing equipment, concrete saws, crawler tractors, asphalt pavers, paving equipment, bore/drill rigs, skid-steer loaders, crushing/processing equipment, tracked loaders, graders, scrapers
Forestry includes wood chippers, stump grinders, etc
Ground works contractors – includes backhoe loaders, mini excavators, wheeled excavators, crawler excavators, rigid dump trucks, articulated dump trucks, bulldozers, etc
Haulage – auxiliary power plants, e.g. providing refrigeration, or driving a concrete mixing drum
Portable generators – providing onsite power for outdoor events, street market traders, funfairs, construction sites etc. Please split your response into portable generators 5–100kW, portable generators 100–1000kW and portable generators over 1000kW.
Logistics and freight – ports, rail terminals, other sites handling shipping containers; warehouses, distribution hubs
Machinery installers – e.g. installers of manufacturing plant or electrical turbines
Manufacturing –

when 'works trucks' cart materials around a site

Maritime & inland waterway vessel operators

Property managers and maintainers –

grass mowing and using elevating work platforms

Quarrying and mining

Rail industry –

motive power for freight and passenger trains

Waste handling and recycling

Annex B

Licences, supply chain and international comparisons

Red diesel licences

In exceptional cases, HMRC issues licences to allow use of red diesel as fuel to propel vehicles, including road vehicles.

Such licences are intended for vehicles that have no entitlement to use red diesel. Authority to use red diesel is given only in exceptional circumstances where the vehicle's owner is unable to access or use white diesel and it would be unnecessarily obstructive to refuse the user permission to use red diesel in their vehicle.

Licence holders are required to pay the duty differential between red diesel's rebated rate and the full diesel rate in advance of the fuel being used. This means they must provide HMRC with an estimate of the fuel they will use together with payment for the additional duty. Further payments will be required if the estimate of consumption proves insufficient

The supply chain

Red diesel is supplied to users through a controlled supply chain, where there is oversight of both wholesale and retail suppliers. HMRC approve suppliers under the Registered Dealers in Controlled Oil (RDCO) scheme before they can supply red diesel. Suppliers who only supply fuel in small pre-packaged containers of 20 litres or less do not need to be approved. HMRC will only grant approval where the applicant is assessed as being a fit and proper person to supply controlled oil. Approved suppliers are required to take reasonable steps to make sure that their customer is properly entitled to receive the oil that is being supplied. Under the RDCO scheme suppliers are required to make periodic returns of the controlled oils supplied.

The government is aware in broad terms of which industries are supplied with red diesel but does not collect information from the users themselves. For example, when red diesel is supplied to a construction site that is not connected to mains power, there is no information on the

proportion used in site vehicles such as digging machines and mobile cranes as opposed to that used in generating sets to heat the portable buildings for site staff.

International comparisons

The UK is not unique in offering a tax reduction for fuel marked for use off-road. Examples of other countries that allow the use of such fuel and the circumstances in which it may be used include:

- Republic of Ireland – there is a red diesel equivalent which is referred to as green diesel as the dye used to mark it is green. It can be used for non-road mobile machinery
- Canada – there is ‘coloured fuel’; diesel mixed with a specific dye which is taxed at a lower motor fuel tax rate. This can be used in ships and boats, locomotives, tractors and unlicensed motor vehicles. Industrial machines are also eligible when used off the road. Coloured fuel can also be used to operate an engine separate from that used to power a motor vehicle
- United States – ‘dyed gas’ is available for use in off-road vehicles such as farm tractors, heavy construction equipment and generators. This fuel is not taxed.